UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
		Docket No. 50-346-LR
First Energy Nuclear Operating Company	)	
(Davis-Besse Nuclear Power Station, Unit 1)		January 10, 2011
	)	
Regarding the Renewal of Facility Operating License NPF-003 for a 20-Year Period	)	
	)	

* * * * *

MOTION FOR ADMISSION OF CONTENTION NO. 5 ON SHIELD BUILDING CRACKING

Now come Beyond Nuclear, Citizens Environment Alliance of Southwestern Ontario (CEA), Don't Waste Michigan, and the Green Party of Ohio (collectively, Intervenors), by and through counsel, and move for the admission of a new Contention No. 5 related to the recently-discovered cracking phenomena involving the Davis-Besse reactor shield building.

Introduction

In the past 110 days, so-called "hairline" and other cracks in the concrete walls of the reactor shield building ("shield building") at Davis-Besse Nuclear Power Station, Unit 1 ("Davis-Besse"), have been identified and have prompted utility and NRC concern. One or more of the cracks, which are believed to have appeared in about the past nine (9) years, is acknowledged by First Energy Nuclear Operating Company ("FENOC") to be about 225 feet in length, running vertically to the top of the reactor shield building. As detailed below, recent information concerning the cracking phenomena that have just occurred and/or might be

continuing to occur warrant consideration of this development within the pending license renewal case. In light of the law as discussed in Parts I, II and III below, and the facts, as delineated in Part IV below, the cracking should be considered as an aging feature at Davis-Besse, which requires explicit plans for remediation and management. Further, the cracking should be analyzed within the forthcoming Supplemental Environmental Impact Statement for the plant.

I. The Shield Structure Is A Feature Requiring Aging-Management Review Of The Cracking Problem Must Be Addressed As Part Of The License Extension Determination

The Davis-Besse reactor shield building constitutes a "system [or] structure . . . as delineated in [10 C.F.R.] §54.4. . . subject to an aging management review" because it "perform[s] an intended function . . . without moving parts . . . [and includes] the containment [and] containment liner. . . ." 10 C.F.R. §54.21(a)(1).

The shield building and the steel liner within it are among those "[p]lant systems, structures, and components" which are "[s]afety-related systems [and] structures . . . which are . . . relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49 (b)(1)) to ensure the following functions - (i) The integrity of the reactor coolant pressure boundary; (ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or (iii) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in §50.34(a)(1), §50.67(b) (2), or §100.11 of this chapter, as applicable." 10 C.F.R. §54.4(a)(1).

The aging of materials is important during the period of extended operation, since certain components may have been designed upon an assumed service life of forty years. Florida Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 & 4), CLI-01-17, 54 NRC 3, 7

(2001). *Entergy Nuclear Generation Co. And Entergy Nuclear Operations, Inc*. (Pilgrim Nuclear Power Station), LBP-06-24, 64 NRC 257, 276 (2006). Part 54 requires license renewal applicants to demonstrate how they will manage the effects of aging during the period of extended operation. *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), CLI-01-17, 54 NRC 3, 8 (2001). Applicants must demonstrate how their programs will manage the effects of aging in a detailed manner with respect to specific components and structures, rather than at a more generalized system level. *Entergy Nuclear Generation Co. And Entergy Nuclear Operations, Inc*. Supra at 64 NRC 275.

Sections 54.21 and 54.29 require that license renewal applications demonstrate by a preponderance of the evidence that aging management programs provide reasonable assurance that SSCs will continue to perform their intended functions consistent with the current licensing basis during the period of extended operation. Whether the reasonable assurance is met will be determined on a case-by-case basis using sound technical judgment. Reasonable assurance "is not susceptible to formalistic quantification (i.e., 95% confidence) or mechanistic application." *AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), LBP-07-17, 66 NRC 327, 340 (2007), aff'd CLI-09-07, 69 NRC 235 (2009)

II. Implications Of The Shield Building's Cracking Phenomena Must Be Analyzed Within the Supplemental Environmental Impact Statement

The National Environmental Policy Act (NEPA) requires disclosure of environmental impact assumptions and the basis for agency decisions in license renewal requests. In an attempt to fulfill its NEPA obligations, FirstEnergy Nuclear Operating Company (hereafter, FENOC) has prepared an Environmental Report (hereafter ER). The NRC later will publish a Supplemental Environmental Impact Statement (hereafter SEIS) based in part on FENOC's ER.

