

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

Before Administrative Judges:

E. Roy Hawkens, Chairman  
Dr. Paul B. Abramson  
Dr. Anthony J. Baratta

In the Matter of  AMERGEN ENERGY COMPANY, LLC  (License Renewal for Oyster Creek Nuclear Generating Station)
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Docket No. 50-0219-LR  
ASLBP No. 06-844-01-LR  
August 9, 2007

**MEMORANDUM AND ORDER**  
(Ruling on Motions in Limine and  
Motion for Clarification)

On July 27, 2007, the Licensing Board in the above-captioned proceeding received three motions in limine – one each from AmerGen Energy Company, LLC (“AmerGen”), Intervenors (six organizations hereinafter referred to collectively as Citizens<sup>1</sup>), and the NRC Staff – and a motion for clarification submitted by Citizens, regarding the initial written statements of position and prefiled testimony filed on July 20, 2007.<sup>2</sup> For the reasons set forth below, this Board (1) grants in part and denies in part AmerGen’s and the NRC Staff’s motions in limine, (2) denies Citizens’ motion in limine, (3) provides the clarification requested by Citizens, and (4) poses

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<sup>1</sup> The six organizations are Nuclear Information and Resource Service, Jersey Shore Nuclear Watch, Inc., Grandmothers, Mothers and More for Energy Safety, New Jersey Public Interest Research Group, New Jersey Sierra Club, and New Jersey Environmental Federation.

<sup>2</sup> See AmerGen’s Motion in Limine to Exclude Portions of Citizens’ Initial Written Submission (July 27, 2007) [hereinafter AmerGen Motion]; Citizens’ Motion for Clarification and Motion in Limine (July 27, 2007) [hereinafter Citizens Motion]; NRC Staff Motion in Limine Regarding Citizens’ Presentation on Drywell Contention (July 27, 2007) [hereinafter NRC Staff Motion].

questions for the parties to address in their written response and rebuttal testimony to be filed on August 17.

**A. AmerGen And The NRC Staff Motions In Limine To Exclude Portions Of Citizens' Written Submission**

AmerGen and the NRC Staff assert that portions of Citizens' written initial statement, Dr. Hausler's prefiled direct testimony, and certain prefiled exhibits, should be excluded from the evidentiary record.<sup>3</sup> Citizens oppose both motions. See Citizens' Opposition to AmerGen and NRC Motions in Limine (Aug. 1, 2007) [hereinafter Citizens Answer]. Licensing Boards are accustomed to weighing evidence, including expert testimony, and determining its relevance to the issues presented. In the instant case, we conclude that AmerGen and the NRC Staff have identified some material that is not relevant. This Board will refrain from actually expunging the irrelevant material from the record. Rather, to the extent we conclude that material is irrelevant or otherwise inadmissible, we will accord it no weight in making our determination as to whether the frequency of AmerGen's ultrasonic testing ("UT") program is sufficient to maintain adequate safety margins during the period of extended operation. See Licensing Board Memorandum and Order (Denying AmerGen's Motion for Summary Disposition) at 6 n.9 (June 19, 2007) (unpublished).

**1. Admission of Prefiled Direct Testimony of Dr. Rudolf H. Hausler**

AmerGen asks the Board to strike those portions of Dr. Hausler's prefiled testimony that relate to the statistical treatment of UT data collected by AmerGen, on the basis that "[the Board] has not accepted [Dr. Hausler] as an expert in statistical analyses" (AmerGen Motion at 4). Additionally, both AmerGen and the NRC Staff contend that Dr. Hausler "is unqualified to

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<sup>3</sup> Because the arguments raised by the NRC Staff are in large measure the same as those raised by AmerGen, we address the arguments raised by both parties under the general categorical headings used in AmerGen's motion.

provide expert opinions regarding the application, performance, and expected life span of the epoxy coating system,” because his “experience, education, and expertise appear to be confined to chemical corrosion inhibitors – not coatings” (ibid.; see also NRC Staff Motion at 7). Finally, the NRC Staff asserts that the Board should exclude Dr. Hausler’s testimony regarding the acceptability of AmerGen’s acceptance criteria, because “Citizens have not demonstrated that [he] is an expert in structural mechanics or [American Society of Mechanical Engineers (“ASME”)] Code Section III” (NRC Staff Motion at 6).

