

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
OFFICE OF THE SECRETARY

ATOMIC SAFETY AND LICENSING BOARD

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

In the Matter of)	
)	July 25, 2006
AMERGEN ENERGY COMPANY, LLC)	
)	Docket No. 50-0219-LR
(License Renewal for the Oyster Creek)	
Nuclear Generating Station))	

SUPPLEMENT TO PETITION TO ADD A NEW CONTENTION

PRELIMINARY STATEMENT

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 (collectively "Citizens" or "Petitioners") submit this Supplement to their Petition of June 23, 2006 at the invitation of the Atomic Safety and Licensing Board ("ASLB" or "Board") in its decision of July 5, 2006 in this proceeding. In accordance with that decision, Citizens now seek to supplement their contention so that it fully addresses the new information provided by AmerGen Energy Co. LLC ("AmerGen") in their commitment letter of June 20, 2006. Citizens therefore set forth modifications to their contention, explain how those modifications satisfy the legal requirements, and provide additional bases for an allegation in the contention about which AmerGen provided

material new information. The modified contention challenges the adequacy of the latest version of AmerGen's aging management program for the severely corroded steel drywell shell.

In a nutshell, AmerGen is putting the cart before the horse. It is trying to design an adequate monitoring regime before it has established what margins of safety currently exist, what areas it needs to measure, how often it needs to measure them, and what accuracy is required to maintain the safety margins. Thus, the current monitoring scheme is based on an *ad hoc* rather than a systematic approach to the problem. All of these issues could be resolved by taking comprehensive measurements, using sophisticated modeling to determine the existing safety margins, deriving adequate acceptance criteria, and then designing the ongoing monitoring to ensure that those criteria are maintained. Moreover, even if AmerGen's current criteria were deemed adequate, it has failed to systematically ensure that the current scheme matches with the current acceptance criteria. In particular, the current scheme monitors an insufficient area of the drywell shell, fails to take full account of how quickly corrosion could cause the acceptance criteria to be violated, and fails to deal with the inherent uncertainties in the results of the monitoring.

Thus, the aging management regime for the sandbed region of the drywell shell is currently an inadequate mixture of UT measurements in very limited areas, monitoring for corrosive conditions in a non-systematic manner, and responses timed for convenience rather than safety. AmerGen cannot produce an adequate aging management program through *ad hoc* revisions to an outdated scheme that is based on a monitoring regime designed in the 1980s when the sand was still in place and the extent of corrosion was unknown. Instead, AmerGen must now thoroughly redesign the monitoring regime using rigorous acceptance criteria derived from current comprehensive measurements and modeling to determine the existing safety margins. It

should then use those margins to set acceptance criteria for the ongoing monitoring. These criteria would then be used determine how to monitor for corrosive conditions, where and how often to take UT measurements, and how quickly to respond to adverse results. Unless AmerGen undertakes such a redesign, it will be doomed to continue to modify the existing regime without producing an adequate aging management program.

BACKGROUND

This proceeding concerns the aging of the steel containment vessel of the Oyster Creek Nuclear Generating Station that is termed the drywell shell. The shell provides containment in the event of an accident. The lower portion of the shell is spherical with an inside diameter of 70 feet. Ex. NC 8 at 47. It is free standing from an elevation of 8 feet 11.75 inches from the bottom. Id. at 40. For around 3 feet 4 inches above that level to elevation 12 feet 3 inches, the exterior of the steel shell used to have sand supporting it, but the sand was removed in 1992. Id. at 47-48. This exterior portion of the drywell shell is termed the sand bed region. An interior floor is at elevation 10 feet 3 inches, id. at 47, and concrete curbs around the edge of the floor go up to the 11 foot elevation. Ex. NC 10. In the sand bed region, the design thickness of the vessel was 1.154 inches. Ex. NC 8 at 40.

Citizens initially contended that the testing of the extent of corrosion at all levels of the drywell shell proposed in AmerGen's license renewal application was inadequate to assure the continued integrity of this safety-critical structure for the period of the license extension. Petition at 3. To support this contention, Citizens showed that the drywell shell is a safety-critical structure that acts both as a pressure boundary and as a structural support. Id. at 4. Citizens then showed that water leakage onto the exterior of the drywell shell has caused significant corrosion, particularly in the sand bed region, where the NRC regarded the corrosion

as a “threat to drywell integrity.” Id. at 4-6. Citizens showed further that in 1986 NRC regarded ultra-sonic testing of the sand bed region and other accessible areas of the drywell liner as “essential . . . for the life of the plant.” Id. at 7.

Citizens asserted that the potential for ongoing corrosion means that ongoing comprehensive testing is required to ensure the remaining razor-thin safety margins are met throughout any extended life of the plant. Indeed, Petitioners’ Exhibit 5 at pages 8 and 12 showed that while AmerGen reported the “current thinnest” area to be 0.8 inches in December 1992, the actual thinnest areas are less than 0.736 inches, which was the original acceptance criterion, derived from modeling segments of a spherical shell with uniform thickness. Multiple measurements in bays 1 and 13 and isolated measurements in bays 11, 15, and 17 were below 0.736 inches. Id. at 12.

