

April 26, 2007

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
AMERGEN ENERGY COMPANY, LLC	)	Docket No. 50-219-LR
	)	
(Oyster Creek Nuclear Generating Station)	)	

NRC STAFF RESPONSE TO AMERGEN'S MOTION FOR SUMMARY DISPOSITION

INTRODUCTION

On March 30, 2007, AmerGen Energy Company, LLC (AmerGen) filed a "Motion for Summary Disposition of Citizens'¹ Drywell Contention" (Motion) in the above-captioned proceeding. Pursuant to 10 C.F.R. § 2.1205(b) and the Board's order, dated April 5, 2007, the staff of the Nuclear Regulatory Commission ("Staff") hereby answers AmerGen's Motion. For the reasons set forth below, the Staff believes summary disposition is warranted.

BACKGROUND

On November 14, 2005, Citizens filed a timely request for hearing concerning AmerGen's application to renew the Oyster Creek operating license for 20 years past the April 9, 2009 expiration date. On February 27, 2006, the Atomic Safety and Licensing Board (Board) granted Citizens' intervention petition, admitting a contention that alleged that the license renewal application (LRA)² was deficient due to the failure to include periodic ultrasonic test (UT) measurements of the sand bed region of the drywell liner in the aging management program, and rejecting Citizens' attempt in its reply to expand the contention. LBP-06-07,

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

² Letter from C. N. Swenson, AmerGen, to NRC (July 22, 2005) (ML052080172).

63 NRC 188, 211-217 (2006).³ In LBP-06-11, 63 NRC 391, 393-95, *review den'd*, CLI-06-24, 64 NRC 111 (2006), the Board rejected Citizens' February 7, 2006, attempt to raise contentions challenging, among other things, the adequacy of monitoring of thickness in inaccessible areas of the drywell liner.

In LBP-06-16, 63 NRC 737, 742-45 (2006), the Board ruled that Citizens' contention of omission was rendered moot by AmerGen's April 4, 2006, commitment⁴ to perform periodic UT measurements in the sand bed region of the drywell (*i.e.*, prior to entering the period of extended operation and every ten years thereafter), but gave Citizens the opportunity to file a new contention challenging AmerGen's new periodic UT program for the sand bed region. Citizens' filing was to be limited to AmerGen's new UT program for that region as reflected in its April 4 commitment and was to address the remaining factors in 10 C.F.R. § 2.309(f)(2), as well as the admissibility factors in 10 C.F.R. § 2.309(f)(1). *Id.* at 744-45.

Citizens subsequently submitted a contention based on the April 4 commitment, got permission to file a supplement "limited to AmerGen's UT program as reflected in [a June 20, 2006 commitment] and new information in that commitment,"⁵ and filed a supplemental petition. See [Citizens] Petition to Add a New Contention (June 23, 2006) ("June 23 Petition"); Order (Granting NIRS's Motion for Leave to Submit a Supplement to its Petition (July 5, 2006) (unpublished); "Supplement to Petition to Add a New Contention" (July 25, 2006)

³ The admitted contention alleged that "AmerGen's corrosion management program . . . will not enable AmerGen to determine the amount of corrosion in that region and thereby maintain the safety margins during the term of the extended license." LBP-06-07, 63 NRC at 217. Prior to the admission of the contention, AmerGen committed to "perform a set of onetime thickness measurements . . . in the 'sand bed region' . . . at a sample of areas previously inspected (in the 1990s) and identified as having exhibited corrosion." Letter from C. N. Swenson, AmerGen, to NRC (Dec. 9, 2005) (ML053490219), at 3.

⁴ Letter from Michael P. Gallagher, AmerGen, to NRC (Apr. 4, 2006) (ML060970288).

⁵ Letter from Michael P. Gallagher, AmerGen, to NRC (June 20, 2006) (ML061740573).

("Supplement").⁶ In LBP-06-22, 64 NRC 229, 255-56 (2006), the Board admitted one of seven challenges⁷ raised by Citizens as the following contention:

[I]n light of the uncertain corrosive environment and correlative uncertain corrosion rate in the sand bed region of the drywell shell, AmerGen's proposed plan to perform UT tests prior to the period of extended operations, two refueling outages later, and thereafter at an appropriate frequency not to exceed 10-year intervals is insufficient to maintain an adequate safety margin.

The Board noted that Citizens' argument was grounded upon the assumption that the corrosion rate in the sand bed region is unknown due to the uncertain corrosive environment. See 64 NRC at 240. The Board, *inter alia*, rejected as nontimely Citizens' challenge to the adequacy of monitoring the sand bed region for integrity of the epoxy coating and for moisture as well as the challenge to the spatial scope of AmerGen's UT measurements and assertions that monitoring fails to systematically survey thin areas, and the challenge to AmerGen's drywell minimum thickness acceptance criteria (*i.e.*, 0.736 inches and 0.536 inches) used since 1992. *Id.* at 244-51, 237-240.

⁶ Appended to Citizens' June 23 Petition and the Supplement are memoranda from Rudolph Hausler, dated June 23 and July 25, 2007, respectively.

⁷ Citizens challenged as inadequate AmerGen's (1) drywell thickness acceptance criteria, (2) scheduled UT monitoring frequency, (3) moisture and coating integrity monitoring, (4) response to wet conditions and coating failure, (5) scope of UT monitoring to systematically identify and sufficiently test degraded areas, (6) quality assurance for measurements, and (7) methods for analyzing UT results. See LBP-06-22, 64 NRC at 236.

On February 9, 2007, the Board denied Citizen's request⁸ to admit two late contentions concerning (1) AmerGen's December 3, 2006 proposal⁹ to conduct UT monitoring in the embedded region and (2) the inadequacy of AmerGen's proposed monitoring in the sand bed region from the outside. The Board ruled that the contentions were nontimely under 10 C.F.R. § 2.309(f)(2), and inadmissible under § 2.309(f)(1) since they failed to raise a genuine dispute regarding a material issue of law or fact. Memorandum and Order (Denying Citizens' Motion for Leave to Add Contentions and Motion to Add Contention) (unpublished), slip op. at 7, 15-16, 19, *reconsideration den'd*, Memorandum and Order (Nov. 20, 2006) (unpublished).