The presumption is that agencies will adequately study the environmental issues which are engendered by the undertaking. *Crounse Corp. v. Interstate Commerce Comm'n,* 781 F.2d 1176 (6th Cir. 1986). The harm is complete when an agency makes a decision without sufficiently considering information NEPA requires be placed before the decision-maker and public. *Sierra Club v. Marsh,* 872 F.2d 497, 500 (1st Cir. 1989). The injury of an increased risk of harm due to an agency's uninformed decision is precisely the type of injury {NEPA} was designed to prevent." *Comm. to Save the Rio Hondo v. Lucero,* 102 F.3d 445, 448-49 (10th Cir. 1996).

The scope of the environmental review is defined by 10 C.F.R. Part 51, the NRC's "Generic Environmental Impact Statement [GEIS] for License Renewal of Nuclear Plants" (NUREG 1437 (May 1996)), and the initial hearing notice and order. *See, e.g., Vermont Yankee,* 2006 NRC Lexis 201 (ASLB 9/22/2006). The GEIS may, *prima facie,* place some environmental issues that might otherwise be germane in a license renewal proceeding "beyond the scope of a license renewal hearing." *Matter of Florida Power & Light Co.* (Turkey Point Nuclear Power Plant), CLI-01-17, 54 NRC 3, 15 (7/19/2001). These "Category 1" issues, which are classified in 10 C.F.R. Part 51, Subpart A, Appendix B, may nonetheless be raised when a petitioner demonstrates that "there is new and significant information subsequent to the preparation of the GEIS regarding the environmental impacts of license renewal." See *Turkey Point,* 54 NRC at 10-12; *see also* 10 C.F.R. § 51.53(c)(3)(iv) (new and significant information).

NEPA imposes continuing obligations on the NRC following completion of an environmental analysis. An agency that receives new and significant information casting doubt upon a previous environmental analysis must reevaluate the prior analysis. *Marsh v. Oregon Natural Resources Council,* 490 U.S. 360, 374 (1989). This requirement is codified in NRC

regulations at 10 C.F.R. §51.92(a). The NRC's license renewal application regulations also contain this obligation. 10 C.F.R. §51.53(c)(3)(iv) (ER must contain "any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware"). The Commission has concluded that this applicant obligation extends to new and significant information even when such information pertains to a Category 1 issue. *See Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-14, 55 NRC 278, 290 (2002). In *Vermont Yankee*, 50-271-LR (9/22/2006) at 17-27, the Commission recognized:

> . . . that even generic findings sometimes need revisiting in particular contexts. Our rules thus provide a number of opportunities for individuals to alert the Commission to new and significant information that might render a generic finding invalid, either with respect to all nuclear power plants or for one plant in particular. In the hearing process, for example, petitioners with new information showing that a generic rule would not serve its purpose at a particular plant may seek a waiver of the rule. See 10 C.F.R. § 2.758; see also note 3, *supra*, and accompanying text. Petitioners with evidence that a generic finding is incorrect for all plants may petition the Commission to initiate a fresh rulemaking. See 10 C.F.R. §2.802. Such petitioners may also use the Supplemental Environmental Impact Study (SEIS) notice-and-comment process to ask the NRC to forgo use of the suspect generic finding and to suspend license renewal proceedings, pending a rulemaking or updating of the GEIS. See 61 Fed. Reg. at 28,470; GEIS at 1-10 to 1-11.

With respect to the issues in Appendix B, Category 2 issues, (1) the applicant must make a plant-specific analysis of environmental impacts in its Environmental Report, 10 C.F.R. §51.53(c)(3)(ii), and (2) NRC Staff must prepare a Supplemental Environmental Impact Statement (SEIS), *id.* § 51.95(c). Contentions implicating Category 2 issues ordinarily are deemed to be within the scope of license renewal proceedings. *See Turkey Point*, 54 NRC at 11-13; *Matter of Amergen Energy Co.* (Oyster Creek), 50-0219-LP, 2006 NRC Lexis 195 (Feb. 27, 2006).