The ASLB admitted a narrowed version of the initial contention pertaining to the need for ultrasonic (“UT”) testing of the drywell in the sand bed region. In the Matter of AmerGen Energy Company (License Renewal for Oyster Creek Nuclear Generating Station), LBP-06-07 (slip op. at 39-40) LBP-06-07, 63 NRC 188 (2006). The ASLB recently found that a new commitment made by AmerGen on April 4, 2006 to use UT testing to verify the thickness of drywell shell in the sand bed region every ten years had rendered the initial contention moot, but also invited Citizens to submit a new contention concerning the adequacy of AmerGen’s newly proposed UT testing regime for the sand bed region. LBP-06-16 (June 6, 2006) at 9. On June 20, 2006, AmerGen submitted a new letter enclosing a discussion of the UT testing program for the drywell and new commitments to carry out certain additional testing. Letter from Michael P. Gallagher, AmerGen, to NRC (June 20, 2006).

On June 23, 2006, Citizens submitted a new contention addressing the issues raised by AmerGen's newly proposed testing regime for the sand bed region as presented in the new commitment of April 4, 2006. Citizens also submitted a motion asking leave to supplement the new contention so as to take into account AmerGen's June 20, 2006 commitment letter. The Board granted Citizens' motion, with instructions that the supplement should be limited to discussion of issues raised by the June 20, 2006 commitment, and that the supplement should be a self-contained document. Order (Granting NIRS's Motion for Leave to Submit a Supplement to its Petition), ASLBP No. 06-844-01 at 3 (July 5, 2006) (unpublished).

In their commitment letter of June 20, 2006, AmerGen laid out a monitoring plan that takes into account the importance of monitoring for conditions conducive to corrosion in the drywell. Letter from Michael P. Gallagher, AmerGen, to NRC, Enclosure 2 ("New Commitments") at 3-4. (June 20, 2006). AmerGen's proposed monitoring procedures call for daily monitoring of the drains from the sand bed region during refueling outages and quarterly monitoring of the drains during the plant operating cycle. Id. The proposed procedures include steps to be taken to determine the source of any leakage. Id. However, the proposal does not suggest continuous monitoring or monitoring of moisture in the drywell proper.

AmerGen's most recent commitment also describes proposed procedures for monitoring the epoxy coating. Id. The proposed procedure calls for visual inspection of the epoxy coating if leakage is found during drain monitoring. Id. If the leakage is found during refueling, the coating is to be visually inspected during that outage. Id. If, however, the leakage is detected during the operating cycle, the epoxy is not to be inspected at all until the next refueling cycle. Id. The proposal does not lay out an objective standard for determining whether the coating is degraded, and it does not call for objective testing of the coating.

AmerGen also submitted a considerable amount of new information on engineering and other issues in response to a Request for Additional Information from NRC Staff and in support of the new commitments. Letter from Michael P. Gallagher, AmerGen, to NRC, Enclosure 1 (“New Information”) at 3-4. (June 20, 2006). The New Information discussed, among other things, the use of engineering code sections to generate the acceptance criteria, the problems with the UT results taken in 1996, the UT testing frequency for the sand bed region, and details of proposed corrective measures to be taken if water is detected in the sand bed drains. Id. AmerGen explained that their monitoring regime continues to be based on, among other things, an assumption that corrosion is best modeled as a continuing linear decrease in mean thickness of the drywell shell over time. Id. at 3. In interpreting this model, measurements showing a statistically significant slope on the plot of mean thickness versus time trigger a calculation of the uncertainty in the measurements in order to determine the time at which there is a 5% chance that certain acceptance criteria could be exceeded. Id. However, as before, if the measurements do not show a statistically significant slope, AmerGen will not estimate a confidence interval, but will assume instead that no corrosion is occurring or will occur. Id.

AmerGen also expressed its belief that there are no practical methods available to replace the current technique of using ASME Code Section III, Subsection NE-3213.10 to extrapolate from computer modeling done in 1991 by General Electric to real conditions. Id. AmerGen further claimed a minimum measured drywell thickness of 0.800 inches in the sand bed region, id. at 5, which stands in contrast to their reported measurements taken in several bays showing areas with average thickness at 0.703 inches, Ex. NC 2 at 13, and a thinnest individual measurement of 0.603 inches, Ex. NC 1 at 7. While recognizing that this Code Section is not directly applicable to randomly thin areas caused by corrosion, AmerGen asserted that the Code

Section is applicable to the severely corroded areas based on, among other things, their belief that no further significant corrosion will occur in the sand bed. New Information at 5-6.