In a Memorandum and Order, dated April 10, 2007 (unpublished), the Board also rejected, as unjustifiably late, Citizens' request to add a late contention alleging that UT acceptance criteria for the drywell shell should be increased from 0.536 and 0.736 inches to 0.618 and 0.844 inches, respectively. Subsequently, on March 30, 2007, the Applicant filed the instant Motion, seeking summary disposition of the admitted contention. Appended to the Motion are (1) two drawings of the drywell (Exhibits 1 and 2), (2) a Letter from AmerGen to NRC, dated February 15, 2007 (ML070520252), documenting commitments made at a February 1, 2007 Advisory Committee on Reactor Safeguards ("ACRS") meeting, including a commitment to perform full scope of drywell sand bed region inspections every other refueling outage, (3) the Affidavit of Peter Tamburro, dated March 26, 2007 ("Tamburro Affidavit"), (4) the Affidavit of Barry Gordon, dated March 26, 2007 ("Gordon Affidavit"), and (5) the Affidavit of Jon R. Cavallo,

⁸ Motion for Leave to Add Contentions and Motions to Add Contentions (Dec. 20, 2006). Appended to this filing was the December 3 Supplement (Exh. ANC 1), AmerGen's Advisory Committee on Reactor Safeguards Information Package (Exh. ANC 2), an Oyster Creek shift turnover note for October 21-22, 2006 (Exh. ANC 3), a Memorandum of Dr. Rudolph Hausler (Dec. 19, 2006) (Exh. ANC 4) ("Sixth Hausler Memo"), an Oyster Creek Action Request (Oct. 25, 2006) (Exh. ANC 5), and a Letter from Richard Conte, NRC, to Richard Webster (Nov. 9, 2006) (Exh. ANC 6).

⁹ Letter from Michael P. Gallagher to NRC (Dec. 3, 2006) (enclosing Post-2006 Refueling Outage Information) ("December 3 Supplement") (ML063390664). Corrections to this letter were submitted on December 15, 2006 (ML963530042).

dated March 26, 2007 ("Cavallo Affidavit"). The Staff response to the motion is set forth below.

DISCUSSION

I. Legal Standards Governing Motions for Summary Disposition

Pursuant to 10 C.F.R. § 2.1205(a), a motion for summary disposition must be in writing, must include a written explanation of the basis of the motion and must include affidavits to support statements of fact. A presiding officer will rule on a motion for summary disposition "applying the standards for summary disposition set forth in [10 C.F.R. Part 2,] Subpart G. 10 C.F.R. § 2.1205(c). A moving party is entitled to summary disposition of a contention as a matter of law if the filings in the proceeding, together with the statements of the parties and the affidavits, demonstrate that there is no genuine issue as to any material fact. See 10 C.F.R. §§ 2.1205 and 2.710(d)(2);¹⁰ *see also Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant), CLI-01-11, 53 NRC 370, 384 (2001); *Advanced Medical Sys., Inc.* (One Factory Row, Geneva, Ohio), CLI-93-22, 38 NRC 98, 102-03 (1993); *Exelon Generation Co, LLC* (Early Site Permit for Clinton ESP Site), LBP-05-19, 62 NRC 134, 179-80 (2005) (§ 2.710 requires that no genuine issue be shown through a statement of material facts not at issue and any supporting materials; an opposing party must state specific facts showing a genuine issue of material fact to be litigated; any of the movant's facts not controverted by a like statement by an opposing party are deemed admitted).¹¹

¹⁰ Section 2.710 contains substantive and procedural standards for rulings on summary disposition motion (e.g., a movant's facts not controverted are deemed admitted, 10 C.F.R. § 2.710(a); affidavits may be supplemented or opposed by further affidavits, 10 C.F.R. § 2.710(b); and summary disposition may be granted if no genuine issue as to any material facts is shown, 10 C.F.R. § 2.710(d)).

¹¹ AmerGen argues that 10 C.F.R. § 2.1205 provides a simplified procedure for summary disposition in informal proceedings that does not require a separate statement of facts. See Motion at 4 (citing 69 Fed. Reg. 2182, 2228 (Jan. 14, 2004)). The rule does not explicitly require a separate statement of material facts, see 10 C.F.R. § 2.1205, and the Statements of Considerations accompanying the rule is not instructive. The failure to include such a statement, whether in the body of a summary disposition motion or in a separate document, may make it difficult for parties and this Board to discern (continued. . .)

The party seeking summary disposition bears the burden of demonstrating the lack of a genuine issue of material fact and the evidence submitted must be construed in favor of the non-moving party. See *Sequoyah Fuels Corp. & Gen. Atomics Corp.* (Gore, Oklahoma Site Decontamination and Decommissioning Funding), LBP-94-17, 39 NRC 359, 361, *aff'd*, CLI-94-11, 40 NRC 55 (1994). The opinions of experts qualified by “knowledge, skill, experience, training, or education” must be sufficiently grounded upon a factual basis. *Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-05-04, 61 NRC 71, 80-81(citing Federal Rule of Evidence 702; *Bragdon v. Abbott*, 524 U.S. 624, 653 (1998). Bare assertions and general denials, even by an expert, are insufficient to oppose a properly supported motion for summary disposition. *Id.* at 81 (citing *Advanced Med. Sys., Inc.*, CLI-93-22, 38 NRC at 102; *Houston Lighting & Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-629, 13 NRC 75, 81 (1981). See also 10 C.F.R. § 2.710(b). For the Board to find the existence of a genuine issue of material fact, “the factual record, considered in its entirety, must be enough in doubt so that there is a reason to hold a hearing to resolve the issue.” *Cleveland Elec. Illuminating Co.* (Perry Nuclear Power Plant, Units 1 & 2), LBP-83-46, 18 NRC 218, 223 (1983). Admission of a party in a proceeding based on one acceptable contention neither precludes summary disposition nor guarantees a party a hearing on its contentions. *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant, Unit 1), ALAB-696,

(. . .continued)

material facts that the movant believes are not in dispute and whether particular facts have been controverted. See 10 C.F.R. § 2.710(a), (d). Licensing boards rulings on such motions in Subpart L proceedings have construed § 2.1205 as incorporating the terms of § 2.710, but were not faced with this issue since the movants and respondents appended separate statements of material facts. See *Clinton ESP*, 62 NRC at 180 n.189; *Entergy Nuclear Vermont Yankee, LLC & Entergy Nuclear Operations* (Vermont Yankee Nuclear Power Station), LBP-06-05, 63 NRC 116, 119-20, 124-125, 128 (2006) (denying motion due to conflicting expert opinion inappropriate to “untangle” or weigh at the summary disposition stage). Assuming AmerGen is correct, an opposing party’s material facts in dispute similarly would not need to be set forth in a separate statement.

16 NRC 1245, 1258 n.15 (1982) (citing *Houston Lighting & Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542, 550 (1980)).