According to 10 C.F.R. §51.53(c)(2), at the operating license stage, FENOC's

Environmental Report "must contain . . . (2) The report must contain a description of the proposed action, including the applicant's plans to modify the facility or its administrative control procedures" and "describe in detail the modifications directly affecting the environment or affecting plant effluents that affect the environment." Despite the "small" significance assigned to Category 1 "Postulated Accidents" at 10 C.F.R. Part 51, Subpart A, Appendix B, Intervenors contend that the rather unique cracking phenomenon at Davis-Besse suggests that this generic finding is inapplicable in this instance. Similarly, the potential for severe accidents might be implicated were the cracking to be accepted without any repair or other mitigation, such as replacement of the entire shield building. According to NRC interpretation, the analysis in the Generic Environmental Impact Statement for Category 2 "Severe Accidents" "has shown that one or more of the criteria of Category 1 cannot be met, and therefore additional plant-specific review is required."

The environmental review mandated by NEPA is subject to a rule of reason. While it need not include all theoretically possible environmental effects arising out of an action, it draws direct support from the judicial interpretation of the statutory command that the NRC is obliged to make reasonable forecasts of the future. *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 & 2), ALAB-455, 7 NRC 41, 48, 49 (1978); Hydro Res., Inc., LBP-04-23, 60 NRC 441, 447 (2004), *review declined*, CLI-04-39, 60 NRC 657 (2004).

III. Contention Admissibility Standards

Contention No. 5 is new, being filed in response to fast-emerging developments following discovery of cracking in the reactor shield building at Davis-Besse. The requirements for determining the timeliness of a new contention are set forth in 10 C.F.R. §2.309(f)(2), but 10 C.F.R. §2.309(c) is also potentially relevant given that it provides criteria for boards to apply in

deciding whether to admit "nontimely filings."

Section 2.309(f)(2) allows a new contention to be filed after the initial docketing with leave of the presiding officer upon a showing that (i) The information upon which the amended or new contention is based was not previously available; (ii) The information upon which the amended or new contention is based is materially different than information previously available; and (iii) The amended or new contention has been submitted in a timely fashion based on the availability of the subsequent information.

The regulations do not define or specify an exact number of days within which a new or amended contention must be filed in order to be considered "timely." Accordingly, unless a deadline has been specified in the scheduling order for the proceeding, the determination of timeliness is subject to a reasonableness standard that depends on the facts and circumstances of each situation. *Entergy Nuclear Vt. Yankee, LLC* (Vermont Yankee Nuclear Power Station), LBP-07-15, 66 NRC 261, 266 n.11 (2007). If the filing of a proposed new contention is not authorized by either alternative in §2.309(f)(2), then it may be evaluated under §2.309(c). Even if a petitioner is unable to show that the NRC Staff's NEPA document differs significantly from the ER, it "may still be able to meet the late filed contention requirements." *Sacramento Mun. Util. Dist.* (Rancho Seco Nuclear Generating Station), CLI-93-12, 37 NRC 355, 363 (1993).Similarly, if a contention based on new information fails to satisfy the three-part test of §2.309(f)(2)(i)–(iii), it may be evaluated under §2.309.

Section 2.309(c)(1) includes eight factors that boards must balance in evaluating nontimely intervention petitions, hearing requests, and contentions.[1] In *Crow Butte Res., Inc.*

[1]The factors are: (i) Good cause, if any, for the failure to file on time; (ii) The nature of the [petitioner's] right under the Act to be made a party to the proceeding; (iii) The nature and extent of the

(North Trend Expansion Area), CLI-09-12, 69 NRC 535, 549 (2009), the Commission upheld the Licensing Board's finding that the petitioner demonstrated "good cause" for its late filing. The Commission affirmed that "'[g]ood cause' is the most significant of the late-filing factors set out at 10 C.F.R. § 2.309(c)." *Id.* at 549 n.61. If good cause is not shown, the board may still permit the late filing, but the petitioner must make a strong showing on the other factors. *See Pac. Gas and Elec. Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), CLI-08-1, 67 NRC 1, 5–8 (2008).

Intervenors assert that their bringing of this contention is timely. It is based on structural damage - cracks - which were noticed by FENOC's contractors or employees in September 2011 and soon reported to the NRC. The NRC initially kept the plant shut down for analytical work, but in early December 2011 allowed Davis-Besse to resume power generation. The NRC presently has established a February 28, 2012 deadline for provision by FENOC of a "root cause analysis" and further actions by regulator and utility. Only on January 5, 2012 was the public told by NRC Region III staff at a presentation convened at Camp Perry near the Davis-Besse plant that one or more cracks extended the full 225-foot height of the reactor shield building, that those cracks were numerous, and that the cracks were not confined to the architecturally "decorative" elements of the building (contrary to FENOC's repeated statements in the media throughout October, November and December 2011).

