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VIA E-MAIL AND FIRST CLASS MAIL

~~*TRANSMITS CONFIDENTIAL INFORMATION NOT FOR PUBLIC DISCLOSURE, PENDING RELEASE PURSUANT TO 10 C.F.R. § 2.1207(a)(3)*~~ 9/1

August 24, 2007

Judge E. Roy Hawkens
Atomic Safety and Licensing Board Panel
Mail Stop – T-3 F23
U.S. Nuclear regulatory Commission
Washington, D.C. 20555-0001

Re: Submittal of Proposed Questions Pursuant to 10 C.F.R. § 2.1207(a)(3) on Citizens' Direct and Rebuttal Testimony; AmerGen Energy Company, LLC (License Renewal Proceeding for Oyster Creek Nuclear Generating Station), Docket No. 50-219

Dear Judge Hawkens:

In accordance with 10 C.F.R. § 2.1207(a)(3), AmerGen is filing the attached questions for the Board to consider asking Citizens' proffered expert, Dr. Hausler, during the hearing in September. These questions are based on Citizens' direct and rebuttal submittals dated July 20, and August 17, 2007, respectively.

Sincerely,

Alex S. Polonsky

cc: Service List (without attachment)

Template=SECY-049

SECY-02

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	August 24, 2007
AmerGen Energy Company, LLC	)	Docket No. 50-219
(License Renewal for Oyster Creek Nuclear Generating Station)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the letter from Alex S. Polonsky to Judge E. Roy Hawkens re: "Submittal of Proposed Questions Pursuant to 10 C.F.R. § 2.1207(a)(3) on Citizens' Direct and Rebuttal Testimony" were served this day upon the persons listed below, by e-mail and first class mail, unless otherwise noted. The confidential attachment was transmitted only to the Atomic Safety and Licensing Board Panel members and law clerk.

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Raphael P. Kuyler

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

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

In the Matter of:	August 24, 2007
AmerGen Energy Company, LLC	Docket No. 50-219
(License Renewal for Oyster Creek Nuclear Generating Station)	

AMERGEN'S QUESTIONS FOR THE BOARD ON CITIZENS' DIRECT AND REBUTTAL TESTIMONY PURSUANT TO 10 C.F.R. § 2.1207(a)(3)

In accordance with 10 C.F.R. § 2.1207(a)(3), and the Atomic Safety and Licensing Board's ("Board") Order of April 17, 2007,[1] AmerGen Energy Company, LLC ("AmerGen") hereby submits proposed questions that the Board should consider asking Dr. Hausler at the hearing. These questions are based on Citizens'[2] direct and rebuttal submittals filed on July 20 and August 17, 2007, respectively.

As directed by the Board, this submittal provides a description of the issues (Section I, below), the objective of the line of questioning (Section II, below), and specific questions (Section III, below).

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1 Memorandum and Order (Prehearing Conference Call Summary, Case Management Directives, and Final Scheduling Order) (unpublished) ("April 17 Order").

2 "Citizens" 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.

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I. Description of the Issues

A. Lack of Independent Verification

B. Acceptance Criteria

C. Available Margin

D. Sources of Water

E. Epoxy Coating System

F. Future Corrosion Rate

II. Objectives of the Proposed Examination

A. Lack of Independent Verification

1. Determine what verification processes Dr. Hausler used to develop his evaluations and calculations.

2. Identify examples of where Dr. Hausler's evaluations and calculations are mathematically incorrect.

B. Acceptance Criteria

1. Explore whether Dr. Hausler believes that: (a) buckling is the relevant failure mode at issue; and (b) that this is a phenomenon that can only be of concern if corrosion occurs over large areas.

2. Understand why Dr. Hausler believes that the buckling acceptance criteria are not volumetric (*i.e.*, depth x area).

3. Understand why Dr. Hausler believes AmerGen's use of more conservative "acceptance criteria" (akin to administrative limits) is not permissible and does not demonstrate compliance with the ASME Code.