II. Safety-Related Issues in License Renewal Proceedings

The Commission's "[l]icense renewal reviews are not intended to 'duplicate the Commission's ongoing review of operating reactors.'" *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), CLI-01-17, 54 NRC 3, 7 (2001) (citing Final Rule, "Nuclear Power Plant License Renewal," 56 Fed. Reg. 64,943, 64,946 (Dec. 13, 1991)). Therefore, the license renewal safety review process focuses on the "potential detrimental effects of aging that are not routinely addressed by ongoing regulatory oversight programs." *Id.* Consequently, "10 C.F.R. Part 54 requires renewal applicants to demonstrate how their programs will be effective in managing the effects of aging during the period of extended operation." *Id.* at 8 (citing 10 C.F.R. § 54.21(a)). Applicants are required to "identify any additional actions, i.e., maintenance, replacement of parts, etc., that will need to be taken to manage adequately the detrimental effects of aging." *Id.* (citing Final Rule, "Nuclear Power Plant License Renewal; Revisions," 60 Fed. Reg. 22,461, 22,479 (May 8, 1995)). The Commission has recognized that these "adverse aging effects generally are gradual and thus can be detected by programs that ensure sufficient inspections and testing." *Id.* (citing 60 Fed. Reg. at 22,475). License renewal proceedings are limited to a "review of the plant structures and components that will require an aging management review for the period of extended operation and the plant's systems, structures, and components that are subject to an evaluation of time-limited aging analyses." *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-01-20, 54 NRC 211, 212 (2001) (citing 10 C.F.R. §§ 54.21(a) and (c), 54.4; Nuclear Power Plant License Renewal Revisions, Final Rule, 60 Fed. Reg. 22,461 (1995)). Among the findings that the Staff must make in order to grant renewal of the license is to find that AmerGen has demonstrated "that the effects of aging [of the Oyster

Creek drywell shell] will be adequately managed so that the intended function(s) [i.e., structural support and pressure boundary] will be maintained . . . for the period of extended operation.”

Oyster Creek. LBP-06-22, 64 NRC at 241 (quoting 10 C.F.R. § 54.21(a)(3)).

III. AmerGen's Motion Should Be Granted

AmerGen argues that summary disposition is warranted because the admitted contention is limited to whether the frequency of UT measurements in the sand bed region of the drywell shell is sufficient and there is no genuine issue of material fact with respect to the bases the Board identified in admitting the contention. See Motion at 9-10. AmerGen asserts that there is no genuine issue of material fact as to whether AmerGen's UT monitoring frequency is sufficient to maintain an adequate safety margin in accordance with NRC requirements and, hence, AmerGen, is therefore entitled to a decision as a matter of law. *E.g.*, Motion at 3. AmerGen notes (see Motion at 9-10) that the bases identified by the Board (64 NRC at 242, 244 n.16 (citing [Citizens'] Supplement to Petition to Add a New Contention (July 25, 2006) ("Citizens' Supplement"), at 9, 12; Citizens' June 23 Petition, Memorandum from Dr. Rudolf H. Hausler to Richard Webster, at 7) were:

1. "portions of the drywell shell are 0.026 inches or less from violating AmerGen's acceptance criteria [of 0.736 inches]";
2. "long term corrosion rates of more than 0.017 inches per year have been observed; "
3. "[thus,] if corrosive conditions are possible, a UT monitoring frequency of once per year or more would be necessary to prevent violation of acceptance criteria"
4. "if the [next scheduled] UT monitoring that is to occur before the end of the licensing period reveals that the sand bed region has suffered additional corrosion, a UT testing frequency would have to be increased accordingly;" and
5. "UT monitoring is necessary even where visual inspections of epoxy coating do not reveal that the coating has deteriorated, because corrosion may occur under the epoxy coating in the absence of visible deterioration due to nonvisible holidays, or pinholes."

64 NRC at 242. The crux of AmerGen's argument is that Citizens' contention is based on speculation about future corrosion, misinterpretation of the "local area" average thickness criterion, and math errors. See Motion at 7. AmerGen's material facts appear to be that:

1. Corrective actions take since the 1980s, including removal of sand from the sand bed region, removal of corrosion products from the exterior of the drywell shell in the sand bed region and the multi-layer coating of the exterior of the drywell in that region, have protected the drywell shell exterior from further corrosion in the sand bed region, and such corrosion has been arrested, see Motion at 15-16; Tamburro Affidavit at ¶¶39; Gordon Affidavit at ¶¶ 12-13; Cavallo Affidavit at ¶ 12.

2. The general thickness acceptance criterion of 0.736 inches satisfies ASME Code requirements with a safety factor of 2.0 against buckling for the controlling refueling load combination, and a safety factor of 1.67 for the post-accident load combination, see Motion at 18-19; Tamburro Affidavit at ¶ 17;

3. Locally thinned areas are evaluated against a local average thickness of 0.536 inches over an area not to exceed one square foot, surrounded by a one foot transition area up to 0.736 inches, see Motion at 19; Tamburro Affidavit at ¶ 20;

4. An average thickness of 0.49 inches in an area not to exceed 2.5 inches is the acceptance criterion for a very locally thinned area, see Motion at 19; Tamburro Affidavit at ¶ 18;

5. VT-1(visual) inspections of the epoxy coating in all 10 bays in the sand bed region in accordance with ASME Code Section XI, Subsection IWE by qualified inspectors did not identify any defects or deterioration of epoxy coating, see Motion at 16; Tamburro Affidavit at ¶ 40; Cavallo Affidavit at ¶ 15.

6. The bounding general average thickness in the sand bed region is .800 inch in Bay 9, leaving a margin of 0.064 inch, not 0.026 inch, to the 0.736 inch acceptance criterion, and the bounding local average thickness of 0.618 inch in Bay 13, leaves a margin of 0.082 to the 0.536 inches local thickness criterion. See Motion at 19-22; Tamburro Affidavit at ¶ 24;

7. Dr. Hausler's opinion that corrosive conditions exist which could result in a continued corrosion rate of 0.017 inches per year is speculative since AmerGen has taken corrective actions to prevent reactor cavity leakage during refueling, sand -- the water retaining media --has been removed from the sand bed region, a corrosion rate as high as .017 inches per year occurred prior to application of the epoxy coating and such coating prevents corrosion, such a high corrosion rate would have been detected by previous VT-1 inspections and UT measurements, and corrosion behind a pin hole or holiday, even if it occurred, would be acceptable so long as it did not exceed the very local area acceptance criterion of 0.49 inches in an area 2.5 inches or less in diameter, Motion at 22-28, Tamburro Affidavit at ¶¶ 39-40, 43; Gordon Affidavit at ¶¶ 12, 15, 17; Cavallo Affidavit at ¶¶ 13-18, 20.

8. Commitments docketed since the admission of the contention now include (a) visual inspections of the epoxy coating on the drywell shell exterior as well as internal and external UT measurements of the sand bed region all 10 bays, every other outage (i.e., every four years), and (b) additional measures such as notifying the NRC, conducting additional visual inspections, performing an operability determination prior to restart from the associated outage, and conducting more frequent UT measurements, if AmerGen finds statistically-significant deviations from prior UT results. See Motion at 17-18; Exhibit 3

(Commitment 27, items 1, 4, 21);

The Staff agrees that AmerGen is entitled to a decision as a matter of law. As noted in the attached Affidavit of Hansraj G. Ashar, dated April 26, 2007 ("Ashar Affidavit") and Affidavit of James A. Davis, Ph.D, dated April 26, 2007 ("Davis Affidavit"), the Staff concluded in its Safety Evaluation Report, dated March 2007 ("SER"), that the commitment to perform ASME Section XI, Subsection IWE, drywell shell inspections in all ten bays of the sand bed region every other refueling outage, and to take appropriate actions when significant corrosion is detected, provides assurance that effects of aging will be adequately managed so that intended functions of the drywell shell will be maintained during the renewal period. See SER at 3-143, 4-75; Ashar Affidavit at ¶ 6; Davis Affidavit at ¶ 4, 9, 10 (citing Commitments 27, items 4 and 21, and Commitment 33 in SER Appendix A).

