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U. S. Nuclear Regulatory Commission
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Washington, DC 20555

Oyster Creek Generating Station
Facility Operating License No. DPR-16
NRC Docket No. 50-219

Subject: Information for ACRS Addressing Public Comments from January 18, 2007 ACRS Plant License Renewal Subcommittee Meeting Related to AmerGen's Application for Renewed Operating License for Oyster Creek Generating Station (TAC No. MC7624)

References: 1. January 18, 2007 ACRS Plant License Renewal Subcommittee Meeting Related to AmerGen's Application for Renewed Operating License for Oyster Creek Generating Station

2. January 16, 2007 Letter from R. Webster to ACRS, Summarizing Comments to ACRS Plant License Renewal Subcommittee Meeting

In the Reference 1 meeting, AmerGen Energy Company, LLC (AmerGen) and the NRC Staff met with the Advisory Committee on Reactor Safeguards (ACRS) Plant License Renewal Subcommittee to discuss AmerGen's License Renewal Application (LRA) for the Oyster Creek Generating Station (Oyster Creek). During that meeting, AmerGen and the NRC Staff presented information related to the Oyster Creek LRA to the Subcommittee and discussed technical information related to the Application.

In addition, comments related to the LRA were provided by representatives from an organization known as STROC. A letter summarizing those comments was also sent to the ACRS (Reference 2).

In the Enclosure of this letter, AmerGen provides a White Paper with information addressing concerns identified in the comments and letter submitted by STROC. AmerGen will be available to discuss these issues further, as needed, at the February 1, 2007 ACRS meeting during the planned discussion of the Oyster Creek LRA.

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If you have any questions regarding this information, please contact me at 610-765-5958.

Respectfully,

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Enclosure: White Paper Addressing Areas of Inquiry During January 18, 2007 ACRS Subcommittee Meeting

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Oyster Creek File No. 05040

ENCLOSURE

White Paper Addressing Areas of Inquiry During
January 18, 2007 ACRS Subcommittee Meeting

White Paper Addressing Areas of Inquiry During
January 18, 2007 ACRS Subcommittee Meeting

AmerGen is providing this White Paper to the Advisory Committee on Reactor Safeguards (ACRS) to address the major areas of inquiry discussed by Richard Webster at the January 18, 2007, ACRS License Renewal Subcommittee meeting.

This paper addresses the condition of the drywell shell, and AmerGen's Aging Management Programs that provide reasonable assurance that the shell will continue to perform its intended function through the proposed period of extended plant operation. It also addresses an inquiry associated with the aging management of the containment torus. The information is organized into the following five areas:

1. The acceptance criteria (*i.e.*, minimum required thickness) for the drywell shell in the sand bed region established by analyses performed by GE Nuclear,

2. The bases for reasonable assurance that the thinnest portions of the drywell shell in the sand bed region have been identified by,

3. AmerGen's selection of ultrasonic testing (UT) data from the drywell shell in the sand bed region for statistical analysis,

4. Why drywell shell UT measurements of the embedded region in Bay 5 are adequate, when other areas of the shell and other methods are available, and

5. A Torus Commitment and adequate Margin

1. SAND BED REGION ACCEPTANCE CRITERIA

Mr. Webster questioned whether AmerGen's acceptance criteria for drywell shell thickness are appropriate in light of the Sandia Report that was issued on January 12, 2007. As presented in our submittal on December 8, 2006 and our presentation to the Subcommittee on January 18, 2007, the acceptance criteria of record for the sand bed region were developed through engineering modeling using conservative assumptions.

The acceptance criteria for the drywell shell in the sand bed region are defined as the minimum thicknesses required for the drywell to perform its intended functions, and include ASME Code safety factors. These criteria are established by analyses performed by GE Nuclear Energy, have been approved by the NRC, and are part of the Oyster Creek Current Licensing Basis (CLB). These criteria were previously provided to the ACRS in AmerGen's submittal dated December 8, 2006 (References 15, 16 and 22).

The ACRS License Renewal Subcommittee asked for clarification about GE Nuclear's reliance on ASME Code Case N-284 in its analyses and, in particular, GE Nuclear's use of a capacity reduction factor. AmerGen will provide that clarification in the February 1, 2007 full ACRS meeting as requested by the Subcommittee.