Moreover, the SDEIS for Davis-Besse has not yet been issued (although issuance may be

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[petitioner's] property, financial or other interest in the proceeding; (iv) The possible effect of any order that may be entered in the proceeding on the [petitioner's] interest; (v) The availability of other means whereby the [petitioner's] interest will be protected; (vi) The extent to which the [petitioner's] interests will be represented by existing parties; (vii) The extent to which the [petitioner's] participation will broaden the issues or delay the proceeding; and (viii) The extent to which the [petitioner's] participation may reasonably be expected to assist in developing a sound record.

imminent). Hence by bringing this contention now, Intervenors are avoiding the procedural peril of sitting-and-waiting while in possession of information that should be included and analyzed in the NEPA document in this proceeding. *Cf. Private Fuel Storage*, LLC, LBP-00-27, 52 NRC at 223 (2000); *La. Energy Servs., L.P.* (Claiborne Enrichement Center), LBP-94-11, 39 NRC 205, 212 (1994). And so far as Intervenors can tell at this juncture, the Davis-Besse ER does not address admitted cracking to the reactor shield building.

Contention No. 5 could not have been filed in December 2010, at the time Intervenors first petitioned to participate in this proceeding, because the contention is based entirely upon information and events that post-date the intervention petition. Analysis under § 2.309(f)(2)(i-iii) is to be conducted in the same manner as analysis under § 2.309(f)(2) of new or amended contentions based upon new information from Staff-created NEPA documents. Therefore, the new information must be materially different from the information that was previously available, and the ordinary contention admissibility criteria of § 2.309(f)(1) must be satisfied as well. *Exelon Generation Co.* (Early Site Permit for Clinton ESP Site), LBP-05-19, 62 NRC 134, 160-61 (2005).

An admissible contention under 10 C.F.R. §2.309(f)(1)(i)-(vi) must: (i) provide a specific statement of the issue of law or fact to be raised; (ii) provide a brief explanation of the basis for the contention; (iii) demonstrate that the issue raised is within the proceeding's scope; (iv) demonstrate that the issue raised is material to the findings the NRC must make to support the action that is involved in the proceeding; (v) provide a concise statement of the alleged facts or expert opinions, including references to specific sources and documents, that support the petitioner's position and upon which the petitioner intends to rely at hearing; and (vi) show that a genuine dispute exists on a material issue.

A petitioner does not have to prove its contentions at the admissibility stage. *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-04-22, 60 NRC 125, 139 (2004). The factual support required is "a minimal showing that material facts are in dispute." All that is needed at this juncture is "alleged facts" and the factual support "need not be in affidavit or formal evidentiary form and need not be of the quality necessary to withstand a summary disposition motion." *First Energy Nuclear Operating Company* (Davis-Besse Nuclear Power Station, Unit 1), ASLBP No. 11-907-01-LR-BD01, LBP-11-13 at 17 (April 26, 2011) (slip op.).

The extensive factual recitation below will establish that a genuine dispute exists on an issue material to the license extension decision for Davis-Besse. The cracking and cracking-related phenomena raise valid aging-management and NEPA issues within the scope of this proceeding which must be addressed as part of the assurances the NRC is obliged to give concerning operational, safety and environmental obligations surrounding the re-licensing determination. Because all of the criteria for admissibility are present, Contention No. 5 is timely brought to this panel and should be admitted.

IV. Evidence in Support of Contention

In support of their Motion, Intervenors further state as follows:

1. Intervenors were accorded representational standing by the Atomic Safety and Licensing Board in a Memorandum and Order issued earlier in this case. *FirstEnergy Nuclear Operating Company* (Davis-Besse Nuclear Power Station, Unit 1) LBP-11-13 at 30 (slip op.).

2. Intervenors propose the following new Contention No. 5:

Contention 5: Cracked Shield Building/Secondary Reactor Radiological Containment Structure

> Interveners contend that FirstEnergy's recently-discovered, extensive cracking of unknown origin in the Davis-Besse shield building/secondary reactor radiological containment structure is an aging-related feature of the plant, the condition of which precludes safe operation of the atomic reactor beyond 2017 for any period of time, let alone the proposed 20-year license period.