The Staff agrees that AmerGen has taken corrective actions which should reduce the likelihood that past corrosion rates will continue in the sand bed region. See Ashar Affidavit at ¶ 7. It is apparent that Citizens' merely speculate that annual or more frequent monitoring should be required, acceptance criteria would be violated in less than two years, and that inspections are needed where visual inspections of the epoxy coating do not reveal that the coating has deteriorated. See Motion at 28-30; Ashar Affidavit at ¶ 7-9; Davis Affidavit at ¶ 9. In addition, it does not appear that Dr. Hausler has experience in the inspection of coatings and thus is not qualified to render an opinion on such matters. See Exhibit 13 to Combined Reply of [Citizens] to the Answers of AmerGen and the [NRC] (Dec. 19, 2005). See *Duke Cogema*, LBP-05-04, 61 NRC at 80-81 & n. 70 (expert opinion is only admissible if the affiant is competent to give an expert opinion).

The results of the internal and external UT measurements taken in the sand bed region in 1992-1996, and in 2006 in all 10 bays, in the sand bed region indicate no significant corrosion since 1992 and that past corrosion is not likely to continue. Ashar

Affidavit at ¶ 7. If significant corrosion is identified, AmerGen will perform an operability determination, additional UT measurements, and an evaluation to assess the extent of degradation and the necessity for additional inspections. Ashar Affidavit at ¶ 6; Motion, Exhibit 3, Enclosure at 1-2. Thus, there is no genuine dispute as to a material issue of law or fact and, AmerGen's motion should be granted.

CONCLUSION

For the reasons discussed above, the Motion should be granted.

Respectfully submitted,

/RA/

Mitzi A. Young
Counsel for NRC Staff

Dated at Rockville, Maryland
this 26th day of April, 2007

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
AMERGEN ENERGY COMPANY, LLC	)	Docket No. 50-219-LR
	)	
(Oyster Creek Nuclear Generating Station)	)	

AFFIDAVIT OF HANSRAJ G. ASHAR

I, Hansraj G. Ashar, do hereby state as follows:

1. I am employed by the U.S. Nuclear Regulatory Commission ("NRC") as a Structural Engineer in the Division of Engineering, Office of Nuclear Reactor Regulation ("NRR"). For the last 33 years, I have reviewed plant license and license renewal applications, and have been involved in nuclear power plant standards development. As part of my responsibilities, I represent the NRC on committees for a number of organizations that develop standards related to nuclear power plant structures, namely, the American Society of Mechanical Engineers (ASME), American Concrete Institute, and American Institute of Steel Construction. I reviewed Section 4.7.2, "Time Limited Aging Analysis of Drywell Corrosion" in the Oyster Creek License Renewal Application and prepared Section 4.7.2 of the NRC Safety Evaluation Report, dated March 2007 ("SER") (ML070890637). A copy of my professional qualifications is attached.

2. The purpose of this affidavit is to address AmerGen's "Motion for Summary Disposition of Citizens' Drywell Contention" (Motion) in the above-captioned proceeding. Citizens' contention, as admitted by the Board, LBP-06-22, 64 NRC at 255-56, alleges that:

[I]n light of the uncertain corrosive environment and the correlative uncertain corrosion rate in the sand bed region of the drywell shell, AmerGen's proposed plan to perform UT tests prior to the period of extended operations, two refueling outages later, and thereafter at an appropriate frequency not to exceed 10-year intervals is insufficient to maintain an adequate safety margin.

I have read the Motion and relevant portions of LBP-06-22, 64 NRC 229 (2006), Citizens' June 23 Petition, and Citizens' July 5 Supplement.

3. In section V.A of the motion, AmerGen discusses the locally-thin areas in the sand bed region of the Oyster Creek drywell shell. Based on the review of the GPU Nuclear Calculation C-1302-187-5320-024 (Exhibit 3 to AmerGen's Answer Opposing Citizens' February 6, 2007 Motion for Leave to Add a Contention and Motion to Add a Contention (March 5, 2007) ("March 5 Answer") (ML070670373)) related to the identification of degraded areas, and responses to the staff's requests for additional information (see NRC SER Section 4.7.2), it is my opinion that AmerGen has developed three criteria related to acceptance of the shell thicknesses; (1) general minimum average required thickness of 0.736 inch, (2) a minimum locally thin thickness of 0.536 inch, in an area of one square foot, with a surrounding one foot transition area to 0.736 inch, and (3) the minimum thickness of 0.49 inch in an isolated area not exceeding an area of a circle having a diameter of two and one-half inches. See March 5 Answer, Exhibit 3 at 10-11 of 117. In addition, AmerGen has elected to use a thickness of 0.636 inch to characterize the extent of degradation below 0.736 inch. See *id.*

4. In GPU Nuclear Calculation C-1302-187-5320-024, there are eight raw 1992 UT data points in Bay 1, that are between 0.636 inch and 0.736 inch, and no UT data point is less than 0.636 inch. In Bay #13, there are nine raw data points between the thickness of 0.636 inch and 0.736 inch, and one data point (i.e., 0.618 inch) below 0.636 inch, but above 0.536 inch. AmerGen has adjusted the raw data points less than 0.736 inch to account for surface roughness for their use in its structural evaluation. *Id.* at 67-87 of 117.

5. The GE analysis performed for the locally thin acceptance criterion in paragraph 3, above, assumes that the minimum thickness in one square foot area is 0.536 inch, and spreading the transition area to 0.736 inch in one foot on all sides of the 0.536 area is

considered an acceptable modeling assumption. The modeling concept is illustrated in Figure 1 of Mr. Tamburro's Affidavit at ¶ 20. The Staff has accepted this method of analyzing the simulated degraded areas in section 4.7.2 of its SER.

6. In Section V.B of the motion, AmerGen discusses the differences in margins claimed by AmerGen and Citizens. This discussion is based on consideration of an average thickness of the shell being 0.736 inch and a localized minimum thickness of 0.536. AmerGen asserts that the drywell shell corrosion in the sand bed area has been arrested (Tamburro at ¶ 41). Based on the overall review of the October 2006 UT test results, I agree that the corrective actions taken by AmerGen, and the aging management program commitments in Appendix A of the staff's SER will monitor and possibly prevent additional corrosion in the sand-bed region of the drywell shell. AmerGen's Commitment #27 (item 1) provides that AmerGen will report statistically significant corrosion to the NRC, and perform an operability determination and justification for operation until the next inspection. This commitment includes identification of the extent of additional degradation and performing additional UT measurements in addition to comparing the thickness differential.