2. REASONABLE ASSURANCE THAT AMERGEN HAS IDENTIFIED THE THINNEST PORTIONS OF THE OYSTER CREEK DRYWELL

Mr. Webster questioned whether AmerGen has identified the thinnest portions of the drywell shell. As described in our December 8, 2006 submittal, and during our presentation to the Subcommittee on January 18, 2007, our monitoring program was conservatively established to identify and monitor the thinnest areas on the drywell shell. A brief summary follows.

A. Internal Drywell Measurements

In 1986, UT measurements were taken in each bay at the lowest accessible *interior* locations (approximately elevation 11'3"). Where thinning was detected, additional measurements were taken in a cross pattern to determine its extent. Upon completion of the cross pattern, the lowest reading was then used to expand the UT to a 6 x 6 grid on 1" center with the lowest reading at its center.

Also in 1986, two trenches were excavated below the interior concrete floor, which is at elevation 10'3", to allow vertical profiling of the thinning in the sand bed region. The concrete floor was removed to expose a portion of the drywell shell sufficiently deep to allow UT thickness measurements towards the bottom of the sand bed region. The UT measurements taken from these trenches demonstrated that the corrosion was less severe at the lower portions of the sand bed region. Accordingly, these UT measurements demonstrate that the thinnest portions of the drywell shell in the sand bed region are above the elevation of the interior concrete floor.

B. External Drywell Measurements

Visual examinations and UT measurements taken from the *exterior* of the drywell shell also demonstrate that AmerGen has identified the thinnest areas of the drywell shell in the sand bed region. In 1992, once the sand was removed and the exterior surface of the drywell shell was cleaned and prepared for coating, engineers, working with NDE-qualified inspectors, examined the corroded exterior surface in all ten bays to identify the thinnest areas. These visual inspections were followed by optical pit measurements taken with a pit gauge. The thinnest areas were then prepared to allow UT measurements to be taken from approximately 125 "points." These are the exterior points that are monitored today.

In conclusion, iterative UT measurements and visual examinations identified the thinnest areas of the shell in the sand bed region. These are the areas monitored today.

3. UT DATA INTERPRETATION

Mr. Webster raises some questions about the interpretation of UT data from the sand bed region. He specifically is concerned about why some data are excluded from statistical analysis. He also advocates using "extreme value" statistics and a 99% upper confidence limit. As we presented in our submittal on December 08, 2006 and our presentation to the Subcommittee on January 18, 2007, our UT data interpretation and analysis was conservatively established to identify on going corrosion on the drywell shell. A brief summary follows.

A. Exclusion of Data for Statistical Analysis

Very few points of the UT data collected on the drywell shell in the sand bed region were excluded from the statistical calculations. Exclusion of these data is reasonable, and the very few excluded points that were thin were nevertheless trended individually. There are only 2 measurement locations where points were not included in the average thickness because they were more than 2 sigma thinner than the average. Inclusion of these data points would have reduced the average thickness from 0.992" to 0.9875" in one location, and from 1.101" to 1.069" in the second case. Neither of these changes is significant. It should be noted that in some cases, a point is excluded from the average thickness because it is more than 2 sigma thicker than the average.

B. Statistical Analysis

Mr. Webster also has suggested that the UT measurements be calculated using "extreme value" statistics and with a 99% level of confidence. Extreme value statistics is simply another means of analyzing data. It uses different distributions, such as the Weibull distribution, rather than the "normal" distribution used for the Oyster Creek data. AmerGen believes using the normal distribution is appropriate, and the NRC has approved AmerGen's methodology that uses the normal distribution. Regardless, AmerGen's statistical advisor performed statistical calculations using the Weibull distribution and found that there is no significant difference between the two methods.

The 99% level of confidence is not an industry standard and is not endorsed by the American National Standards Institute (ANSI). Rather, a 95% level of confidence is standard in the industry, has been accepted by the NRC for use in Oyster Creek's drywell thickness calculations, and is included in ANSI standards.

4. EMBEDDED REGION

This region consists of both the interior and exterior drywell shell that is embedded in concrete, and is subject to monitoring activities that are adequate for the extended period of plant operation. The following addresses some specific questions that Mr. Webster presented on January 18, 2007.