3. Intervenors state that there is a likelihood that the risks presented by the current cracks will only increase in the next few years. In addition to age-related worsening of the cracks already present, FENOC plans to perform a steam generator replacement in 2014 at Davis-Besse, as documented in its revised Environmental Report (ER). This will increase the risk that Davis-Besse's concrete shield building/secondary reactor containment structure will be subjected to new stresses and will display additional cracking and consequently will not adequately perform its safety- and security-related functions. Yet another hole will have to be cut into shield building structure to remove the radioactive large nuclear components (used, radioactive, dangerously degraded steam generators), and replace them with new large nuclear components (new steam generators).

4. FENOC describes its plans for the 2014 steam generator replacement as follows:

> To perform the steam generator replacement, FENOC plans for a temporary construction opening approximately 24 feet wide by 39 feet high to be created in the Shield Building and free-standing Containment Vessel. The Shield Building is composed of reinforced concrete walls approximately two and one-half feet thick, and the free standing Containment Vessel is approximately 1.5 inches thick steel. The process of creating the opening would include activities such as removing concrete, cutting rebar, and cutting and removing a section of the steel Con-tainment Vessel. A hydro-demolition (high pressure water) process or other mechanical methods are being considered to remove the Shield Building concrete, and mechanical methods are being considered to cut the Containment Vessel opening. After installation of the new steam genera-tors, the openings would be sealed and the Containment Vessel and Shield Building returned to their original configurations and integrity.

Source: FENOC's revised Davis-Besse Environmental Report, pp. 3.2-1 thru 3.2-4.

5. This will be the *fourth* time that Davis-Besse's concrete shield building/secondary

reactor radiological containment structure will have been cut open, in order to remove large, used, degraded, radioactive nuclear components, and to replace them with new large nuclear components: a breach in the year 1970 (53 feet by 46 feet 6 inches in size); two reactor lid replacements (the first a decade ago, in 2002, the opening 23 feet 6 inches by 18 feet six inches in size; the second very recently, in late 2011, between October and December, 26 feet 3 inches by 35 feet 6 inches in size); and one replacement of steam generators, scheduled for 2014, that will necessitate yet another large breach in the concrete shield building. The first three breaches of the concrete shield building are documented on Slide #18, page 9, of the hardcopy handout entitled "Davis-Besse Nuclear Power Station, Nuclear Regulatory Commission, Public Meeting, January 5, 2012, NRC Informational Presentation," presented by Barry Allen (FENOC Site Vice President – Davis-Besse), Brian Boles (FENOC Director – Site Operations), and Ken Byrd (Director – Site Engineering) at Camp Perry in Port Clinton, Ohio. [posted online at http://www.beyondnuclear.org/storage/FENOC%20Slide%20Show%20January%205%2020121.pdf]

6. There might even be cause for one or more additional cuts into the shield building. As has been shown at the Palisades atomic reactor, a single replacement of steam generators was not enough. Palisades' previous owner, Consumers Power, admitted as long ago as spring, 2006 that Palisades atomic reactor needed a *second* steam generator replacement (although current owner Entergy has not done this over the past six years). [This is documented by Consumers Energy's briefing to State of Michigan regulators (the Michigan Public Service Commission) regarding its intention to sell the Palisades reactor as quickly as possible, revealing important problems

afflicting the plant, Slide 2 ("page 2"), May 10, 2006, posted online at http://www.nirs.org/reactorwatch/licensing/kampsconsbrifeinf051806.htm.]

7. Considering FENOC's request to extend Davis-Besse operation for 20 years beyond 2017, it is conceivable that FENOC very well may need to replace its steam generators *yet again* after 2014. That would be the *fifth time* that there was a necessary cut through the reinforced concrete of the shield building, risking further contributions to the cracking.

