UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
AMERGEN ENERGY COMPANY, LLC)
(Oyster Creek Nuclear Generating Station))

Docket No. 50-219-LR

NRC STAFF'S SUPPLEMENTAL BRIEF ON COMMISSION-REFFERED QUESTION

INTRODUCTION

In accordance with the Board's instructions during the September 18, 2008 oral argument in Toms River, New Jersey, the Staff of the U.S. Nuclear Regulatory Commission ("Staff") hereby submits this supplemental brief. For the reasons set forth below and in the Staff's June 11 and June 18, 2008 submissions, the Staff maintains its position that the structural analysis that AmerGen has committed to perform, and that is reflected in the Staff's proposed license condition, matches or bounds the sensitivity analyses that Judge Baratta would impose and that, in any event, no additional analysis is necessary.

BACKGROUND

On December 18, 2007, this Board issued an initial decision resolving Citizens' contention¹ in favor of AmerGen concluding: "AmerGen has demonstrated that the frequency of its planned UT measurements, in combination with other elements of its aging management program [("AMP")], provides reasonable assurance that the sand bed region of the drywell shell

¹ Citizens' contention asserted that, "[i]n light of the uncertain corrosive environment and the correlative uncertain corrosion rate in the sand bed region of the drywell shell, AmerGen's proposed [UT monitoring] plan . . . is insufficient to maintain an adequate safety margin." *AmerGen Energy Company, LLC* (Oyster Creek Nuclear Generating Station), LBP-07-17, 66 NRC 327, 336 (2007).

will maintain the necessary safety margin during the period of extended operation." Oyster

Creek, LBP-07-17, 66 NRC at 330. In so concluding, the Board found the following:

- The factor of safety is greater than 2.0. *Id.* at 343 n.20.
- "AmerGen demonstrated by a preponderance of the evidence that the sand bed region satisfies the acceptance criteria [which are part of CLB]." *Id*. at 345.
- "[T]here will be an available margin of at least 0.064 inch when Oyster Creek enters the renewal period." *Id.*; *see also id.* at 371.
- The external UT measurements are not representative of the overall drywell shell thickness in the sand bed region and do not provide a basis for determining the available buckling margin. *Id.* at 349 n.30.
- The external UT measurements, which are representative of the most severely corroded areas, were then thinned even further (approximately 100 to 200 mils) by the grinding process. *Id.*
- Dr. Hausler's "contour plots are not reliable representations of the drywell shell because they are based upon the exterior UT measurements, which are significantly biased in the thin direction." *Id.*
- AmerGen's compliance with its commitment, and the proposed license condition, to perform a 3-D analysis is not a condition precedent to renewing Oyster Creek's operating license. *Id.* at n.55.

In an "Additional Statement" appended to the Board's initial decision, id. at 373-76,

Judge Baratta stated that he agreed with his brethren's findings of fact, but given the "limited

data set of thickness measurements" he would "impose an additional requirement" to perform a

series of sensitivity studies as part of AmerGen's future 3-D analysis, to provide a "conservative

best estimate of the actual condition of the drywell shell." *Id.* at 376.

On January 14, 2008, Citizens appealed this Board's decision in LBP-07-17.² The Staff

and AmerGen filed answers on January 24, 2008.³ On May 28, 2008, the Commission issued

an order requesting briefs addressing the following:

² Citizens also appealed to the Commission several decisions by this Board denying admission of proposed contentions challenging, among other things, the adequacy of AmerGen's thickness acceptance criteria, the spatial scope of AmerGen's UT monitoring program, AmerGen's method for (continued. . .)

Explain whether the structural analysis AmerGen has committed to perform, and that is reflected in the Staff's proposed license condition, matches or bounds, the sensitivity analyses Judge Baratta would impose. In any event, explain whether additional analysis is necessary.

Oyster Creek, CLI-08-10, 67 NRC (May 28, 2008) (slip op. at 3). The parties filed

initial briefs on June 11, 2008⁴ and reply briefs on June 18, 2008.⁵ On August 21, 2008,

the Commission referred the single specified issue in CLI-08-10 to this Board for

expeditious resolution. See Commission Order (Aug. 21, 2008) (unpublished) at 2

("Commission Order").