ARGUMENT

In response to AmerGen's new commitments, Citizens have modified the previously filed contention. The modifications to the contention are discussed in Section I, which demonstrates that the modifications, like the new contention, meet the requirements for basis, scope, and materiality. In addition, Section II of this Section sets forth additional bases for an unmodified allegation about engineering issues, because AmerGen provided substantial material new information on this issue. Finally, Section III shows that this submission is timely. Otherwise, Citizens rely on the Petition dated June 23, 2006 to plead for the admission of the unchanged allegations in the contention.

I. The Modified Contention

A. Specific Statement of the Amended Contention

In order to bring a contention before the Commissioners, Citizens must "[p]rovide a specific statement of the issue of law or fact to be raised or controverted." 10 C.F.R. §

2.309(f)(1)(i). The amended contention is:

AmerGen must provide an aging management plan for the sand bed region of the drywell shell that ensures that safety margins are maintained throughout the term of any extended license, but the proposed plan fails to do so because the acceptance criteria are inadequate, the scheduled UT monitoring frequency is too low in the absence of adequate monitoring for moisture and coating integrity and is not sufficiently adaptive to possible future narrowing of the safety margins, the monitoring for moisture and coating integrity is inadequate, the response to wet conditions and coating failure is inadequate, the scope of the UT monitoring is insufficient to systematically identify and sufficiently test all the degraded areas of the shell in the sand bed region, the quality assurance for the measurements is inadequate, and the methods proposed to analyze the UT results are flawed.

Thus, the changes to the new contention are, as follows:

- 1) “the monitoring frequency is too low and is not adaptive to possible future narrowing of the safety margins ” is changed to “the scheduled UT monitoring frequency is too low in the absence of adequate monitoring for moisture and coating integrity and is not sufficiently adaptive to possible future narrowing of the safety margins” (the “Amended Allegation”);
- 2) “the monitoring for moisture and coating integrity is inadequate” is added (the “First Added Allegation”);
- 3) “the response to wet conditions and coating failure is inadequate” is added (the “Second Added Allegation”) and
- 4) “UT” has been inserted in the last line. (“Minor Modification”)

The Minor Modification has been made for clarity, but does not change the meaning of the allegation. It is therefore not addressed further in this Supplement.

B. Basis for Modifications

At this preliminary stage, Citizens do not have to submit admissible evidence to support their contention, rather they have to “[p]rovide a brief explanation of the basis for the contention,” 10 C.F.R. § 2.309(f)(1)(ii), and “a concise statement of the alleged facts or expert opinions which support the ... petitioner’s position.” 10 C.F.R. § 2.309(f)(1)(v).

This rule ensures that “full adjudicatory hearings are triggered only by those able to proffer ... minimal factual and legal foundation in support of their contentions.” In the Matter of Duke Energy Corp. (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 N.R.C. 328, 334 (1999) (emphasis added). The Commission has clarified that, “an intervener need not . . . prove its case at the contention stage. The factual support necessary to show a genuine dispute exists need not be in affidavit or formal evidentiary form, or be of the quality necessary to withstand a summary disposition motion.” In the Matter of Georgia Institute of Technology, CLI-95-12, 42 N.R.C. 111, 118 (1995). Thus, the Commission has indicated that where petitioners make

technically meritorious contentions based upon diligent research and supported by valid information and expert opinion, the requirement for an adequate basis is more than satisfied.

Because part of the new contention filed on June 23, 2006 alleged that the UT monitoring frequency was too low when no monitoring of moisture and coating integrity and no contingent monitoring was proposed, the basis set out for that element of the new contention in the Petition of June 23, 2006 is directly applicable to the Amended Allegation. In summary, the drywell shell is 0.026 inches or less from violating AmerGen's acceptance criteria. Under corrosive conditions, long-term corrosion rates of more than 0.017 inches per year have been observed. Thus, if corrosive conditions are possible, a UT monitoring frequency of once per year or more would be necessary. Furthermore, if the next scheduled UT monitoring that is to occur before the end of the licensing period shows that these safety margins have narrowed, even more frequent monitoring would be needed.

AmerGen's new proposal to add a round of scheduled UT monitoring at the second refueling outage does not respond to these problems because the monitoring is scheduled after corrosion beyond the safety margins could occur. In addition, the proposal to review the frequency of the monitoring after the second round of monitoring is not sufficiently adaptive because, as discussed below, AmerGen has yet to set adequate acceptance criteria, which are essential to establish the required monitoring frequency. Indeed, it appears that the selection of four years as the time interval for the first scheduled monitoring in any license renewal period was based on a suggestion from NRC Staff rather than any reasoned analysis on AmerGen's part. Ex. NC 4 at 59:6-9.