7. In section V.D of the motion, AmerGen discusses the UT monitoring frequency in the sand bed area. Based on the comparison of the UT measurements in October 2006, and earlier UT measurement data, AmerGen asserts that the drywell corrosion in the sand bed area has been arrested (Tamburro Affidavit at ¶ 41). The corrective actions taken by AmerGen in 1992 provide assurance that corrosion experienced prior to 1992 will not occur in the future. In addition, the results of the 1994, 1996 and 2006 UT measurements have not identified any significant corrosion. See SER at 3-120 to 3-121. Thus, the Staff concluded that the commitment to examine the coating surface by ASME Subsection IWE's VT-1 method every other refueling outage, will ensure that any disruption in the epoxy coating due to future

corrosion will be identified and corrective actions taken before such corrosion would challenge the structural integrity of the drywell shell. See SER at 3-143, 4-75.

8. In Section V.F of the Motion, AmerGen discusses the Citizens' allegation: "UT monitoring is necessary even where visual inspection of the epoxy coating does not reveal that the coating has deteriorated." AmerGen has committed to perform VT-1 examination of the 100% of the epoxy coating every other outage (Commitment 27, item 4), and perform UT measurements from inside and outside the drywell every other outage (Motion, Exhibit 3; Commitment 27(items 9, 14, 21)). These commitments provide reasonable assurance that the drywell will perform its intended function (providing a pressure retaining boundary and supporting loads) during the period of extended operation. SER at 3-143, 4-75.

9. Based on the condition of the Oyster Creek drywell shell in the sand bed area during the October 2006 outage and AmerGen's Commitments, it is my opinion that the frequency of every four years for VT-1 examinations of the coating, and performance of UT measurements, during the period of extended operation, provides reasonable assurance that the drywell shell integrity (and the intended function of the drywell) will be maintained during the period of extended operation.

10. I declare under penalty of perjury that the foregoing affidavit and attached statement of professional qualifications are true and correct to the best of my knowledge and belief.

/Original signed by/

Hansraj G. Ashar

Executed at Rockville, MD
this 26th day of April, 2007

Hansraj G. Ashar
Statement of Professional Qualifications

CURRENT POSITION:

Senior Structural Engineer
Regulation

Division of Engineering, Office of Nuclear Reactor
U.S. Nuclear Regulatory Commission
Rockville, MD

EDUCATION

Bachelor of Civil Engineering, Gujarat University, India
Masters Degree in Civil-Structural Engineering, 1958, University of Michigan, Ann Arbor, MI

Registered Professional Engineer in the States of Ohio and Maryland.

EXPERIENCE

For the last 33 years, I have been working as a Structural engineer/Sr. Structural Engineer with the U.S. Nuclear Regulatory Commission in review of the plant licenses, standards development, containment related research activities and license renewal activities. For the first eleven years of my career, I have worked as a Bridge Engineer in the States of Ohio, New Jersey; and in Wiesbaden Germany on designing steel, reinforced and prestressed concrete bridges. The next five years, I worked as a Lead Civil Engineer on developing design documents and procurement specifications for nuclear power plants, namely, Three Mile Island, Unit 2, Forked River, and Oyster Creek.

I represent NRC in a number of Standards Developing Organizations, namely, American Society of Mechanical Engineers (ASME), American Concrete Institute, and American Institute of Steel Construction on several committees developing standards related to the nuclear power plant structures. I am a fellow member of the American Concrete Institute, and the American Society of Civil Engineers.

REGULATORY DOCUMENTS (Principal Author):

Information Notices

- | | |
|----------|---|
| IN 93-53 | Effects of Hurricane Andrew on Turkey Point Nuclear Generating Station and Lessons Learned, April 1994 |
| IN 95-49 | Seismic Adequacy of Thermo-Lag Panels, October 1995
Supplement 1: Seismic Adequacy of Thermo-Lag Panels, December 1997 |
| IN 97-10 | Liner Plate Corrosion in Concrete Containments, March 1997 |
| IN 97-11 | Cement Erosion from Containment Subfoundation at Nuclear Power Plants, March 1997 |

IN 97-22	Failure of Welded Steel Moment-Resisting Frames During the Northridge Earthquake, April 1997
IN 97-29	Containment Inspection Rule, May 1997
IN 98-26	Settlement Monitoring and Inspection of Plant Structures Affected by Degradation of Porous Concrete Subfoundation, July 1998
IN 99-10	Degradation of Prestressing Tendon Systems in Prestressed Concrete Containments, April 1999
IN 06-01	Torus Cracking in a BWR Mark-I Containment, January 2006
ISG 06-01	Aging Management Program for Inaccessible Areas of BWR Mark-I Containment Drywell shell, September 2006

Inspection Procedures

IP 62002	Inspection of Structures, Passive Components, and Civil Engineering Features at Nuclear Power Plants, Dec. 1996
IP 62003	Inspection of Steel and Concrete Containments at Nuclear Power Plants, June 1997

Regulatory Guides

RG 1.35	Inservice Inspection of UngROUTED Tendons in Prestressed Concrete Containments. Rev. 1 (1974), 2 (1976), 3 (1990)
RG 1.35.1	Determining Prestressing Forces for Inservice Inspection of Prestressed Concrete Containments: Draft (1979), final (1990)
RG 1.90	Inservice Inspection of Prestressed Concrete Containments with Grouted Tendons: (1977).
RG 1.107	Qualification of Cement Grouting for Prestressing Tendons in Prestressed Concrete Containments: (1977)
RG 1.136	Materials, Construction and Testing of Concrete Containments (Endorsement of ASME Section III/Div. 2 (or ACI 359): (1981)
RG 1.142	Safety-Related Concrete Structures for Nuclear Power Plants (Other than Reactor Vessels and Containments): (1981)

Technical Support to the principal coordinators of 10 CFR 50.55a, (Codes and Standards) Revisions on endorsing Subsections IWE/IWL (ISI of Containments) of the ASME Code: 1994 to Present

PROFESSIONAL AND COMMUNITY ACTIVITIES

Participation in National and International Standards Organizations

Member of the following NSO and INSO Committees:

- American Institute of Steel Construction (AISC)
Chairman: Nuclear Specification Committee (AISC/ANSI N690)
Member: Building Specification Committee
Advisory: Seismic Provisions Committee
- American Concrete Institute (ACI) 349 Committees
Member: Main committee
Member: Subcommittee 1 on General Requirements, Materials and QA
Member: Subcommittee 2 on Design
- American Society of Mechanical Engineers (ASME):
Member: Working Group on Inservice Inspection of Concrete and Steel Containments
(Subsections IWE and IWL of ASME Section XI Code)
Member: ASME/ACI Joint Committee on Design, Construction, Testing and Inspection
of Concrete Containments and Pressure Vessels
- Member: RILEM Task Committee 160-MLN: Methodology for Life Prediction of Concrete
Structures in Nuclear Power Plants
- Member: Federation Internationale du Beton (FIB) Task Group 1.3: Containment
Structures
- Consultant to IAEA on Concrete Containment Database (2001 to 2005)

PROFESSIONAL MEMBERSHIPS

Professional Engineer: State of Ohio, State of Maryland

Fellow - American Concrete Institute

Fellow - American Society of Civil Engineers

Professional Member - Post-tensioning Institute

COMMUNITY ORGANIZATIONS - SERVICES

Member- Montgomery County Energy and Air-Quality Advisory Committee (1995 to 2001)

Science Fair Judge (Montgomery County) - 1994-2001

Member-Architectural Committee – Hickory Crest, Columbia, Association

Peer reviewer of number of papers to be published in ASCE Material Journal, NED Periodicals, and ACI International.