C. Available Margin

1. Understand why Dr. Hausler believes that the nuclear industry standard for evaluating UT measurement data requires the use of something other than the "sample mean."

2. Understand why Dr. Hausler does not believe that the lowest "sample mean" for the internal UT grid data is 0.800" for grid 19A resulting in a bounding available margin of 0.064" (when compared to the 0.736" general buckling criterion).

3. Understand why Dr. Hausler believes that the internal UT grids are not representative of the thinnest areas of the drywell shell.

4. Understand why Dr. Hausler believes that the 106 single point, external UT sampling locations are not biased thin and, therefore, can be statistically treated and contoured as representative of the drywell shell.

D. Sources of Water

1. Understand why Dr. Hausler believes that, during outages, any water on the exterior surface of the drywell shell in the sand bed region could originate from a source other than the reactor cavity.

2. Understand why Dr. Hausler believes that, during operation, any water could be on the exterior surface of the drywell shell in the sand bed region.

3. Understand why Dr. Hausler believes that the lack of detectable gamma activity in the water sample taken from the poly bottles found in March 2006 "confirm[s]" the "potential for condensation." Hausler Rebuttal Testimony at 9 (A.19).

4. Understand the basis for Dr. Hausler's assumption that the sand bed drains could become clogged again such that no water could flow through any of them.

5. Understand the scenario Dr. Hausler envisions that would require filling the reactor cavity during a forced outage "before there is any chance to apply measures to mitigate leaks in the cavity liner." Hausler Rebuttal Testimony at 9 (A.19).

E. Epoxy Coating System

1. Explore Dr. Hausler's expertise in the area of epoxy coating systems of the kind used on, and in the environment adjacent to, the exterior drywell shell in the sand bed region at OCNGS.

2. Understand why Dr. Hausler believes that the coating system will not last through the period of extended operation.

3. Understand why Dr. Hausler believes that the coating system would catastrophically fail as opposed to slowly degrade over time.

4. Understand why Dr. Hausler believes that visual inspections, by ASME-qualified inspectors, would not be able to observe slow degradation of the epoxy coating system or rust bleeding through the coating and onto the grayish white epoxy from pinholes or holidays.

5. Understand why Dr. Hausler believes that corrosion through pinholes or holidays is significant from a buckling perspective.

6. Understand why Dr. Hausler believes that the epoxy coating system is susceptible to osmotic diffusion and subsequent blistering.

F. Future Corrosion Rate

1. Explore Dr. Hausler's understanding of pitting vs. general corrosion.

2. Understand why Dr. Hausler believes that any of the historical corrosion rates for the external surface of the drywell shell are relevant for the future, when all of those rates occurred with an uncoated shell adjacent to sand that was saturated with oxygenated water.

3. Understand why Dr. Hausler believes that it is reasonable to assume that corrosion could occur on an uncoated exterior drywell shell during operations, when the temperature of the shell would evaporate any water on it within a few hours.

4. Understand why Dr. Hausler believes that it is reasonable to assume anything other than negligible corrosion on the interior surface of the drywell shell (that is embedded in concrete), when the high pH from the concrete prevents significant corrosion.

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III. Line of Questions/Specific Questions

A. Lack of Independent Verification

1. Determine what verification processes Dr. Hausler used to develop his evaluations and calculations.

   a. What process did you use to verify the accuracy and appropriateness of the various calculations and evaluations that you have presented in your testimony?

   b. Did anyone other than Mr. Webster and Mr. Gunter review your calculations and evaluations before you submitted them? If so, who? Are those individuals trained and qualified to perform those technical reviews?

   c. Did these individuals check your assumptions, inputs, methodologies, and computations in accordance with established industry standards?