However, the related proposal to monitor the presence of water and the integrity of the coating could provide a solution, if the monitoring were sufficient to ensure that corrosive

conditions cannot go undetected and the action triggered by the detection of corrosive conditions were adequate. Unfortunately, neither the monitoring of corrosive conditions proposed by AmerGen on June 20, 2006 nor the response to the results of that monitoring is adequate. To address these issues, the First Added Allegation concerns the inadequacy of the proposed monitoring for corrosive conditions, while the Second Added Allegation concerns the inadequacy of the response to that monitoring.

With respect to the monitoring for moisture, AmerGen committed to visually monitoring the drains from the sand bed daily during refueling outages and quarterly during normal operations. New Commitments at 3-4. The danger of leakage going undetected is obvious in this scheme. Minor leaks or condensation may never reach the drains and leaks could occur at times when inspections are not occurring. Furthermore, no objective data would be created. As set out in the attached Memorandum of Dr. R. H. Hausler, moisture sensors are readily available that could monitor for the presence of water on the exterior of the drywell shell continuously. Memorandum of Dr. R. H. Hausler, dated July 25, 2006 at 5. In addition, the results from these monitors could be recorded. The superiority of continuous monitoring of moisture on the exterior of the shell is self-evident.

Turning to the proposed monitoring of the epoxy coating, AmerGen now proposes visual inspection of the epoxy coating if water is detected in the sand bed drains. New Commitments at 3-4. In addition, AmerGen asserts that it will perform visual inspections of the coating every other refueling outage. Id. at 13. Citizens note that the April 4, 2006 commitment actually required such visual inspections only once every ten years on a scheduled basis, Letter from Gallagher to NRC, dated April 4, 2006 Enclosure at 1, and the language of the New

Commitments is carefully phrased so that the discussion in the New Information does not make regulatory commitments. New Commitments at 2.

Dr. Hausler opines that “holidays and pinholes in the coating cannot be assessed by ‘visual examination’” and therefore recommends use of standard technology that can more accurately establish the integrity of the coating. Memorandum of Dr. R.H. Hausler dated July 25, 2006 at 6. This opinion provides part of the basis for the allegation that AmerGen’s proposed monitoring of the coating integrity is inadequate.

With regard to the frequency of the coating inspection, AmerGen has committed to completing a coating inspection before exiting the refueling outage, if moisture is first detected during an outage, or during the next refueling outage, if moisture is first detected during operation. New Commitments at 3-4. In contrast, Dr. Hausler opines that the first coating inspection should occur “at the onset of moisture being detected” and “quarterly, while wet conditions prevail.” Memorandum of Dr. R.H. Hausler dated July 25, 2006 at 6. Dr. Hausler states that the corrosion rate in the sand bed was as much as 0.033 inches per year from 1986 through 1992, *id.* at 3, and that monitoring should occur half way towards the shortest predicted service life. *Id.* at 2. Because the margins are 0.026 inches or lower, in wet conditions coating failure could lead to the loss of the safety margin within nine and one-half months. Thus, if water is present the inspections of the coating must occur at intervals that are smaller than 4.75 months. Because this is a safety-critical application and corrosion rates are uncertain, Dr. Hausler has selected quarterly monitoring as most appropriate for the ongoing inspection frequency while wet conditions prevail. In addition, if water is detected will be uncertain how long it has been in contact with unmonitored parts of the coated area. Because dangerous corrosion could occur rapidly if wet conditions prevail and the coating has failed Dr. Hausler

recommends a coating integrity check as soon as water is detected. This is in sharp contrast to AmerGen's proposal to wait until the next refueling outage, which could allow the drywell shell to remain wet for up to two years without any check of the integrity of the coating.

Furthermore, the Second Added Allegation deals with the inadequacy of AmerGen's proposed response to the detection of moisture and coating failure. AmerGen has committed to perform UT testing on "any areas in the sand bed region" where water is found, the coating is defective, and "corrosion has occurred." New Commitments at 3-4. The damaged area of coating would then be repaired. Id. This commitment is inadequate for two reasons; first, the spatial extent of the action is too narrow; and second, AmerGen cannot know whether corrosion has occurred without first doing UT testing, because corrosion could occur below the damaged coating without being observed visually.

Looking first at the spatial extent of the action, Dr. Hausler believes that when a coating failure is found, the entire coating should be removed and replaced because failure of the coating in one area would indicate that it could also rapidly fail in other areas. Memorandum of Dr. R.H. Hausler dated July 25, 2006 at 6. This opinion is reinforced by the physical constraints on UT monitoring. Dr. Hausler points out that monitoring of most of the sandbed region is impossible from the inside of the drywell shell because of the concrete floor and a concrete curb that goes to the top of the sandbed in many areas. Id. at 3, Figures 3-4. He also points out that UT monitoring of the sandbed from the outside cannot be done from the outside through the epoxy coat. Id. at 6. Thus, once it is known that corrosion could have occurred in one area, the whole vessel should be comprehensively monitored and its integrity checked, while it is possible to do so. This would reestablish the safety margins and would verify whether the monitoring for corrosive conditions is effective.