PUBLICATIONS/PRESENTATIONS

1. Ashar, H., Terao, D., Imbro, E.: "Reliability of Containment and Risk-Informed Decision Making – A Perspective," Presented at SMiRT17 International Conference in Prague, Czech Republic, August 2003.

2. Ashar, H., Imbro, E, Terao, D.: Integrated Leak Rate Testing of Containments - A Regulatory Perspective, Presented by Eugene Imbro at ICONE11 in Tokyo, Japan, April 2003.
3. Ashar, H.: Inspection of Containment Structures in the U.S.A. Presented at the 16th International Conference on Structural Mechanics in Reactor Technology, Washington DC. August 12-17, 2001.
4. Kotzalas, M., Ashar, H.: Regulatory Issues Involved in the Use of the ASME XI, IWE/IWL, Presented at the ASME Pressure Vessel and Piping Conference, Atlanta, GA. July 2001.
5. Ashar H., Kotzalas, M.: Implementation of Containment Inspection Rule, 10 CFR Part 50.55a, Presented at the ASME Pressure Vessel and Piping Conference, Atlanta, GA. July 2001.
6. Ashar, H.: Implications of Concrete Structure Degradations in Nuclear Power Plants, Proceedings of the International RILEM Conference on Life Prediction and Aging Management of Concrete Structures, Cannes, France, October 16-18, 2000.
7. Ashar, H., Bagchi, G.: "Monitoring Degradation of Concrete Structures in U.S. Nuclear Power Plants," Proceedings of the 8th International Conference (Sponsored by RILEM) on "Life Management and Aging Management of Concrete Structures," Bratislava, Slovakia, July 1999.
8. Ashar, H., Bagchi, G.: "Implementation of Maintenance Rule for Structures," Proceedings of the 7th symposium on Current Issues Related to Structures, Systems, and Piping, North Carolina State University, Raleigh, NC, December 1998 (Published in Nuclear Engineering and Design in Nov. 1999).
9. Ashar, H., Costello, J., Graves, H.: "Prestress Force Losses in Containments of U.S. Nuclear Power Plants," Proceedings of the Joint WANO-PCIOECD-NEA Workshop on Prestress Loss in Nuclear Containments, Poitier, France, August 1997.
10. Ashar, H., Bagchi G.: "Safety Related Nuclear Power Plant Structures - Assessment of Inservice Conditions," NUREG 1522, U.S. Nuclear Regulatory Commission, Washington D.C., 20555, May 1995.
11. Ashar, H., Jeng, D.: "Degradation of Passive Components in U.S. Nuclear Power Plants," Proceedings of the 6th Symposium on Current Issues Related to Structures, Systems, and Piping, North Carolina State University, Raleigh, NC, December 1996.
12. Ashar, H., Jeng, D.: "Performance of Structures in Nuclear Power Plants," Paper X/2, Proceedings of the 5th Symposium on Current Issues Related to Structures, Systems, and Piping, Orlando, FL., December 1994.

13. Ashar, H., Naus, D., Tan, C. P.: "Prestressed Concrete in U.S. Nuclear Power Plants," Concrete International, American Concrete Institute, Detroit, Michigan, Part I in May 1994, Part 2 in June 1994.
14. Jeng, D., Bagchi, G., Ashar, H.: "Structural Issues Related to Containment Performance in Advanced Reactors," Proceedings of the Second ASME/JSME Conference on Nuclear Engineering, San Francisco, CA, March 1993.
15. Ashar, H., Tan, C. P.: "Inservice Performance of Containment Structures - U.S. Experience," Proceedings of the 11th Conference of Structural Mechanics in Reactor Technology (SMIRT), Tokyo, Japan, August 1991.
16. Tan, C. P., Ashar, H.: "Modifications of Concrete Containments for Steam Generator Replacement-Regulatory Considerations," Proceedings of SMIRT 11th, Tokyo, Japan, August 1991.
17. Ashar, H., Jeng, D.: "Effectiveness of Inservice Requirements for Prestressed Concrete Containments," Proceedings of the 2nd International Conference on Containment Design and Operation, Toronto, Ontario, Canada, October 1990.
18. Ashar, H., Degrossi, G.: "Design and Analysis of Free standing Spent Fuel Racks in Nuclear Power Plants," Proceedings of the 10th SMIRT Conference, Anaheim, CA., August 1989.
19. Bagchi, G., Jeng, D., Ashar, H.: "Proposed Modifications of NRC's Standard Review Plan for Seismic Analysis," Proceedings of the 2nd Symposium on Current Issues Related to NPP Structures, Systems, and Piping, Orlando, FL., Dec. 1988.
20. Ashar, H., Jeng, D.: "Spent Fuel Storage - A Regulatory Perspective," Presented at 1988 ASME Joint Power Generation Conference, Philadelphia, Pa. September 1988.
21. Richardson, J., Ashar, H.: "Regulatory Perspective on Containment Performance," Presented at MITI/NRC Conference on Nuclear Technology, Tokyo, Japan, Dec. 1987.
22. Ashar, H., Naus, D.: "Overview of the Use of Prestressed Concrete in U.S. Nuclear Power Plants," Nuclear Engineering and Design, Vol. 75, North Holland Publishing Company, August 1983.
23. Dougan, J., Ashar, H.: "Evaluation of Grease Performance in Prestressed Concrete Containments," Proceedings of 6th SMIRT Conference, Chicago, 11. August 1983.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
AMERGEN ENERGY COMPANY, LLC	)	Docket No. 50-219-LR
	)	
(Oyster Creek Nuclear Generating Station)	)	

AFFIDAVIT OF JAMES A. DAVIS, PH.D

I, James A. Davis, do hereby state as follows:

1. I am employed by the U.S. Nuclear Regulatory Commission ("NRC") as a Senior Materials Engineer in the Office of Nuclear Reactor Regulation ("NRR"), Division of License Renewal. Since November 2005, I have served as an audit team leader and as an audit team member for license renewal audits. Prior to joining the Division of License Renewal, I was the lead researcher on steam generator issues in the Materials Engineering Branch of the Office Nuclear Regulatory Research and a technical reviewer in the Materials and Chemical Engineering Branch of NRR, Division of Engineering, responsible for conducting reviews of coating issues, corrosion of metals, service water issues, threaded fasteners, and license renewal. I have worked on coatings and corrosion control since 1968 and have worked on coating issues in nuclear facilities for the past sixteen years at the NRC. A copy of my professional qualifications is attached.