2. Identify examples of where Dr. Hausler's evaluations and calculations are mathematically incorrect.

   a. Didn't you ignore the data from grid 17D (and only rely on the data from grid 17A) when you concluded in your April 25, 2007 memorandum that the internal UT grids are not representative of the thinnest areas of the drywell shell? And isn't it true that if you have included grid 17D that the internal data would have undermined your conclusion?

   b. On page 7 of your April 25, 2007 memorandum, you state that "if an average of ten measurements over a specific area results in a thickness of 0.750 inches with a variability (standard deviation) for the average of 0.03 inches, the lower 95% confidence limit for this average would be 0.690 (0.75 – 0.06)." In other words, you conclude that the 95% confidence interval would be +/- 0.060". But isn't it true that if you had performed the calculation properly, then the 95% confidence interval would have been approximately +/- 0.019", not 0.060"? [Dr. Hausler failed to divide the standard deviation by the square root of $n = 10$. AmerGen, Rebuttal, A.31]

   c. When you "pooled" the bay 5, 15 and 19 external data in your evaluation that concluded that the 95% confidence value for all of the external data points is 0.090", wouldn't that value have been reduced to 0.075" if you had included the data from Bay 7?

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B. Acceptance Criteria

1. Explore whether Dr. Hausler believes that: (a) buckling is the relevant failure mode at issue; and (b) that this is a phenomenon that can only be of concern if corrosion occurs over large areas.

   a. Do you understand that the bounding failure mode of the drywell shell in the sand bed region is from buckling loads rather than from internal pressure?

   b. Isn't buckling a phenomenon that can only be of concern if corrosion or some other mechanism causes a significant reduction in thickness occurs over large areas? If not, why?

   c. Wouldn't significantly large areas that are thicker than 0.736" that surround thinner, smaller areas tend to reinforce those thinner, smaller areas from a buckling perspective?

   d. Isn't the bounding condition from a buckling perspective a seismic event during an outage when the reactor cavity is filled with water (*i.e.*, the drywell is not pressurized)?

2. Understand why Dr. Hausler believes that the buckling acceptance criteria are not volumetric (*i.e.*, depth x area).

   a. Do you agree that the local buckling criterion is volumetric in nature, in that it requires the removal (by corrosion or another mechanism) of metal to a certain depth over a specific area?

   b. Would you agree that the local buckling criterion (the "tray" configuration described by AmerGen) requires the removal of the entire "tray" of metal before the criterion is exceeded? If not, why?

   c. What is the basis for your opinion that the buckling criteria are not volumetric criteria?

3. Understand why Dr. Hausler believes AmerGen's use of more conservative "acceptance criteria" (akin to administrative limits) is not permissible and does not demonstrate compliance with the ASME Code.

   a. AmerGen has used calculation specific values to evaluate UT measurements from the sand bed region of the drywell shell (e.g., 0.636" over a 12" x 12" area). Do you agree that each of these values is more conservative than the established local buckling criterion? If not, why not?

b. Why isn't it acceptable for AmerGen to use a more conservative "acceptance criteria" which is akin to operating the plant in accordance with administrative limits that are more restrictive than design or regulatory limits?

C. Available Margin

1. Understand why Dr. Hausler believes that the nuclear industry standard for evaluating UT measurement data requires the use of something other than the "sample mean."

   a. What is your experience performing evaluations related to buckling of structures?

   b. When you have evaluated structures, have you ever applied the ASME Code? If yes, which part of the Code? If not, then what Codes and standards have you applied (American Petroleum Institute, etc.).

   c. What knowledge do you have regarding the prevailing or typical nuclear industry practice with respect to statistical analysis of UT data including use of a 95% confidence interval, sample mean, and extreme value statistics? Specifically, what are the roles of sample mean, confidence interval, and extreme value statistics in the nuclear industry?

   d. What nuclear industry Codes or standards require the use of statistical treatment of UT thickness data?

   e. What nuclear industry Codes or standards require the use of a 95% level of confidence in the UT thickness data?

   f. What nuclear industry Codes or standards require the use of confidence limit analysis of data?

   g. Please cite a Code or standard that specifically requires the use of extreme values for buckling or for pressure.

   h. Haven't you stated in your August 16 memorandum that there are no such industry Codes or standards, but rather that you believe there *ought to be*?

   i. And isn't the industry practice today accepting of the use of the "sample mean"?

   j. Do you have any citations or sources to support a position that extreme value statistics are the nuclear industry standard for evaluating UT thickness measurements?

   k. Do you have any citations or sources to support a position that extreme value statistics are the standard for any industry?