Turning to the trigger for UT testing, it is totally illogical to condition the testing on whether corrosion has occurred, which is precisely the question that the testing seeks to answer. Because corrosion could occur and not be visible, LBP-06-07 at 26, 63 NRC 188 (2006), visual inspection alone is not adequate to determine whether corrosion is occurring. Instead, detection of moisture combined with coating failure should automatically lead to UT testing.

Memorandum of Dr. R.H. Hausler dated July 25, 2006 at 6.

C. All New Allegations Relate to the UT Testing Program

The Board has ordered that this submission must be “limited to AmerGen’s UT program for the sand bed region.” LBP 06-844 at 3. AmerGen or the NRC Staff may argue that allegations regarding the adequacy of the corrosive conditions monitoring stray beyond the confines of the Board’s instructions. If so argued, this would be incorrect, because AmerGen has stressed that the commitments regarding the aging management of the drywell liner form an “integrated package.” Ex. NC 4 at 55:23-27. NRC Staff has also stressed the importance of moving beyond a scheduled regime for UT testing into an adaptive regime that would require such testing when water leakage is detected. *Id.* at 59:18-22. Thus, because the corrosive conditions monitoring is the trigger for additional UT testing, it is part of the UT monitoring program for the sandbed, and so may legitimately be addressed in this submission.

More specifically, Citizens have shown that without any monitoring for corrosive conditions, UT measurements would have to be infeasibly frequent to ensure that safety margins continue to be met. Tacitly acknowledging this fact, AmerGen has now proposed to monitor corrosive conditions and adapt its UT testing program to the results of the corrosive conditions monitoring. However, if the corrosive conditions monitoring is inadequate, too few UT measurements will be taken to maintain safety margins. Thus, because the monitoring for

corrosive conditions is an essential part of the UT testing program, the adequacy of the conditions monitoring is an appropriate topic for this submission.

D. Allegations Regarding Monitoring for Corrosive Conditions Are Otherwise Admissible

Even if the Board decides that the allegations regarding the monitoring for corrosive conditions are not admissible within the terms of the Board's most recent order, they would be admissible as new contentions because they are within the scope of the proceeding. Citizens have ample basis for the Added Allegations, the Added Allegations raise material issues about whether AmerGen's aging management program is adequate to assure that safety margins will be maintained throughout the licensing period, and the filing of the contentions would be timely in accordance with 10 C.F.R. § 2.309(c) and (f)(2), because they are based on material new information that only became available to Citizens recently. Thus, if the Board decides that some of the new Added Allegations are not admissible within the terms of its most recent Order, Citizens seek leave to file the new allegations as contentions based on the New Information and New Commitments or as late-filed contentions.

E. The Modifications Are Within the Scope of the Hearing

Petitioners are required to demonstrate that the issues raised in their contentions are within the scope of the proceeding, 10 C.F.R. § 2.309(f)(1)(iii). After extensive briefing of this issue, the ASLB concluded that corrosion of the drywell shell is within the scope of license renewal proceedings. In the Matter of AmerGen Energy Company (License Renewal for Oyster Creek Nuclear Generating Station), LBP-06-07 (slip op. at 39-40), 63 N.R.C. 188 (February 26, 2006). That finding directly applies to the current contention, because it concerns the very same issue; the aging management of the drywell shell in response to the potential for further corrosion. Thus, the issue of scope is currently *res judicata* in this proceeding and is not subject

to further dispute. However, the decision to admit the initial contention is currently on appeal to the Commission. Therefore, should the Commission amend the ASLB's finding regarding scope in its review of the AmerGen's appeal, Citizens request an opportunity to file a supplemental briefing addressing the Commission's findings.

F. The Modifications Raise Material Issues

The regulations require petitioners to “[d]emonstrate that the issue raised in the contention is material to the findings the NRC must make to support the action that is involved in the proceeding.” 10 C.F.R. § 2.309(f)(1)(iv). A showing of materiality is not an onerous requirement, because all that is needed is a “minimal showing that material facts are in dispute, indicating that a further inquiry is appropriate.” Georgia Institute of Technology, CLI-95-12, 42 N.R.C. 111, 118 (1995); Final Rule, Rules of Practice for Domestic Licensing Proceedings – Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,171 (Aug. 11, 1989). Similarly, in Gulf States Utilities Co. (River Bend Station, Unit 1), CLI-94-10, 40 N.R.C. 43 (1994), the Commission stated that, at the contention filing stage, “the factual support necessary to show that a genuine dispute exists need not be in formal evidentiary form, nor be as strong as that necessary to withstand a summary disposition motion.” 40 N.R.C. at 51. Rather, the petitioner need simply make “a minimal showing that the material facts are in dispute, thereby demonstrating that an inquiry in depth is appropriate.” Id. (internal quotation marks omitted).