On September 18, 2008, this Board held oral argument on the referred issue in

Toms River, NJ. See Memorandum and Order (Scheduling Oral Argument) (Sept. 8,

2008) (unpublished). Prior to the argument, the Board provided a list of topics to be

addressed at oral argument. See Memorandum and Order (Topics for Discussion and

Procedures for Oral Argument) (Sept. 10, 2008) (unpublished).

³ See AmerGen's Answer Opposing Citizens' Petition for Review of LBP-07-17 and the Interlocutory Decisions in the Oyster Creek Proceeding (Jan. 24, 2008); NRC Staff's Answer to Citizens' Petition for Review of LBP-07-17 (Jan. 24, 2008).

⁴ NRC Staff's Brief Responding to the Commission's Order ("Staff Brief") (attaching Affidavit of Hansraj G. Ashar); AmerGen's Initial Brief in Response to CLI-08-10 ("AmerGen Brief") (attaching Affidavit of John F. O'Rourke); Citizens' Response to the Commission's Order ("Citizens' Brief") (attaching three exhibits including Declaration of Dr. Rudolf Hausler (CR 1)).

⁵ NRC Staff's Reply in Response to Citizens' Response to Commission Order Dated May 28, 2008 ("Staff Reply"); AmerGen's Reply to Citizens' Response to CLI-08-10 ("AmerGen Reply"); [Citizens'] Reply to NRC Staff and AmerGen Responses to Commission Order Dated May 28, 2008 ("Citizens' Reply") (attaching Declaration of Dr. Rudolf Hausler (CR 4) and Letter from J. Kirk Brownlee and Richard C. Biel to Richard Webster (June 17, 2008) (CR 5)). It should be noted that Messrs. Brownlee and Biel did not provide statements of professional qualifications, did not testify at hearing, and have not been qualified as experts in this proceeding.

^{(...} continued)

analyzing UT results, and the use of the capacity reduction factor in determining the thickness acceptance criteria. *See* Citizens' Petition for Review of LBP-07-17 and Interlocutory Decisions in the Oyster Creek Proceeding (Jan. 14, 2008) ("Petition") at 17-18.

As requested by the Board in its September 10 Order, AmerGen distributed a diagram explaining Mr. O'Rourke's June 11, 2008 affidavit to the Board and the parties. *See* e-mail from Raphael P. Kuyler, counsel for AmerGen, to Emily Krause, Board law clerk, enclosing AmerGen diagram of base case thicknesses (Sept. 16, 2008). On the same day, Citizens filed "Citizens' Emergency Motion to Amend Reply Pleading and for Other Appropriate Relief" (Citizens' September 16 Motion"). On September 18, 2008, in response to Citizens' Motion, the Board ruled from the bench that each party would have an opportunity to file a supplemental brief. Tr. 916, 1045-47.

DISCUSSION

I. Boundaries of the Commission Order and Status of the Evidentiary Record

The Commission Order did not remand the proceeding, reopen the record, order further evidentiary hearing, or suggest in any way that this Board should reconsider its initial decision.⁶ The record in this proceeding is closed and Citizens' appeals of LBP-07-17 and the Board's interlocutory decisions regarding admissibility of Citizens' other proposed contentions are still pending before the Commission. Tr. 1034, 1039 (J. Abramson). Thus, the Commission's request for additional briefs in CLI-08-10, the Board's oral argument, and these supplemental briefs are not opportunities for Citizens to reargue their appeals or for any party to supplement the evidentiary record.

At oral argument Citizens asserted that this Board has the jurisdiction to take additional testimony and or revisit issues already reviewed and determined. Tr. 928 (citing *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station) et al., CLI-77-10,

⁶ Compare Commission Order with Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), CLI-86-13, 24 NRC 22, 24 (1986) (specifically reversing and remanding for further evidentiary hearing) and Andrew Siemaszko, CLI-06-16, 63 NRC 708, 718-19 (2006) (vacating and remanding licensing board decision for further consideration because decision was "too cursory" and "in other respects in error").