Based on Dr. Hausler’s knowledge, experience, and education – as set forth in Attachment 1 to the Pre-Filed Direct Testimony of Dr. Rudolf H. Hausler (July 20, 2007) [hereinafter Hausler Testimony] and the attachments to Citizens Answer – we conclude that Dr. Hausler’s opinions may assist the Board in understanding Citizens’ arguments and evidence on the matters properly at issue in this proceeding. See LBP-06-7, 63 NRC 188, 220 n.33 (2006). We thus deny the request to strike portions of Dr. Hausler’s prefiled testimony based on his alleged lack of expertise.

## **2. Citizens’ Testimony Regarding AmerGen’s Statistical Analyses**

AmerGen and the NRC Staff assert that Citizens’ initial statement and Dr. Hausler’s prefiled testimony impermissibly challenge AmerGen’s statistical analyses by proposing alternative approaches for estimating the mean thickness for the sand bed region. Both parties contend that because AmerGen “does not use the external data to determine margin to the buckling criteria for the purposes of license renewal” – rather it uses UT data from internal grids – Citizens’ suggestion that AmerGen incorporate into their analysis recent UT measurements from the outside of the vessel is an impermissible attempt to apply additional uncertainties to AmerGen’s analysis (AmerGen Motion at 5; see also NRC Staff Motion at 5). In addition, AmerGen asserts that Dr. Hausler’s “contour plots” in Attachment 4 to his testimony and in Exhibit 13 “also represent an impermissible ‘alternative approach’” (AmerGen Motion at 5).

As we stated in our July 11, 2007 Memorandum and Order (Clarifying Memorandum and Order Denying AmerGen's Motion for Summary Disposition) (unpublished) [hereinafter July 11 Order], "it is open to Citizens to argue that AmerGen has not been consistent in applying [its] Statistical Analysis and, accordingly, that AmerGen's asserted corrosion rate is suspect" (July 11 Order at 4). Accordingly, we will not exclude from consideration those portions of Citizens' written statement and testimony that address themselves to the manner in which AmerGen has applied its statistical analysis. See, e.g., Citizens' Initial Statement Regarding Relicensing of Oyster Creek Nuclear Generating Station at 4, 11, 14, 19 (July 20, 2007) [hereinafter Citizens Initial Statement] (discussing AmerGen's use of the 95% confidence level and standard deviation in applying its statistical analysis); Citizens Answer at 6 (alleging AmerGen "has been inconsistent in its selection of inputs"). Nor do we accept AmerGen's assertion that Dr. Hausler is prohibited from organizing and displaying AmerGen's data through the use of contour plots. See Hausler Testimony, Att. 4, at 18-23 (Figs. 2-7); Citizens Answer at 6-7.

AmerGen and the NRC Staff are correct, however, that Citizens may not propose the use of additional data points from outside the vessel as an alternative means for estimating the thickness of the drywell shell. Nor may Citizens argue that AmerGen's inputs are not sufficiently accurate (Citizens Answer at 5, 6). The Board will accord such arguments no weight in determining the acceptability of AmerGen's proposed UT monitoring program.

**3. Citizens' Testimony Regarding Corrosive Conditions on the Interior of the Sand Bed Region of the Drywell Shell**

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AmerGen and the NRC Staff ask the Board to exclude those portions of Citizens' initial statement and Dr. Hausler's testimony that discuss corrosive conditions on the interior of the drywell shell, because this Board previously rejected a proposed contention related to the embedded interior surface of the shell. See AmerGen Motion at 6 (citing Licensing Board Memorandum and Order (Denying Citizens' Motion for Leave to Add Contentions and Motion to

Add Contention) at 11-12 (Feb. 9, 2007) (unpublished) [hereinafter February 9 Order]); NRC Staff Motion at 5-6.