2. As part of my official duties, I was an audit team member for the license renewal safety audit at Oyster Creek. I also reviewed the Oyster Creek LRA, including the following aging management programs: B.1.11, "Flow Accelerated Corrosion;" B.1.12, "Bolting Integrity;" B.1.15, "Boraflex Monitoring;" B.1.21, "Above Ground Tanks;" B.1.21A, "Above Ground Tanks-Forked River Construction Tower;" B.1.25, "Selective Leaching;" B.1.26, "Buried Pipe Inspection;" B.1.26B, "Met. Tower Repeater Engine Fuel Supply – Buried Pipe Inspection;"

B.2.02, "Lube Oil Monitoring Activities;" and B.2.52, "Periodic Inspection," including preparation of Section 3.0.3 of the Safety Evaluation Report, dated March 2007 ("SER"). I also review the aging management reviews not consistent with GALL and prepared Sections 3.1.2.3, 3.2.2.3, 3.3.2.3, 3.4.2.3, 3.5.2.3, and 3.6.2.3 of the SER.

3. The purpose of this affidavit is to address AmerGen's "Motion for Summary Disposition of Citizens' Drywell Contention," dated March 30, 2007 (Motion), with respect to the Citizens' asserted basis that UT monitoring is necessary even where even where visual inspections of epoxy coating do not reveal that the coating has deteriorated, because corrosion may occur under the epoxy coating in the absence of visible deterioration due to nonvisible holidays, or pinholes. See LBP-06-22, 64 NRC 229, 242 (2006) (citing Citizens' Petition to Add a New Contention (June 23, 2006) ("June 23 Petition"); Supplement to Petition to Add a New Contention (July 25, 2006) ("Supplement"), at 12; Supplement, Memorandum from Dr. Rudolf H. Hausler to Richard Webster, at 5-6 (July 25, 2006) ("July 25 Hausler Memo"). I have read the Motion and relevant portions of LBP-06-22, 64 NRC 229 (2006), Citizens' June 23 Petition, and Supplement.

4. In my opinion, Citizens' contention lacks technical merit because AmerGen has committed to conduct inspections of the coatings in the sand bed region in accordance with the ASME Code Section XI. Subsection IWE (Commitment 27 Items 4 and 21 and Commitment 33 in SER, Appendix A). If the coating is damaged and corrosion is observed, AmerGen will conduct UT measurements of that area and will evaluate the results following the existing program. The applicant has committed to conduct additional visual inspections of the epoxy coatings applied to the external surface of the drywell shell in the sand bed region prior to entering the period of extended operation. AmerGen has committed to enhance the Inservice

Inspection Program to require 100% inspection of the epoxy coatings every other refueling outage during the period of extended operation (Commitment 27, Items 4 and 21 and Commitment 33 in SER, Appendix A).

5. There is a multi-layer epoxy coating on the exterior of the Oyster Creek drywell shell in the sand bed region to prevent corrosion in that region. This coating was discussed in detail under SER Open Item 4.7.2-3, which has been closed. This coating was applied as part of corrective actions taken in the late 1980s and early 1990s to prevent additional corrosion of the drywell shell in the sand bed region. This coating was discussed in detail under Open Item 4.7.2-3 in the SER. In addition to removing the sand from the sand bed region, a coating was applied to the exterior of the drywell shell in the sand bed region with a multi-layered epoxy system (i.e., one pre-primer coat, and two top coats) to prevent any water or moisture that might reach the sand bed region from contacting the exterior shell. See Open Item 4.7.2-3 in SER Sections 1.5, 3.0.3.2.27, and 4.7.2.2.5.

6. Citizens suggest that there could be pinholes or holidays in the epoxy coating on the external surface of the drywell shell, which would allow moisture to get through the coating and cause the drywell to corrode. See Supplement, July 25 Hausler Memo at 5-6. Because the pinholes are small, Citizens argue that corrosion could occur which would not be visible. See *id.*

7. In my opinion, the use of multiple layers of epoxy coatings at Oyster Creek results in an extremely low probability that pinholes and holidays will line up in the three layer coating system. In addition, pinholes usually develop during the initial cure of the coating and new pinholes would not likely develop over time in the absence of conditions such as mechanical impacts or exposure to ultraviolet light.

8. When a steel surface corrodes, the oxide film that is generated has a higher volume than the original volume of the steel because iron in the steel is converted to iron oxide that is then hydrated. The film will be rust colored and will be obvious against the grey colored epoxy coating.

9. AmerGen's protective coating monitoring and maintenance program specifies VT-1 visual inspections of epoxy coating using qualified inspectors. The rust colored corrosion product will be easily detected during VT-1 inspections of the coating on the external surface of the drywell shell in accordance with the ASME Code, Section XI, Subsection IWE. Additional guidance for inspection of the epoxy coatings on the drywell shell are in the Generic Aging Lessons Learned Report ("GALL") in section XI.S1, "ASME Section XI, Subsection IWE," and XI.S8, "Protective Coating Monitoring and Maintenance Program." These sections indicate that inspectors are to be trained to inspect the surfaces within the scope of IWE for evidence of flaking, blistering, peeling, discoloration, and other signs of degradation. AmerGen has committed to follow these commitments (Commitment 27, Items 4 and 21 and Commitment 33 in the SER Appendix A).

10. The Staff, as noted in SER Sections 3.0.3.2.23 and 3.0.3.2.27, concluded that the performance of ASME Section XI, Subsection IWE, visual inspections of the drywell in all ten bays of the sand bed region every other refueling outage, and as well as AmerGen taking appropriate actions when significant corrosion is detected, provides assurance that effects of aging will be adequately managed so that intended functions will be maintained throughout the renewal period.

11. I have read the affidavit submitted by Jon R. Cavallo, dated March 26, 2007, and my opinions stated in ¶¶ 4-9, above, are consistent with those stated by Jon Cavallo in

¶¶ 11-22.

12. I declare under penalty of perjury that the foregoing and the attached statement of professional qualifications are true and correct to the best of my knowledge and belief.