5 NRC 717 (1977) ("CLI-77-10"). The case cited by Citizens, however, is inapposite. In CLI-77-10, the Commission instructed appeal boards to resume show cause (i.e. 10 C.F.R. § 2.206) proceedings⁷ that had been suspended pending promulgation of an interim rule. CLI-77-10, 5 NRC at 717. The Commission stated that the boards could secure the information necessary to act in those proceedings, but noted that in most cases no additional information would be necessary. Id at 717. Here, however, the Commission has not instructed this Board to resume the proceeding or obtain additional information. In a situation much more similar to the one at hand, the Commission remanded a single issue to the Board for clarification before taking action on three pending petitions for review of the Board's decision. Louisiana Energy Serv. (Claiborne Enrichment Ctr.), CLI-97-11, 46 NRC 49 (1997). In providing the requested clarification, the Board stated that it could not properly rely upon evidentiary material submitted after the close of the record in making factual findings. Louisiana Energy Serv. (Claiborne Enrichment Ctr.), 46 NRC 275, 277 n. 1 (1997),⁸ see also Carolina Power and Light Co. (Shearon Harris Nuclear Power Plant, Units 1-4), ALAB-526, 9 NRC 122, 124 n.3 (1979) (stating that on remand, a licensing board may only consider the specific remanded issue). Thus, Citizens' assertion that the Board has jurisdiction to revisit issues beyond the single specified issue in CLI-08-10 is unsupported and their attempts to revisit such matters should not be entertained.9

⁷ See, e.g. Public Serv. Co. of New Hampshire, et al. (Seabrook Station Units 1 & 2), CLI-76-17, 4 NRC 451 (1976)(granting motion to suspend construction permits for the Seabrook station in light of a Commission policy statement on the environmental effects of the uranium fuel cycle).

⁸ In granting a subsequent motion by Louisiana Energy Services to withdraw its application and terminate the proceeding, the Commission vacated the Board's decision but stated: "Our decision to vacate the Board orders 'does not intimate any opinion on their soundness." *Louisiana Energy Serv.* (Claiborne Enrichment Ctr.), CLI-98-5, 47 NRC 113, 114 (1998).

⁹ See, e.g., AmerGen Reply at 3-5 (listing Citizens' attempts to resurrect arguments considered and rejected by this Board and the ACRS).

II. <u>Staff Review of the Planned 3-D Finite Element Analysis</u>

Neither the Staff's nor this Board's finding of reasonable assurance that the structural integrity of the drywell shell will be maintained during the period of extended operation is predicated on AmerGen's performance of a 3-D structural analysis. *Oyster Creek*, LBP-07-17, 66 NRC at 330, 367 n.55, 371; Staff Initial Brief at 3; Tr. 1002 (J. Abramson). The 3-D analysis AmerGen plans to perform is not part of AmerGen's AMP for the drywell shell, and it is the AMP, not the future 3-D analysis, that provides reasonable assurance. *Oyster Creek*, LBP-07-17, 66 NRC at 330, 371. The GE analysis (which forms the basis for AmerGen's AMP), not the future 3-D analysis, is and will remain Oyster Creek's CLB absent a request to amend it. *See id.* at 342-45 & n.55. Nevertheless, the Staff plans to review, in accordance with Inspection Procedure 71003, the summary of the 3-D analysis that AmerGen has agreed to provide. This detailed summary will describe the methodology, input assumptions, modeling approach, and overall conclusions in detail sufficient for the Staff to determine whether the analysis is consistent with applicable codes and standards and to ensure that the CLB remains conservative.¹⁰ If the Staff has questions or concerns, the Staff will audit the underlying calculations in order to make these determinations.

III. <u>Regulations Require AmerGen to Meet the</u> <u>Acceptance Criteria Formed by the CLB Analysis, Not to Precisely Quantify Margin</u>

In arguing that AmerGen's planned analysis will not meet Judge Baratta's requirements and that more analysis is needed, Citizens allege that the "margin is unknown" (referring to the

- 6 -

¹⁰ AmerGen represented that the summary will be hundreds of pages, including figures, diagrams, and data, such that a knowledgeable structural engineer could view it with an independent eye. Tr. 1026-27. AmerGen also represented that the summary will not contain proprietary information. Tr. 1034. If this is the case, the Staff will make the entire summary available to the public. However, it is the Staff's understanding that some aspects (i.e., design input information) of the entire analysis (as opposed to the summary) may be proprietary.