8. Events unfolded rapidly after the shield building cracking was first publicly announced in fall 2011 by FirstEnergy and NRC. FENOC shut down Davis-Besse on October 1, 2011, in order to replace the reactor lid (for the second time in the past decade), reported in the *Toledo Blade*: [http://www.toledoblade.com/local/2011/09/30/Davis-Besse-to-shut-down-for-replace-vesselhead.html]. On October 10, 2011, while cutting a large hole (22 feet by 33 feet, according to the *Cleveland Plain Dealer* on October 12, 2011 [http://www.cleveland.com/business/index.ssf/2011/10/nrc_firstenergy_concerned_abou.html], but 26 feet 3 inches by 35 feet 6 inches, according to FENOC's own Jan. 5, 2011 slide show presentation at Camp Perry, cited above) in the shield building/secondary concrete containment structure so the large, radioactive nuclear component (the reactor's second, degraded lid, installed less than 10 years ago, between 2002 and 2004) could be removed, and replaced with a new large nuclear component (the reactor's third lid in a decade, manufactured by Areva of France, reportedly weighing 82 tons, measuring 17 feet in diameter and 8 feet high), subcontractors from Bechtel and Sargent & Lundy discovered cracks in the concrete shield building/secondary reactor radiological containment structure wall. A 30-foot-long crack, initially described by FENOC as "barely visible," or "hairline," was described as running parallel to and being closely associated with the

steel rebar of the shield building.[http://www.toledobla

de.com/Energy/2011/10/14/First-Energy-NRC-eye-hairline-crack-at- Davis-Besse.html]

9. In the *Toledo Blade's* coverage, a FirstEnergy spokeswoman said the cause of the cracks was under investigation. She admitted that it was not clear whether the cracks had been there previously, or had been caused by the current cutting operation to make the hole in the shield building for the reactor lid transplant. Such questions and mysteries linger to the present day, and despite the unanswered questions, NRC has allowed the reactor to re-start.

10. In the *Cleveland Plain Dealer* article cited above, it was reported:

> The significance of the crack is not clear at this point, NRC spokeswoman Viktoria Mytling said. "We will review what the company and its engineers find, and we are doing our own independent assessment," she said. *"We will have to resolve this issue before they re-start the reactor."*

(Emphasis added). However, NRC's "independent assessment" and "review" have proven to be woefully inadequate and NRC has allowed the reactor to re-start.

11. On October 14, 2011 the same FENOC spokeswoman cited above assured the *Toledo Blade* that "*We will make sure we fully understand the issue before we re-start the plant*." [http://www.toledoblade.com/news/2011/10/14/Crack-in-Davis-Besse-shield-buildingcontinues. html] (Emphasis added). But even as of the date of this Contention filing in January 2012, neither FENOC nor NRC "fully understand the issue," and yet FENOC has chosen to re-start Davis-Besse, with NRC's blessing.

12. As reported by the *Toledo Blade* on October 20, 2011:

> Utility experts "are performing a methodical, thorough evaluation" to determine the cause and extent of the crack to recommend a response, spokesman Jennifer Young said. "Those suggesting the Shield Building indication is cause for shutting down Davis-Besse clearly are doing so without having the facts around the issue," Ms. Young said. "Our assessment of the [crack] indication continues and the team has arrived at no

> conclusions at this time."
>
> Ms. Young denied an assertion from Mr. Lodge, the attorney for four groups opposing the plant's license renewal, that multiple "micro-cracks" have been identified in the concrete structure, which the utility calls the Shield Building but is also referred to as an outer containment structure.
>
> One "barely visible, crack-like indication" runs vertically along reinforcing steel near the building's surface and "veers a bit horizontally" near the top of an opening that a FirstEnergy contractor cut in the concrete Oct. 10, Ms. Young said.
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> A FirstEnergy contractor used hydro-demolition — high-pressure water jets — to make the opening through which the replacement reactor head is to be passed into the reactor chamber. A matching hole in the plant's steel containment building, inside the concrete, remains to be cut "in the next several days," the spokesman said. . . .
>
> *"FirstEnergy and Davis-Besse place the highest value on safety, and we will have a full understanding of this indication, its implications, and actions we must take — if any — before the end of our scheduled outage,"* Ms. Young said.

(Emphases added). [http://www.toledoblade.com/Energy/2011/10/20/Activists-seek-city-opposition-to-renewinglicense-for-Besse.html]. But it appears that any "'methodical, thorough evaluation' to determine the cause and extent of the crack to recommend a response," if performed at all, has been largely to entirely withheld from public view, undermining rather than assuring public confidence. Ms. Young of FENOC's assertion that the Intervenors' assertions of "multiple 'micro-cracks'" in the shield building was mistaken, and that a single "barely visible, crack-like indication" described the full extent of the problem, was itself mistaken, as FENOC itself has been forced to admit. And Ms. Young's insistence that the utility "place[s] the highest value on safety, and we will have a full understanding of this indication, its implications, and actions we must take . . . before the end of our scheduled outage" has been belied by FirstEnergy's rush to re-start Davis-Besse despite the lack of a full understanding of the extent, cause, or safety significance of the cracking, or of mitigating actions that should be taken, all blessed by the NRC.