2. Understand why Dr. Hausler does not believe that the lowest "sample mean" for the internal UT grid data is 0.800" for grid 19A resulting in a bounding available margin of 0.064" (when compared to the 0.736" general buckling criterion).

   a. Hasn't AmerGen identified the lowest "sample mean" for the internal UT grid data as 0.800" for grid 19A?

   b. And wasn't it appropriate for AmerGen to compare this 0.800" mean thickness value to the general buckling criterion of 0.736" to identify an available margin of 0.064"? If not, why?

3. Understand why Dr. Hausler believes that the internal UT grids are not representative of the thinnest areas of the drywell shell.

   a. Why do you believe that the internal UT grids are not representative of the thinnest areas of the drywell shell?

   b. AmerGen has argued that you ignored the data from grid 17D (and only relied on grid 17A) when you concluded in your 4/25/07 memorandum that the internal UT grids are not representative of the thinnest areas of the drywell shell? Is that true? If true, why did you ignore those data?

4. Understand why Dr. Hausler believes that the 106 single point, external UT sampling locations are not biased thin and, therefore, can be statistically treated and contoured as representative of the drywell shell.

   a. Isn't your treatment of the external UT data analogous to biasing a sample population of the people walking on 5th Avenue by selecting too few people, and only those who are waif-like, and then concluding that only people with anorexic qualities walk on 5th Avenue?

   b. Why did you treat the external UT data points as representative of the thickness of the drywell shell?

   c. Is it reasonable to assume, as you did in your April 25, 2007 (p.6) memorandum that "when assessing the extent of severe corrosion, reviewers should assume that the measured points connect unless other measurements show this not to be the case."

   d. Do you agree with Citizens [page 14 of their Initial Statement] that "the best approach . . . is to regard the external readings as representative, even though they might actually be biased to the thin side by their method of selection"?

e. Why did you assume that the shell between the external points was as thin as the points themselves when you generated contours of the thickness of the drywell shell?

f. Didn't your own calculations determine that the external points were biased towards the thin side? On Citizens' Exhibit 12 (p.4), you state that "the average outside measurements are significantly lower at comparable elevations [than the interior measurements]. This is probably because the choice of location for the external measurements was *deliberately biased towards thin spots.*"

g. If the external points are biased thin, would your computer contouring still be an accurate representation of actual condition of the drywell shell? If yes, why?

h. How do you harmonize your computer contours, which show grooves of significantly thinned metal, with the actual visual observations of those who looked at the exterior drywell shell during the last outage?

i. Are the contour map surfaces that show smooth areas consistent with the pictures that were presented to the ACRS that show rough areas of varying profiles?

j. Are the contour map surfaces consistent with a "general corrosion" mechanism?

k. Did your computer contouring of the external UT data take into account the co-located internal UT data grids? If not, why not? And hasn't AmerGen's overlay of the external and internal UT data points as shown on Exhibit 28 demonstrate that your computer contours are inaccurate?

l. Have you used similar contour maps in other industry applications to conclusively demonstrate failure of code-based criteria?

m. Are there enough external UT data points to represent large areas of the drywell shell, or are the areas isolated points that are only representative of those points?

n. Why did you ignore the external data from Bay 7 when you "pooled" the bay 5, 15 and 19 external data in your evaluation that concluded that the 95% confidence value for all of the external data points is 0.090".

o. Did you investigate if the bay 5, 15 and 19 external data are normally distributed? If yes, what was your conclusion? If you determined that they were not normally distributed, why did you

believe it was appropriate to calculate a confidence interval for those data.

p. Are there enough external UT data points in bays 5, 15 and 19 to be representative over large areas?