margin by which the factor of safety exceeds 2.0)¹¹ and that this margin must be known in order for AmerGen to develop an effective AMP (i.e. to determine the frequency of UT inspections). In LBP-07-17, however, this Board found that although the precise factor of safety is not known, it is greater than 2.0 because the average thickness of the drywell shell is "substantially greater than 0.736 inch" (i.e. generalized corrosion has not thinned the entire drywell shell in the sand bed region to 0.736 inch). *Id.* at 343 n.20. While Citizens may disagree with this finding, unless and until the Commission finds it is not supported by the record, Citizens' assertions do not demonstrate that additional analysis is needed to develop an adequate AMP.¹² Furthermore, Citizens have provided no regulatory basis for their assertion that the precise factor of safety must be quantified. Part 54 requires that AmerGen establish an AMP that is adequate to provide reasonable assurance that the intended functions of Oyster Creek's drywell shell will be maintained in accordance with the CLB during the period of extended operation. *See* 10 C.F.R. §§ 54.21, 54.29. Thus, the regulations require only reasonable assurance that the drywell shell complies with the CLB, not an exact determination of the margin by which it exceeds the CLB.

IV. <u>Citizens Assertions Regarding AmerGen's Planned Analysis are Not Credible</u>

In asserting that AmerGen's planned 3-D analysis will not address Judge Baratta's concerns, and that more analysis is needed, Citizens alleged several inadequacies in AmerGen's proposed analysis, none of which is credible. First, Citizens argued that AmerGen's base case does not adequately consider the external UT measurements, which, in Citizens'

- 7 -

¹¹ This should not be confused with the margin above the thickness acceptance criteria from general buckling, which the Board found to be 0.064 inch. *See Oyster Creek*, LBP-07-17, 66 NRC at 348 & n.27.

¹² Citizens' argument that more data is needed, Tr. 1004-05, 1022, is an attempt to revive a contention that was not admitted by this Board. *AmerGen Energy Company, LLC* (Oyster Creek Nuclear Generating Station), LBP-06-22, 64 NRC 229, 249-51 (2006). *See also* Petition at 17-18 (appealing Board decision in LBP-06-22). Moreover, Judge Baratta's Additional Statement does not suggest that more measurements or new measurement techniques are needed and the Commission's question did not ask if more data or new measurement techniques are needed.

view, are more representative of the remaining thickness than the internal measurements. Tr. 982, 1004. This assertion challenges a specific Board finding and substantial evidence in the evidentiary record, including evidence presented by Citizens' expert and observations of individuals who have actually inspected the drywell shell. *Oyster Creek*, LBP-07-17, 66 NRC at 348, 349 n.30, AmerGen Exh. C, Part. 3 at A.42; Citizens Exh. 12 at 4; Tr. 555 (Tamburro), 560 (O'Hara). This Board also found that the grid locations for internal measurements of the drywell shell were selected after taking over 1000 UT measurements to identify the thinnest areas in each bay; that these grids are located at the elevation where the observed corrosion was most concentrated; and that future corrosion, if it occurs, will occur at the bottom of the sand bed region, where the margin is 0.229 inch. *Oyster Creek*, LBP-07-17, 66 NRC at 346, 368; AmerGen Exh. 3 at 5-1.

Second, Citizens asserted that the planned analysis will not adequately consider individual thin points. Tr. 990, 1000. As Judge Baratta noted, however, Citizen's assertion is contradicted by the testimony of Dr. Hardayal S. Mehta that variations in properties over areas smaller than the square root of radius over thickness will not materially affect the results.¹³ Tr. 990-992 and 1000 (Baratta) (citing Tr. 476 (Mehta)).

Third, Citizens argued that AmerGen has not explicitly accounted for uncertainty in its 3-D analysis. Judge Baratta questioned Citizens' argument, quoting from Citizens own exhibit, CR 4. Tr. 996-97.

Fourth, Citizens asserted that AmerGen's base case is not realistic because it uses data from non-adjacent bays and does not show the bathtub ring all the way around the drywell shell. Tr. 994-95. The assertion that AmerGen is improperly using data from non-adjacent bays lacks

- 8 -

¹³ For the drywell shell at Oyster Creek, the buckling safety factor would not be materially altered if there are fluctuations in thickness over a distance smaller than 18 inches. Tr. 476-77 (Mehta). Citizens' non-structural engineer witness did not dispute this. Tr. 479 (Hausler).

merit, because, as Judge Baratta noted, AmerGen is not relying strictly on thickness measurements but also on visual inspection. Tr. 994. The assertion that the bathtub ring goes all the way around the drywell shell is not supported by the inspection results, which show that some bays have little corrosion. *Oyster Creek*, LBP-07-17, 66 NRC at 333; AmerGen Exh. 16.