In admitting the initial Petition, the ASLB found that a genuine and material dispute existed about whether the then-proposed aging management program, which did not include periodic UT measurements, would enable AmerGen to maintain safety margins during the term of any extended license. LBP-06-07 at 38-39. This new contention concerning AmerGen's June 20, 2006 commitment continues this material dispute and alleges that AmerGen's most recent commitment is inadequate to maintain safety margins throughout the licensing period.

In addition, the New Information had made it less clear what assurances AmerGen is able to give regarding its ability to maintain safety margins over the 20-year renewal period. Previously, AmerGen stated that the April 4, 2006 commitment would "provide assurance that the drywell shell will remain capable of performing its design functions throughout the license renewal period." Letter from Michael P. Gallagher, AmerGen, to NRC (Apr. 4, 2006). While AmerGen have not formally retracted these claims, it is notable that even though the New Commitments provide for additional monitoring, AmerGen makes somewhat weaker claims as to the level of assurance the new proposed procedures will provide. AmerGen now claims that the procedures will suffice "to ensure that significant drywell corrosion will be detected and addressed prior to impacting the intended function of the containment." Letter from Michael P. Gallagher, AmerGen, to NRC at 13 (Jun. 20, 2006). But in its June 20, 2006 submission, AmerGen no longer makes the explicit claim that it believes the drywell actually will be able to operate for 20 years while remaining within safety margins.

In this Supplement, Citizens have shown by reference to exhibits and expert opinion that due to the absence of adequate monitoring for moisture and coating integrity, the proposed scheduled UT monitoring by AmerGen is too infrequent and is not sufficiently adaptive to possible future narrowing of the safety margins to allow the current razor-thin safety margins to be maintained. Furthermore, Citizens have demonstrated that AmerGen's proposed program of monitoring for moisture and coating integrity is inadequate, and that AmerGen's proposed responses to detected moisture and degradation of the coating are inadequate. Thus, Citizens contend that the proposed program would fail to ensure that safety margins would continue to be met during any license renewal period.

In contrast, AmerGen has stated that the committed monitoring regime will be adequate to ensure the drywell shell remains within safety margins. Id. The material dispute about the adequacy of the testing regime results from material disputes about more detailed issues, such as how best to detect moisture, how and when to check coating integrity, and what response is required when moisture is found and the coating is not intact. Finally, because the safety of the reactor hinges on the outcome of the overall dispute, it must be resolved before the NRC can issue any extended license.

II. New Basis for Previously Contended Issues Arising from New Submission

A portion of the new contention alleges that “the acceptance criteria are inadequate.” In its June 20, 2006 submission, AmerGen discussed in some detail the applicability of the engineering codes used to derive the acceptance criteria in an attempt to justify the current approach. New Information at 3-6, 8-9. AmerGen also made new commitments to take additional UT measurements. New Commitments at 2-4. For any UT monitoring taken in response to visual inspections prompted by wet conditions during refueling outages, AmerGen proposed to evaluate the results “per the existing program.” See New Commitments at 3. Thus, AmerGen has decided not to change the acceptance criteria. Presumably, AmerGen based this decision on a belief that it had adequately justified the bases for the acceptance criteria in the New Information.

In its July 5, 2006 Order, the Board allowed Citizens to set forth new bases, based upon the New Information and the New Commitments. Because AmerGen’s June 20, 2006 submission set forth new information and assertions regarding the derivation of the acceptance criteria and relied upon those analyses to continue to assess the additional UT measurements in the same manner as previously proposed, Citizens had the new submission and other relevant

documents reviewed by Stress Engineering Services, Inc. (“Stress”), a well-qualified firm of structural engineers, to determine if the commitment to evaluate future UT results in the sand bed region “per the existing program” is adequate. The resumes of the individual engineers from Stress who provided the opinion are provided as Exhibit NC 11.

As set forth in the attached expert opinion dated July 15, 2006, Stress has concluded that AmerGen’s current approach to assessing the continued integrity of the drywell shell is outdated and may not properly capture the behavior of the shell in its degraded state. Letter from Stress to Webster dated July 15, 2006 (“Stress Opinion”) at 2. Furthermore, Stress points out that the engineering code used relates to pressure integrity and governs construction of pressure vessels, not serviceability. Id. The authors of the code did not intend its rules to be the only arbiter of pressure vessel structural integrity. Id. at 3. Stress opines that much better techniques than those used by AmerGen are now available and are code compliant. Id. at 2. The new techniques are routinely used today and provide the most accurate assessment of vessel integrity possible. Id. Thus, the new techniques are superior to the outdated techniques currently employed by AmerGen.