A. Coring is Unnecessary at Oyster Creek

Mr. Webster stated that Exelon had cored through the interior concrete floor to take UT measurements of the drywell shell at its Dresden power plant, and suggested that AmerGen do the same at Oyster Creek. The Dresden drywell is configured differently than Oyster Creek's in that the sand bed region is below the level of the concrete floor internal to the Dresden drywell. Exelon cored through the interior concrete floor at Dresden to take UT measurements of the drywell shell in the sand bed region. At Oyster Creek, a portion of the area of concern is located at elevations above the drywell interior floor; and therefore core bores were not required to obtain measurements. Furthermore, the sand bed region at Oyster Creek has been accessible for inspection of the shell since 1992; at Dresden it is not.

B. Guided Wave Technology is Unnecessary

Mr. Webster also suggested that AmerGen use "guided wave" technology to assess the condition of the drywell shell in the embedded region. We reviewed the potential use of this technology and, as a result, understand that this technology provides qualitative rather than quantitative results, and is still experimental and unproven. Accordingly, it could not provide thickness readings with any precision.

C. UT Measurements From Bay 5 Are Adequate

Mr. Webster also questioned why UT measurements from the Bay 5 trench are indicative of corrosion in the embedded shell when Bay 5 historically had the least amount of corrosion in the sand bed region. In 1986, two trenches were excavated in the drywell floor slab to gain access to further examine the drywell shell in areas that had been embedded. These trenches were located in drywell bays 5 and 17. During the refueling outage in 2006, AmerGen decided to further excavate the Bay 5 trench because it was identified that it contained standing water, and because its base was at a lower elevation (8'9") than the base of the Bay 17 trench (9'3"). For comparison, the exterior embedded region starts at approximately elevation 8'11".

Accordingly, excavating the Bay 5 trench required removing only sufficient concrete to expose six additional inches of the formerly embedded drywell shell to obtain sufficient UT measurements, while excavating the Bay 17 trench would have required removing more concrete than Bay 5. Although Bay 5 was characterized as having less exterior corrosion than Bay 17, all bays exhibited some corrosion on the exterior surface of the drywell. The concern being addressed here is the condition of the interior surface of the embedded portion of the drywell shell. Therefore, the UT monitoring of the embedded portion in the Bay 5 trench is appropriate and adequate to monitor this different environment of embedded steel in concrete. Also, excavating the Bay 5 trench provided the ability to perform UT measurements of a portion of the drywell shell that was embedded on both the interior and the exterior surfaces.

D. The Sand Bed Floor Epoxy

Mr. Webster also questioned why the epoxy floor in the sand bed region was not repaired when inspections performed subsequent to 1996 identified damage. He apparently believes that water that might migrate under this floor could adversely affect the exterior embedded shell.

The separation of the epoxy and minor cracks on the floor surface were first identified in 2006, and were not in close proximity to the drywell shell. Separation of the epoxy floor from the concrete shield wall would not adversely affect the embedded drywell shell. First, there has been little to no water in the sand bed region bays that could migrate into these areas. Second, even assuming water was present, the cracks are superficial and do not extend down the entire epoxy flooring. Third, even if there were a path for water to travel through the epoxy floor, there is no force that would drive water towards the drywell shell. Finally, even if water reached the embedded shell, no significant corrosion is expected for a wetted, embedded drywell shell due to the alkalinity of concrete pore water. In conclusion, there is simply no significance to superficial cracks in the epoxy floor.

5. TORUS COMMITMENT AND MARGIN

AmerGen has an aging management program for the torus, which includes inspections of the torus coating. In his January 16, 2007 letter to the ACRS subcommittee, Mr. Webster mistakenly alleges that AmerGen missed a torus-related commitment because he cannot confirm the commitment was met. He also alleges that insufficient margin exists in the torus.

AmerGen has implemented the commitment that Mr. Webster refers to in his January 16, 2007 letter. Oyster Creek has implemented an Aging Management Program for the Torus. Oyster Creek developed acceptance criteria and thresholds for entering torus coating defects and unexpected pit depths into the Corrective Action Process for further evaluation. These criteria have been incorporated into the coating's inspection implementing document, Specification SP-1302-52-120 Revision 3. These actions satisfy the commitment made to the NRC. Torus inspections were completed in the 2006 refueling outage using the committed new criteria and all acceptance criteria were satisfied.

AmerGen has established both uniform and local thickness criteria that are used to evaluate the acceptability of the torus shell and to demonstrate adequate margin exists.

The NRC Region 1 performed an inspection during the Fall 2006 outage and confirmed that the commitments on the torus were satisfied. The NRC also reviewed the results of the inspections performed during the Fall 2006 outage. This is documented in Inspection Report 05000219/2006013.