Although the Board is mindful of its prior ruling,<sup>4</sup> the critical issue before us is whether AmerGen's UT monitoring program is sufficient to maintain an adequate safety margin. This determination must be based on the overall corrosion rate of the drywell shell, both interior and exterior. To the extent Citizens advance relevant arguments and evidence regarding interior corrosion, the Board will accord them whatever weight they merit.<sup>5</sup>

#### **4. Citizens' Testimony Regarding the Local Buckling Acceptance Criteria**

AmerGen and the NRC Staff assert that Citizens' allegation that AmerGen's acceptance criteria "do[] not satisfy ASME Code requirements . . . is an impermissible challenge to the derivation of the acceptance criteria, and to [the Oyster Creek Current Licensing Basis]" (AmerGen Motion at 7; see also NRC Staff Motion at 5, 6).

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<sup>4</sup> We note that AmerGen mischaracterizes our February 9 Order as "stat[ing] that 'significant corrosion has not occurred, and will not occur, on any portion of the interior side of the embedded shell in the lower sand bed region'" (AmerGen Motion at 6 (quoting February 9 Order at 11)). To be clear, in our February 9 Order we stated that "*AmerGen concluded* that significant corrosion has not occurred and will not occur, on any portion of the interior side of the embedded shell in the lower sand bed region," and that Citizens – for purposes of satisfying the *contention-admissibility criteria* – "fail[ed] to provide any credible facts or arguments that place *AmerGen's conclusion* in genuine dispute" (February 9 Order at 11-12 (emphasis added)). Our February 9 Order thus dealt with the admissibility vel non of Citizens' newly proffered contention. We made no determination as to the corrosion rate on the interior side of the embedded shell in the lower sand bed region, nor did we evince any intent to bar Citizens from seeking to introduce relevant factual evidence in support of their admitted contention.

<sup>5</sup> The Board will not, however, entertain an argument that, due to the potential for interior corrosion, AmerGen must expand the scope of its UT monitoring program to include locations on the interior side of the drywell shell. Such an argument is beyond the scope of this proceeding. See infra p. 6.

We agree. Although Citizens are free to argue that AmerGen has failed to apply the acceptance criteria in a consistent manner,<sup>6</sup> Citizens may not challenge the derivation of the acceptance criteria, or how the criteria are applied during the current licensing term.<sup>7</sup>

**5. Citizens' Testimony Regarding the Scope of UT**

AmerGen and the NRC Staff seek to strike Citizens' allegedly "impermissible references to alleged inadequacies in the scope of AmerGen's UT monitoring program" (AmerGen Motion at 7; see also NRC Staff Motion at 5). Additionally, AmerGen repeats its request that the Board exclude Dr. Hausler's use of contour plots, which allegedly "attempt to demonstrate that additional UT measurement locations are needed" (AmerGen Motion at 7).

The Board agrees that arguments challenging the spatial scope of AmerGen's UT program are not litigable in this proceeding (see LBP-06-22, 64 NRC 229, 249-51 (2006); supra p. 4) and, accordingly, we will give no weight to such arguments. We do not agree, however, that Dr. Hausler is prohibited from using contour plots as a means of organizing and displaying data obtained by AmerGen (see supra p. 4).

**6. Citizens' Testimony Regarding Real-Time Corrosion Monitoring**

AmerGen and the NRC Staff state that Citizens' assertion that there is "no reason why [real-time corrosion monitoring] could not be taken to monitor . . . corrosion of the drywell shell" (Citizens Initial Statement at 4 n.1) is a "direct challenge to the *use*, as opposed to the *frequency* of UT, and as such is clearly outside the scope of the proceeding" (AmerGen Motion at 8; see also NRC Staff Motion at 5).