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D. Sources of Water

1. Understand why Dr. Hausler believes that, during outages, any water on the exterior surface of the drywell shell in the sand bed region could originate from a source other than the reactor cavity.

   a. What are the credible sources of water and leakage paths into the sand bed region during outages? Why?

   b. How could water from the equipment pool reach the drywell shell during outages?

   c. Explain why condensation is likely to exist on the drywell shell when the drywell chillers are used during certain outages.

   d. If condensation existed on the drywell shell, why would qualified inspectors performing a VT-1 inspection not be able to identify it?

2. Understand why Dr. Hausler believes that, during operation, any water could be on the exterior surface of the drywell shell in the sand bed region.

   a. Assuming that water is present on the drywell shell surface during an outage, why would it remain there following start-up?

   b. What are the credible leakage paths into the sand bed region during operations? Explain why you think they are likely sources of water.

3. Understand why Dr. Hausler believes that the lack of detectable gamma activity in the water sample taken from the poly bottles found in March 2006 "confirm[s]" the "potential for condensation." Hausler Rebuttal Testimony at 9 (A.19).

   a. Explain the significance of the lack of gamma activity from poly bottle water discussed in Citizens' Exhibit 23.

   b. Isn't it true that water collected in the 1980s also did not contain gamma activity, but nonetheless was reactor cavity water because it had high levels of tritium, which cannot come from condensation?

   c. Without a tritium analysis, how can you be certain that the water did not come from the reactor cavity?

   d. How can you be sure that the water in the poly bottles found in March 2006 was not water from an earlier refueling outage?

e. What evidence do you have that there could be sufficient condensation to essentially fill the three, 5-gallon plastic bottles?

f. And if this much condensation is capable of being generated in the sand bed region, why was there no condensation found during physical inspections of the sand bed region during the 2006 outage?

4. Understand the basis for Dr. Hausler's assumption that the sand bed drains could become clogged again such that no water could flow through any of them.

a. What caused the historical blockage of the sand bed drains?

b. Is the sand that caused the historical blockage still present in the sand bed region?

c. Since the sand is no longer present, why should we assume that this problem will recur? What would be the mechanism or medium that could cause complete blockage in the future?

d. AmerGen verifies that the sand bed drains are clear from blockage during each refueling outage. (AmerGen Rebuttal Part 4 A.19) Why should we assume that the drains will not only become completely blocked, but the blockage will not be discovered?

5. Understand the scenario Dr. Hausler envisions that would require filling the reactor cavity during a forced outage "before there is any chance to apply measures to mitigate leaks in the cavity liner." Hausler Rebuttal Testimony at 9 (A.19).

a. What scenario could take place that would force AmerGen to fill the reactor cavity during a forced outage, and not have time to apply strippable coating and metal tape?

b. Is such a scenario likely to occur during the period of extended operation? Has it ever happened in the past?

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E. Epoxy Coating System

1. Explore Dr. Hausler's expertise in the area of epoxy coating systems of the kind used on, and in the environment adjacent to, the exterior drywell shell in the sand bed region at OCNGS.

   a. Explain the epoxy coating systems that you are familiar with.

   b. How is the epoxy coating on the sand bed region chemically similar to these coatings? How is it different?

   c. Explain the similarities and differences in the chemical structure of Tuboscopes TK-7 and the epoxy coating system on the drywell shell.

   d. Explain the types of environments in which these coating systems are used, *e.g.*, type of fluids, gasses, temperatures, pressures, flow rates.

   e. In what way is the environment of the sand bed region similar to these environments? How is it different?

   f. Given the differences in the chemistry of the coatings and the environment, should we expect the drywell shell epoxy coating to behave in a similar fashion to the other coatings that you are familiar with?

   g. Compare the application methods used for the epoxy coating system in the sand bed region with typical nuclear industry practices for similar environments.

   h. Are "tests with the wet sponge technique" typically recommended by coating specialists or national standards for coatings in benign atmospheric conditions such as those in the sand bed region?