/Original signed by/

James A. Davis, PhD

Executed in Rockville, MD
this 26th day of April, 2007

James A. Davis, Ph. D
Statement of Professional Qualifications

CURRENT POSITION:

Senior Materials Engineer Division of License Renewal, Office of Nuclear Reactor
Regulation, U.S. Nuclear Regulatory Commission,
Rockville, MD

EDUCATION:

B. Met. E., The Ohio State University, 1965, Metallurgical Engineering
M.S., The Ohio State University, 1965, Metallurgical Engineering
Ph.D., The Ohio State University, 1968, Metallurgical Engineering

SUMMARY:

Over 39 years of experience in material engineering with over 20 years of experience in the nuclear power industry. Significant experience in the following areas:

- Materials Engineering
- Corrosion and Control
- Protective Coatings and Linings
- Welding and Special Repair Processes
- License Renewal
- Nuclear Facilities Audits
- Allegations
- Reviews of Navy Submarine Power Plant Designs
- Quality Assurance
- ASME Code Committees
- ASTM D-33 Committee on Coatings for Power Generation Facilities

EXPERIENCE:

U.S. Nuclear Regulatory Commission, 11/11/1990 - Present

11/13/2005 to Present - Senior Materials Engineer, Division of License Renewal, Office of Nuclear Regulatory Research

- Audit Team Leader for the license renewal safety audit at the Pilgrim Nuclear Power Station
- Audit Team Member for the license renewal safety audit at the Oyster Creek Generating Station

12/15/2001 - 11/13/ 2005 – Senior Materials Engineer in the Division of Engineering Technology, Office of Nuclear Regulatory Research

- Program Manager on the Steam Generator Tube Integrity Program overseeing work conducted at Argonne National Laboratory
- Acting Program Manager for Non-Destructive Examination research at Pacific Northwest National Laboratory

11/11/1990 - 12/15/2001 - Technical Reviewer in the Materials and Chemical Engineering Branch, Chemical Engineering and Metallurgy Section, Division of Engineering, Office of Nuclear Reactor Regulation.

- Coatings for nuclear power plants,
- License renewal for Calvert Cliffs, Oconee, Arkansas Nuclear One, Hatch, and Turkey Point.
- Threaded fastener issues (such as stress corrosion cracking, boric acid corrosion, and fatigue),
- chemical decontamination,
- Boiling Water Reactor internals cracking,
- pump and valve internals cracking,
- pipe integrity issues,
- corrosion behavior for dry cask storage, and interaction of coatings with spent fuel water,
- Coordinated the responses to a generic letter on containment coatings for nuclear power plants.
- NRC representative to ASTM D-33 on coatings for power generation facilities.
- Member of the Board of Directors for the National Board of Registration for Nuclear Safety Related Coating Engineers & Specialists.
- Member of ASME on Welding and Special Repair Processes.
- Member of an Augmented Inspection Team at Palisades on fuel handling problems, Point Beach on the hydrogen burn as a result of interactions between borated water and the inorganic Zinc coating during dry cask loading operations and Davis-Besse on the Boric acid corrosion of the vessel head.

- Contract Technical Monitor and Project Officer for numerous contracts at Brookhaven National Labs.
- Technical reviewer for the design of the Navy Seawolf Submarine and the Virginia Class Submarine
- Reviewer on the DOE project to produce tritium in a commercial reactor (Watts Bar)
- Numerous presentations to senior NRC management including the Chairman, the Executive Director for Operations, the Committee to Resolve Generic Issues, and the Advisory Committee on Reactor Safety and Safeguards.
- Testified before Representative Dingle's staff on the safety of fasteners in nuclear power plants as a result of concerns raised by a private citizen.

Polyken Division of the Kendall Company. Senior Research Associate, 1981 – 1990:

Responsible for Technical Marketing for the pipeline coating division providing technical data and reports to domestic and international customers. Company representative to the National Association of Corrosion Engineers, the American Water Works Association coatings committees, and ASTM coating committees.

Arthur D. Little, Senior Consultant, 1979 - 1981:

Consultant to DOE on Defense Nuclear Waste issues and Waste Tank corrosion issues. Consultant on numerous commercial contracts on corrosion, coating, metallurgical, and plating issues.

Allied Tube and Conduit Corp., Director of Research, 1978-1979:

Responsible for research and development for metallurgical tube forming, welding, chemical cleaning of steel, galvanizing, surface treatment and coating of electrical conduit, fence posts, and specialty tubing. Responsible for Quality Assurance and Process Control.

Allegheny Ludlum Steel Corp., Research Specialist, 1976-1978:

Responsible for customer service for use of stainless steels in corrosive service. Responsible for conducting failure analysis. Conducted research on corrosion mechanisms for stainless steels.

Bell Aerospace Company, Senior Research Scientist, 1970-1976:

Program Manager on numerous Navy sponsored programs involving corrosion of aluminum alloys, stainless steels, and titanium alloys in high velocity sea water for the

Navy's high performance ships program. Conducted research on corrosion fatigue, stress corrosion, and fouling in sea water. Conducted research on the compatibility of rocket fuels and oxidizers with fuel handling equipment.

U.S. Steel Corporation, Senior Research Engineer, 1968-1970:

Conducted research on the mechanism of pitting/crevice corrosion, stress corrosion cracking, hydrogen embrittlement, and intergranular corrosion using electrochemical techniques, transmission electron microscopy, optical microscopy, and scanning electron microscopy.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
AMERGEN ENERGY COMPANY, LLC	)	Docket No. 50-219-LR
	)	
(Oyster Creek Nuclear Generating Station)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the "NRC STAFF RESPONSE TO AMERGEN'S MOTION FOR SUMMARY DISPOSITION" in the above-captioned proceeding have been served on the following by electronic mail with copies by deposit in the NRC's internal mail system or as indicated by an asterisk, by electronic mail, with copies by U.S mail, first class, this 26th day of April, 2007.

E. Roy Hawken, Chair
Administrative Judge
Atomic Safety and Licensing Board
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ERH@nrc.gov

Anthony J. Baratta
Administrative Judge
Atomic Safety and Licensing Board
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
AJB5@nrc.gov

Paul B. Abramson
Administrative Judge
Atomic Safety and Licensing Board Panel
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
PBA@nrc.gov

Office of the Secretary*
ATTN: Docketing and Service
Mail Stop: O-16C1
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
HEARINGDOCKET@nrc.gov

Office of Commission Appellate
Adjudication
Mail Stop O-16C1
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
OCAEmail@nrc.gov

Debra Wolf
Law Clerk
Atomic Safety and Licensing Board Panel
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
DAW1@nrc.gov

Suzanne Leta Liou
NJ Public Interest Research Group
11 N. Willow St.
Trenton, NJ 08608
sliou@environmentnewjersey.org

Richard Webster, Esq.*
Rutgers Environmental Law Clinic
123 Washington Street
Newark, NJ 07102-5695
rwebster@kinoy.rutgers.edu

J. Bradley Fewell, Esq.*
Exelon Corporation
4300 Warrenville Road
Warrenville, IL 60555
bradley.fewell@exeloncorp.com

/RA/

Mitzi A. Young
Counsel for the NRC Staff