We agree. Because the scope of the admitted contention does not extend beyond a challenge to the frequency of AmerGen's UT monitoring program, Citizens are foreclosed from

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<sup>6</sup> See, e.g., Citizens Initial Statement at 6-8, 29.

<sup>7</sup> See, e.g., id. at 9, 31.

arguing that AmerGen's UT monitoring program must be supplemented with, or replaced by, a real-time corrosion monitoring program. Such arguments are not relevant to the admitted contention and will be accorded no weight.

**7. Citizens' Speculative Statements**

AmerGen contends that Citizens and Dr. Hausler "offer a variety of statements of fact that are unsupported by citations to any document or other basis, or that are simple speculation," and it asks the Board to strike such statements from the record (AmerGen Motion at 8). AmerGen states generally that Dr. Hausler's testimony includes "guesses and suggestions" that should be deemed unreliable (*ibid.* (internal quotation marks omitted)). Similarly, the NRC Staff contends that Citizens' statements regarding corrosion under the epoxy coating are speculative (NRC Staff Motion at 6).<sup>8</sup>

We reject AmerGen's and the NRC Staff's characterization of Citizens' initial statement and Dr. Hausler's testimony. We will consider any such statements in the context in which they are offered and accord them whatever weight they merit.

**8. Attachments to Dr. Hausler's Testimony**

AmerGen asks the Board to exclude from the record Attachments 3, 4, and 5 to Dr. Hausler's prefiled testimony on the ground that "general practice relative to prefiled testimony is that, other than resumes or curriculum vitae regarding the witness, attachments are not to be used with the testimony in lieu of exhibits" (AmerGen Motion at 9). Additionally, The NRC Staff requests that Attachment 5 be excluded "as argument of counsel or unduly repetitious" (NRC Staff Motion at 7).

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<sup>8</sup> To the extent the NRC Staff also argues that Citizens are impermissibly challenging AmerGen's epoxy coating monitoring program, we disagree. We do not perceive Citizens' arguments regarding potential corrosion under the epoxy coating to be a challenge to AmerGen's monitoring program. See, e.g., Citizens Initial Statement at 20.

The Board considers the attachments to Dr. Hausler's testimony to be intertwined with Citizens' initial statement, and we will accord them the weight they merit. Moreover, Citizens are not precluded, if they wish to do so, from resubmitting any attachment to Dr. Hausler's testimony as a separate exhibit.<sup>9</sup>

**B. Citizens' Motion For Clarification And Motion In Limine**

Citizens request clarification as to (1) whether the NRC Staff's testimony regarding the analysis of the drywell shell carried out by Sandia National Laboratories ("Sandia Study") is within the scope of this proceeding, and (2) whether Citizens may respond to the NRC Staff's reliance on the Sandia Study. See Citizens Motion at 2 (citing NRC Staff Testimony of Hansraj G. Ashar, Dr. James A. Davis, Dr. Mark Hartzman and Timothy J. O'Hara Concerning Drywell Contention at 11-12 (July 20, 2007)); see also NRC Staff Initial Statement of Position on the Drywell Contention at 15 (July 20, 2007) [hereinafter NRC Staff Initial Statement]. Additionally, Citizens move to strike certain portions of AmerGen's and the NRC Staff's prefiled testimony on the ground that "the level of detail is insufficient to allow [Citizens] to know which analyses and data support the testimony" (Citizens Motion at 3).<sup>10</sup> Both AmerGen and the NRC Staff oppose Citizens' Motion. See AmerGen's Answer to Citizens' Motion for Clarification and Motion in Limine and Answer to the Staff's Motion in Limine (Aug. 1, 2007); NRC Staff Answer to Citizens' Motion for Clarification and Motion in Limine (Aug. 1, 2007).