2. Understand why Dr. Hausler believes that the coating system will not last through the period of extended operation.

   a. What studies or research support your assertion that Mr. Cavallo's "assurances" about the life of the epoxy coating system are "overly optimistic"?

   b. Explain the basis for your belief that the estimates made in the 1990s about the life span of the epoxy coating system are more accurate than Mr. Cavallo's estimates.

   c. If the previous estimates of the life span are correct, why is there no evidence of deterioration of the coating to date?

3. Understand why Dr. Hausler believes that the coating system would catastrophically fail as opposed to slowly degrade over time.

   a. What studies or research support your assertions that the benign atmospheric conditions which exist in the sand bed region have produced "rapid catastrophic failures" of properly applied, multi-layer epoxy coating systems?

   b. Can you cite any specific example of an epoxy coating system that failed catastrophically, in a low-temperature environment, under atmospheric pressure, with potential occasional exposure to moisture, and no corrosive gasses?

   c. What would be the mechanism that would cause rapid, catastrophic failure of the epoxy coating system in the sand bed region?

   d. What caused the defects in the epoxy covering portions of the external sand bed floor?

   e. Why do the defects discovered in the exterior sand bed floor imply that similar defects could take place on the drywell shell?

   f. Doesn't epoxy poured onto a concrete floor cure and ultimately degrade differently than an epoxy coating system carefully applied to the exterior drywell shell?

4. Understand why Dr. Hausler believes that visual inspections, by ASME-qualified inspectors, would not be able to observe slow degradation of the epoxy coating system or rust bleeding through the coating and onto the grayish white epoxy from pinholes or holidays.

   a. Are you currently a qualified coating inspector per NACE or per ASME? If yes, to what level are you qualified?

   b. If corrosion took place at a pinhole or holiday, what would the corrosion products look like?

   c. What volume would the corrosion products occupy beneath the pinhole compared to the volume of the corroded metal itself? Be specific as to the chemistry of the corrosion products and the basis behind your estimate of volume.

   d. Are your volume estimates based on academic chemistry tables, or are you also taking into account real world conditions such as air gaps, crusting, etc. created by the corrosion? And are you including hydrated forms of corrosion products?

e. Why would such corrosion products not be visible to a qualified VT-1 inspector as they seep through the pinhole onto the coating's surface?

5. Understand why Dr. Hausler believes that corrosion through pinholes or holidays is significant from a buckling perspective.

   a. How could a pinhole in the coating that necessarily results in a small area of corrosion impact buckling which is a phenomena over large areas

6. Understand why Dr. Hausler believes that the epoxy coating system is susceptible to osmotic diffusion and subsequent blistering.

   a. How does osmotic diffusion take place?

   b. What conditions are required for it to take place?

   c. Are all of the required conditions for osmotic diffusion present in the sand bed region?

   d. Are you aware of any examples of coating failure due to osmotic diffusion in environments similar to the sand bed region, in terms of temperature, pressure, potential occasional exposure to moisture, etc.?

F. Future Corrosion Rate

1. Explore Dr. Hausler's understanding of pitting vs. general corrosion.

   a. Does general (a.k.a. uniform) corrosion always result in a smooth surface appearance on the metal surface?

   b. Would you expect carbon steel exposed to oxygenated water to undergo general corrosion or pitting corrosion? If pitting corrosion, what is the basis for your answer, when the consensus is that carbon steel in the exterior drywell environment, even with water present, is not susceptible to pitting corrosion.

   c. Does the presence of general corrosion preempt pitting corrosion and other forms of localized corrosion?

   d. Assuming the corrosion mechanism for the carbon steel drywell shell is general corrosion, would you agree that the corrosion rate would not increase exponentially over time? If not, why?

   e. Does galvanic corrosion always involve dissimilar metals? Have you heard of thermal-galvanic effects, cold work induced galvanic effects, micro-galvanic effects, flow–induced galvanic effects, etc.?