One critical advance is the use of lasers to map the actual shapes of pressure vessels, along with sophisticated UT techniques that measure the wall thickness. Id. Stress points out that the G.E. analysis modeled small slices of the vessel and used idealized geometries, such as a perfect sphere for the lower part of the drywell. Id. at 1-2. These calculations were then adjusted by making assumptions about surface irregularities, plasticity, and local buckling. Id. at 2. Thus, the calculated values used by AmerGen are vulnerable to incorrect assumptions. In particular, if, as is perfectly possible, the lower portion of the drywell shell is not truly spherical, the strength of the vessel would be considerably reduced. As far as Citizens are aware,

AmerGen has not checked the shape of the vessel, but has nonetheless assumed that it is spherical. It is this type of assumption that the laser measurement technique described by Stress can eliminate.

Furthermore, the G.E. model only modeled one bay, all the other bays were assumed to behave in the same way simultaneously. This technique inherently assumed that symmetrical buckling would occur, when, in fact the buckling may be a combination of symmetrical and anti-symmetrical buckling. Id. This means that the G.E. model may have missed the most critical buckling mode.

In the New Information, AmerGen wrestled with some of the problems that Stress points out. For instance, AmerGen stated that one of the code sections is not directly applicable to the issues involved in setting the acceptance criteria. New Information at 3. However, AmerGen attempted to justify continued use of the modeling carried out by G.E. in 1991 and extrapolation of that modeling using sections of the code by stating that “AmerGen is not aware of any new practical engineering analysis methods that can be used as an alternative to ASME Section III, Subsection NE-3213.10 to more accurately reflect the corroded drywell shell.” New Information at 3. Citizens have now established that even if AmerGen is not aware of advances in engineering analysis that could be applied to the problem of assuring the continued integrity of the drywell, such advances have in fact occurred, and should be applied to accurately determine the margins of safety available during any license extension period.

In addition, AmerGen has admitted that code case N-284 requires consideration of surface irregularities, but has relied upon a minimum “margin in the general thickness of the two bays [bays 17 and 19]” of 0.074 inches and 0.064 inches, respectively, to “offset uncertainties related to the surface roughness.” New Information at 9. There are many problems with this

approach. Most obviously, it is by no means clear that the postulated margins are the smallest, as is discussed in detail below. In addition, as the sentence quoted above acknowledges, the surface roughness is highly uncertain because AmerGen has not measured this parameter. It has therefore provided only a very rough estimate of the surface roughness induced by corrosion and has provided no estimate at all of the roughness due to fabrication. New Information at 8.

The estimate of surface roughness caused by corrosion is underestimated because it uses 0.736 inches as the corroded thickness, when 0.603 inches is the thinnest observed. Ex. NC 1 at 7. Assuming an error of 5% of wall thickness the 0.603 inch measurement is consistent with an actual thickness of 0.572 inches. Substituting 0.572 into the equation provided by AmerGen yields a roughness of 0.654. This compares to an acceptable roughness of 1.0, New Information at 8, and is dangerously close to the acceptable limit, given the uncertainty about the current corroded thicknesses and the lack of information about the fabrication roughness. The calculation also shows that the equation is very sensitive to the value for the corroded thickness, which has not yet been systematically determined. Indeed, the last UT measurements in the sandbed were taken in 1996 as part of AmerGen's highly circumscribed monitoring program. These ten year old data have now been admitted to contain "data anomalies." New Information at 8.

Furthermore, AmerGen has argued that "the overall net effect of the corrosion-induced eccentricities would be insignificant." New Information at 8. This flies in the face of observations made from the outside of the drywell shell which found parts of its surface to be "rough, . . . [and] full of dimples comparable to the outer surface of [a] golf ball. Ex. NC 3 at 13. In addition, AmerGen has failed to even estimate fabrication irregularities. Thus, AmerGen's attempt to show that the total surface roughness does not exceed the code requirement of 1.0

completely fails. It is precisely these kinds of difficulties that the technique proposed by Stress would eliminate. If the shape and thickness of the drywell were systematically measured and modeled, there would be no need to rely on making educated guesses about the values of various parameters, such as the roughness factor.

Looking in more detail at the issue of the minimum margins, the measurements taken from the outside show that bays one and 13 were the most corroded in 1992. Ex. NC3 at 1-2. Thus, it is to be expected that the margins in these bays should be lower than the margins in bays 17 and 19. The fallacy in AmerGen's reasoning is exposed by Table 1, which gives the "minimum measured thickness" in the sandbed region as 0.800 inches. New Information at 5. As previously discussed, actual measured thicknesses have ranged as low as 0.603 inches in the sand bed region. Ex. NC 1 at 7. Further, in bay 13, at least nine areas of less than 0.736 inches are present. Ex. NC 9 at 28. Thus, the margins in bays one and 13 are probably smaller than those in bays 17 and 19. In addition, the justification for the procedure actually assumes insignificant corrosion in the sand bed region even though nothing is known about the corrosion of the drywell shell in the sand bed region over the last ten years. New Information at 6. Therefore, using the calculated margins in bays 17 and 19 to "offset for uncertainties related to surface roughness" is a non-rigorous procedure that just confirms the degree to which the current methods employed by AmerGen to evaluate the effect of the corrosion on the structural integrity of the drywell shell rely on highly uncertain calculations that contain numerous unverified assumptions.