With respect to Citizens' request for clarification, we answer both questions in the affirmative. First, to the extent a party wishes to rely on evidence that tends to support an

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<sup>9</sup> We view AmerGen's attack on Citizens' attachments based on their allegedly inappropriate labels as a hyper-formalistic argument that seeks to elevate form over substance. We strongly discourage the employment of similar arguments in any future motions.

<sup>10</sup> Alternatively, Citizens request that AmerGen and the NRC Staff be directed to provide the required support and that Citizens be provided an opportunity to respond (Citizens Motion at 3-4).

argument on an issue within the scope of the admitted contention, it may do so. The NRC Staff is not precluded from attempting to use the Sandia Study for that purpose; however, it bears the burden of demonstrating the Study's relevance to the issues before the Board. Second, if Citizens disagree with the NRC Staff's characterization of the conclusions reached in the Sandia Study, it may so indicate in its rebuttal. Such expression of disagreement is not outside the scope of this proceeding, but seeks to inform the Board regarding the weight to be accorded, if any, to a particular piece of evidence. Citizens' response in this circumstance must be tailored to its purpose, which is to challenge the probative value of the NRC Staff's evidence. The NRC Staff will have an opportunity to rebut Citizens' response, if it wishes.

Citizens' motion in limine is denied. The Board does not find the arguments presented by either AmerGen or the NRC Staff to be so lacking in support as to deprive Citizens of a fair opportunity to respond. Citizens may, in their rebuttal testimony, challenge the adequacy of the level of detail provided by AmerGen and the NRC Staff in support of an assertion that their arguments should not be accorded significant weight. AmerGen and the NRC Staff, in turn, may elect to supplement the level of detail they initially provided in an effort to deflect a challenge to the weight of their evidence. Citizens will be permitted to respond to any additional details in their sur-rebuttal testimony.

**C. Questions To Be Addressed In Written Response And Rebuttal Testimony**

The Board directs the parties to include answers to the following questions in their written responses (which are due August 17, 2007), and that each response be supported by expert testimony.

1. Define as used in the presented statistical analyses (a) population mean, (b) population variance, (c) sample mean, and (d) sample variance.
2. Explain the relationship between (a) population mean and sample mean, and (b) population variance and sample variance.

3. Define “confidence” as used in the analysis of the thickness data in AmerGen’s prefiled Exhibit 20, Calculation No. C-1302-187-E310-041, Statistical Analysis of Drywell Vessel Sand-bed Thickness Data 1992, 1994, 1996, and 2006.
4. Discuss confidence interval and how the interval relates to the sample and population means and variances.
5. What is the students “t distribution” and what is its significance relative to estimation of the mean thickness?
6. What is the “F statistic” used in the regression model of corrosion and its significance relative to the corrosion data?
7. The SER lists ten sources of systematic error (SER at 4-53 to 4-55), but AmerGen’s direct testimony does not appear to discuss all ten sources (AmerGen’s Prefiled Direct Testimony Part 3, Available Margin at 21-23). Estimates and explanations for the all ten sources should be provided, or, if they are insignificant, it should be so stated.
8. Explain in greater detail how systematic error is accounted for in estimating the thickness and corrosion rate.
9. AmerGen’s prefiled Exhibit 20 provides a statistical analysis of all the data obtained to date. AmerGen shall provide the Board with a table that summarizes the data contained in this exhibit. The table shall be arranged as follows:

LOCATION	MEAN THICKNESS (DATE) (1992, 1992, 1996, and 2006) for all locations where available)	95% CONFIDENCE INTERVAL

10. This Board understands that UT thickness measurements are commonly used to determine pipe wall thickness and plate thickness in other industries (see, e.g., Attachment to Citizens Answer (Selected Papers by Dr. Hausler)). To enhance the Board’s general understanding and thereby enable it to make a more informed decision, the parties should discuss other applications of UT thickness measurement and identify the best practices recommended by National Association of Corrosion Engineers or other professional organizations, if any, with particular attention to the determination of the thicknesses of corroded plates and the rate of corrosion. The discussion should include use of mean versus extreme value statistics and the Analysis of Variance used in these cases.