2. Understand why Dr. Hausler believes that any of the historical corrosion rates for the external surface of the drywell shell are relevant for the future, when those rates occurred with an uncoated shell adjacent to sand that was saturated with oxygenated water.

   a. Do you agree that for the exterior surface of the drywell shell to corrode, that there needs to be bare metal and oxygenated water?

   b. Wouldn't the coating have to fail (even locally) and water come into contact with the drywell shell's metal surface in order for corrosion to occur? If not, why? And wouldn't this only be able to occur during an outage when you have alleged that water could reach the sand bed region either from the reactor cavity or from condensation?

   c. What are the chances that the coating will fail and that water will also come into contact with that portion of the drywell shell?

   d. And wouldn't any corrosion cease at the end of the outage once the drywell heats back up? If not, why?

e. Why would you expect historic corrosion rates in the external sand bed region to be repeated in the future and to endure for a long period of time (*i.e.*, years)?

f. Is there now a medium that can hold significant quantities of water adjacent the shell? If yes, what is it? If not, then why would we expect the same amount of corrosion?

g. Because the sand bed region is shaped like the top of an inverted light bulb, how would significant amounts of water adhere to the shell. Wouldn't any water except for a thin film simply drip or slide off the shell by gravity?

3. Understand why Dr. Hausler believes that it is reasonable to assume that corrosion could occur on the exterior drywell shell during operations, when the temperature of the shell would evaporate any water on it within a few hours.

a. Why have you been skeptical that any water would evaporate quickly (*i.e.*, within a few hours) from the exterior surface of the drywell shell following an outage?

b. Would your opinion be different if you had known that AmerGen had set, in the ASHRAE equation, an evaporation value for air or wind velocity at zero, *i.e.*, for stagnant conditions? (AmerGen did set the value at zero—Direct Testimony, Part 6, A.19).

c. If, as you allege, Barry Gordon and Ed Hosterman use the incorrect equation to explain the rate of evaporation of water from the drywell shell, what is the correct equation to use? How long would you estimate that it would take for water to evaporate?

d. Assuming your condensation scenario, and *if* there is little air circulation, then the condensation would have come from the adjacent air. Wouldn't there be enough capacity in that same air to reabsorb the moisture that would have condensed on the shell at the beginning of the outage?

e. Are there other places where air could reach the sand bed region from the torus room other than the sand bed drains?

4. Understand why Dr. Hausler believes that it is reasonable to assume anything other than negligible corrosion on the interior surface of the drywell shell (that is embedded in concrete), when the high pH from the concrete prevents significant corrosion.

a. What is your education and experience regarding corrosion of carbon steel that is embedded in concrete?

b. Do you have any experience with carbon steel that is constantly in contact with water that is also in contact with the concrete or that has percolated through concrete?

c. Citizens allege that the corrosion rate of the internal embedded surface of the drywell shell could be 0.010" per year. Do you agree with this statement? Can you provide the rationale for this corrosion rate because we could not find support for that statement in your testimony?

d. If you agree with a 0.010" per year corrosion rate, why would you expect the rate to be so high, and would you expect that rate to continue for an entire year during the period of extended operation, or would it be pro-rated for the 30-day duration of an outage?

e. Can you explain why the workers who exposed a portion of the interior (formerly embedded) drywell shell during the 2006 outage did not find the level of corrosion that you have alleged should have occurred over the past 37 years if the corrosion rate is even 0.002" per year?

f. Are you familiar with the NRC (GALL) and EPRI guidelines for pH, chlorides, etc. in contact with carbon steel surfaces?

g. Did you know that the water found in contact with the interior drywell shell during the 2006 outage meets these guidelines (high pH and low chlorides, etc.), demonstrating that the conditions are not conducive to corrosion?

h. Why would you expect significant corrosion on the internal embedded surface when the water in contact with the shell has a high pH due to the presence of concrete, and during operations there is a low oxygen operational environment?

~~CONFIDENTIAL PENDING~~
~~RELEASE BY THE LICENSING BOARD~~

Respectfully submitted,

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Dated in Washington, D.C.
this 24th day of August 2007.