Fifth, Citizens assert that, based on the Sandia analysis, the capacity reduction factor ("CRF") AmerGen plans to use is too high and results in "double counting" of hoop stress. Tr. 995. The Staff's position is that a modified CRF is acceptable for evaluation of Oyster Creek's drywell shell.¹⁴ See Staff Exh. 1 at 4-72. Although Sandia did not use a modified CRF, Sandia took no position on GE's use of a modified CRF. See Letter From P.T. Kuo, NRC, to Frank Gillespie, ACRS, Re: ACRS Review of Oyster Creek LRA (Mar. 8, 2008) (ADAMS Accession No. ML070650376) at 2. The GE analysis is the CLB and cannot be challenged in this proceeding. *Oyster Creek*, LBP-07-17, 66 NRC 339, 342-345.

Finally, the only support¹⁵ Citizens provided for its assertions that AmerGen's planned 3-D analysis will not address Judge Baratta's concerns and that additional analysis is needed comes from Dr. Hausler, who is not a structural engineer. Tr. 986-89; *Oyster Creek*, LBP-07-17, 66 NRC at 345.

IV. AmerGen's Base Case Diagram is Based on Record Material

Citizens assertion that AmerGen's base case diagram is not based on "record material" and that they were caught unawares by the inclusion of five locally thinned areas in the base

¹⁴ ASME Code Case N-284 provides that higher values of capacity reduction factor may be acceptable to account for the beneficial effects of tensile hoop stresses. The derivations of a modified CRF were based on research performed by Dr. Clarence Miller, which he presented at the ACRS Meeting on January 19, 2007. See AmerGen Exh. 41 at 22-28

¹⁵ The "opinion" of Richard C. Biel and J. Kirk Brownlee (CR 5) attached to Citizens' Reply Brief does not address the Commission's question, i.e. whether Judge Baratta's concerns are addressed. Rather it describes the limitations of the GE analysis, makes a tentative statement about Sandia's decision not to use the enhanced capacity reduction factor, and suggests use of laser-generated "point clouds" to model the drywell shell. CR 5 at 2, 4.

case for the 3-D model is not credible. September 16 Motion; Tr. 1013-14. First, ¶ 15 of Mr. O'Rourke's affidavit clearly states that five locally thinned areas were included in the base case. Second, it is perfectly reasonable to expect parties to be familiar with the evidentiary record such that they will recognize when material taken directly from hearing exhibits (in this case Citizens' own exhibits 45¹⁶ and 46) is repeated in slightly different form. Third, Citizens have provided no authority requiring affidavits to provide precise citations to the record.¹⁷ Finally, Citizens explicitly cited their Exhibit 45, which contains figures of the five locally thinned areas, in their June 18, 2008 Reply Brief at 3. Thus, Citizens' assertions are simply not credible.

CONCLUSION

For the reasons explained above, AmerGen's planned 3-D structural analysis addresses Judge Baratta's concerns, no additional analysis is needed, and Citizens have failed to proffer credible evidence to the contrary.

Respectfully submitted,

/RA/

Mary C. Baty Marcia J. Simon Counsel for NRC Staff

Dated at Rockville, Maryland this 1st day of October 2008

¹⁶ Citizens' Exh. 45, AmerGen Technical Evaluation 330592-27-27 (Apr. 20, 2007), explicitly states that the information it contains will be provided to Structural Integrity Associates to perform the realistic 3-D analysis. On page 6 of 12, there is a table for the base case analysis and a note that locally thin areas shall be modeled per attachment 1, which contains diagram of five locally thinned areas.

¹⁷ Furthermore, Citizens' expert, Dr. Hausler, failed to provide citations for his sources. In CR 4 at 2 of 7, Dr. Hausler asserts that "the relationship between the internal grid reference and the external reference was revealed" at hearing without citing any exhibit or the transcript. He then depicts the purported relationship in figures 3-11, and 13. Inexplicably, Dr. Hausler's depiction of this relationship conflicts with AmerGen's depictions in AmerGen Exh. 28 and 40 at 101.

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CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S SUPPLEMENTAL BRIEF ON COMMISSION-REFFERED QUESTION" in the above-captioned proceeding have been served on the following by electronic mail with copies by deposit in the NRC's internal mail system or, as indicated by an asterisk, by electronic mail, with copies by U.S. mail, first class, this 1st day of October 2008.

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