As Stress has opined, the accuracy of AmerGen's current calculations could be improved by adopting the most up to date methods. Furthermore, using such methods would allow the unverified assumptions and educated guesses employed by AmerGen at present to be replaced by

systematic measurements. The results of such an exercise would allow the significance of the existing corrosion to be evaluated and would allow quantitative predictions to be made about the structural impact of possible further corrosion during any extended licensing period. Such information is vital to accurately establish how much safety margin is currently available. Once known, the safety margin would dictate the acceptance criteria for future measurements, how accurate the testing regime for any extended license period would have to be, and how quickly the response to corrosive conditions would have to occur. These parameters would be used to design an appropriate monitoring regime.

AmerGen has committed to review the frequency of scheduled UT monitoring during any license renewal period after the results of the second scheduled UT testing. New Commitments at 2. While the commitment does not specify how this review would be undertaken, Citizens believe that it would necessarily involve comparing the amount of additional corrosion that could occur to the amount of corrosion that would impair the structural integrity of the vessel. This is precisely the information that would result from the analysis recommended by Stress.

Thus, Citizens seek to add the new bases discussed above for the portion of the contention alleging that the “acceptance criteria are inadequate” without amending the wording of the contention or changing the bases already submitted.

III. Timeliness of Submission

Petitioners may amend contentions after filing their initial petition, so long as they act in accordance with 10 C.F.R. § 2.309(f)(2). See Entergy Nuclear Vermont Yankee, L.L.C. (Vermont Yankee Nuclear Power Station), LBP-05-32, 62 NRC 813 (2005). The Commission's regulations allow for a new or amended contention to be filed upon a showing that:

- (i) The information upon which the amended or new contention is based was not previously available;
- (ii) The information upon which the amended or new contention is based is materially different than information previously available; and
- (iii) The amended or new contention has been submitted in a timely fashion based on the availability of the subsequent information.

10 C.F.R. § 2.309(f)(2)(i)-(iii).

In Vermont Yankee, the Board first admitted a contention of omission challenging an applicant's failure to perform structural and seismic analyses. The applicant subsequently performed structural and seismic analyses, after which it filed a motion to dismiss the contention as moot, which the Board granted. See Vermont Yankee, LBP-05-32, 62 NRC 813, 820. The Board gave the petitioner 20 days to file a new contention. Id. In response, the petitioner filed a contention challenging the sufficiency of the structural and seismic analyses. Id. In admitting the new contention, the Board held that the analyses were clearly information that was “not previously available” and that they were materially different than information previously available “because something is obviously different than nothing.” Vermont Yankee, LBP-05-32, 62 NRC 813, 820; 10 C.F.R. § 2.309(f)(2)(i)-(ii).

The Board's analysis in Vermont Yankee is directly applicable to this case. The New Commitments were previously nonexistent; their content therefore constitutes new information that is necessarily “materially different than information previously available.” Vermont Yankee, LBP-05-32, 62 NRC 813, 820. Similarly, much of the New Information concerns engineering analyses used to try to justify the New Commitments. Because knowledge of the safety margins is essential to designing an appropriate aging management regime, and the

analyses showed major inadequacies in the approach used to derive the acceptance criteria, the new engineering analyses are also materially different new information. Thus the New Information and the New Commitments are materially different new information satisfying the requirements of 10 C.F.R. § 2.309(f)(2)(i) and (ii).

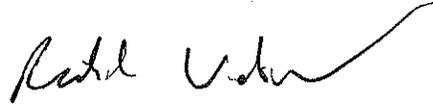
Additionally, the Board's Order of July 5, 2006 allowed Citizens to submit this supplement based on AmerGen's June 20, 2006 submission, illustrating that the Board believed that the submission contained materially different new information. Indeed, AmerGen also acknowledged this fact by requesting that Citizens be allowed to submit a completely new petition based on the monitoring regime as modified in the June 20, 2006 submission.

Furthermore, because this contention is being filed within the timeframe specified by the Board's Order of July 5, 2006 and 24 days from the June 20, 2006 submission it satisfies 10 C.F.R. § 2.309(f)(2)(iii). Furthermore, the parties need not address the requirements under 10 C.F.R. § 2.309(c), which apply to "nontimely filings." See Licensing Board Memorandum and Order (Contention of Omission is Moot, and Motions Concerning Mandatory Disclosure are Moot), LBP-06-16 at n.12 (Jun. 6, 2006) (unpublished). Finally, should the Board decide to treat the Added Allegations as late-filed contentions, Citizens believe that they meet the requirements of 10 C.F.R. § 2.309(c). If it would be helpful to the Board, Citizens would be pleased to brief this issue in detail.

CONCLUSION

For the foregoing reasons, the ASLB should allow the proposed new contention to be modified as specified in this supplement.

Respectfully submitted



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