11. One criterion for issuance of the renewal license is that the Commission must find that there is “reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the [current licensing basis]” (10 C.F.R. § 54.29(a)). In the NRC Staff’s prefiled testimony, it explains that the objective of the GE analyses performed in 1991-1992 was “to provide reasonable assurances that the structural integrity of the as-built

shell would be maintained under refueling conditions, by showing that the stresses do not exceed ASME Section III Subsection NE limits” (NRC Staff Initial Statement at 14).

- (a) The parties shall describe in detail how the term “reasonable assurance” has been defined and applied in the instant case. They shall also explain whether the NRC has a practice or policy for applying the “reasonable assurance” standard in cases where there are measurements of a particular physical condition that vary over a particular component or system and, therefore, must be statistically interpreted. In particular, the parties shall address whether a mean or average has been traditionally used by the NRC to determine “reasonable assurance,” and whether a mean or average was used in the instant case. If neither is used, what criteria has been (and, in the instant case, is) actually applied.<sup>11</sup>

12. It is the Board’s understanding that the original GE analysis of the response of the drywell shell to loads that might lead to buckling failure employed a model that broke the shell into “elements” of certain discrete sizes and shapes over which physical properties (such as shell thickness) are averaged. Assuming the Board’s understanding is correct (if the Board’s understanding is incorrect, the parties should so state):

- (a) The parties shall describe the sizes and shapes of those elements.
- (b) They shall indicate whether the average properties used in any of those elements would be different if the corrosion pattern had been as described by the contour plots proposed by Dr. Hausler (see Hausler Testimony, Att. 4), and if so, the magnitude of those differences.
- (c) They shall indicate the source and sizes of the conservatisms built into the original properties used for those elements and whether any of those conservatisms would be reduced if the elements’ properties were computed based on the pattern of corrosion indicated by the contour plots rather than those used by AmerGen.
- (d) If the elements’ properties would be affected by the contour of corrosion as depicted by the contour plots, assuming the contour plots presented by Dr Hausler are accurate (and if they are not, so state), how should the existing

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<sup>11</sup> In our July 11 Order, the Board made reference to the 95% confidence level used by AmerGen. The parties should not assume the Board adopted the 95% confidence or use of the lower bound as strict criterion for purposes of defining reasonable assurance. Rather, the reference was made to provide the parties with an illustrative example.

buckling failure criteria be applied to the indicated extent of sub-threshold area in those bays?

- (e) Because Oyster Creek's current licensing basis ("CLB") is based on the GE methodology and explicit elementization of the model for the drywell shell (see Licensing Board Memorandum and Order (Denying Citizens' Motion for Leave to Add a Contention) at 3 n.6 (Apr. 10, 2007) (unpublished)), discuss whether consideration of a different modeling or elementization would constitute, under NRC regulations, a challenge to the CLB.

**D. Conclusion**

For the foregoing reasons, we: (1) grant in part and deny in part AmerGen's and the NRC Staff's motions in limine (supra Part A); (2) provide the clarification requested by Citizens, and deny their motion in limine (supra Part B); and (3) direct the parties to answer the Board's questions in their written responses, and that each answer be supported by expert testimony (supra Part C).

It is so ORDERED.

THE ATOMIC SAFETY  
AND LICENSING BOARD<sup>12</sup>

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E. Roy Hawkens, Chairman  
ADMINISTRATIVE JUDGE

*/RA/*

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Dr. Paul B. Abramson  
ADMINISTRATIVE JUDGE

*/RA/*

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Dr. Anthony J. Baratta  
ADMINISTRATIVE JUDGE

Rockville, Maryland

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<sup>12</sup> Copies of this Memorandum and Order were sent this date by Internet e-mail to counsel for: (1) AmerGen; (2) Citizens; (3) the NRC Staff; and (4) New Jersey.

August 9, 2007