13. Also on October 20, 2011, the NRC published its "Preliminary Notification of Event

or Unusual Occurrence - PNO-III-11-014" on "Davis-Besse Shield Building Indications." The PNO reported information "current as of October 19, 2011 at 4:30 p.m. (EDT)." [ADAMS Accession Number: ML11293A092.] NRC states in the PNO: *"If there are any challenges identified to the design function of the shield building they will have to be resolved before the plant restarts."* (Emphasis added). [http://www.beyondnuclear.org/storage/PNO%2010%2020%202011%20Davis-Besse%20Shiled%20Building%20issue1.pdf]. From what little information the public has been provided thus far, NRC's supposedly independent assessment of the safety significance of the cracking appears to be woefully inadequate.

14. On October 21, 2011, the *Toledo Blade* reported about the PNO's publication:

> Jennifer Young, a FirstEnergy spokesman, said such further investigation is under way. "The team is taking additional concrete samples in the area of the micro-crack indication and utilizing electronic testing to determine the depth of the indication," she said in a prepared statement. But the only crack discovered so far is in a "decorative architectural façade section of the building, which extends 18 inches from the main cylindrical portion of the building, giving it a scalloped look rather than a flat, round appearance."
>
> That decorative façade is in addition to the 2-1/2 feet of reinforced concrete that surrounds the reactor's steel containment building, said Prema Chandrathil, an NRC spokesman in Chicago. *So far, Ms. Chandrathil said, there is no evidence of any trouble with that structural concrete,* described variously as the Shield Building — to protect the steel building from outside forces — or as an outer containment building to back up the steel structure.
>
> "We have to understand how this happened and the full extent of it," she said. "*At this point it appears to be in the architectural concrete."*
>
> …Dave Lochbaum, director of the Nuclear Safety Project at the Union of Concerned Scientists, said he *thought it odd that the access hole for installing the new reactor head would go through an area with decorative concrete*, unless there was no alternative, but approved of how the problem is being handled.
>
> "*They have to see if this is the only crack, or if it is the tip of the iceberg,*" Mr. Lochbaum said Friday. "They're right to do their homework."

(Emphases added).

15. As foreshadowed by Mr. Lochbaum's observation, evidence has appeared that indicates

the cracking actually involves not only 15 of 16 "architectural concrete" structures, but also of an inextricably intertwined relationship between those architectural structures and the rest of the concrete shield building itself. Mr. Lochbaum's expectation that FENOC and NRC were "do[ing] their homework" appears to have been dashed by a rush to re-start and a postponement, of the commitment to resolve significant safety-related questions until weeks, months, or even longer into the future, while letting the reactor re-start in the meantime. Despite its assurances, NRC did *not* require a full understanding of "how this happened and the full extent of it" before blessing FENOC's hasty re-start of Davis-Besse. (However, as indicated in paragraph 18 below, FENOC itself admitted additional cracks in *structural* parts of the concrete shield building, in a letter to investors on October 31, 2011.)

16. This wouldn't be the first time for such behavior devoid of "safety culture" at Davis-Besse. Nine years ago, NRC's Office of Inspector General, in the aftermath of the 2002 Davis-Besse Hole-in-the-Head Fiasco, reported that NRC itself – not only FENOC – had placed profits over safety, allowing the reactor pressure vessel lid to come within weeks, or even days, of rupturing due to deep corrosion. Had the lid breached, a "Loss-of-Coolant-Accident" or "LOCA" would have resulted, very possibly followed by a core melt down, and potentially a catastrophic radioactivity release into the environment. Speaking about the 2002 Davis-Besse reactor lid corrosion debacle, U.S. Representative Dennis Kucinich (Democrat-Ohio) said at a December 14, 2011 hearing of the U.S. House Oversight and Government Reform Committee,

> The Government Accountability Office later called it "the most serious safety issue confronting the nation's commercial nuclear power industry since Three Mile Island." The Department of Justice said that FirstEnergy admitted that they "knowingly made false representations to the Nuclear Regulatory Commission (NRC) in the course of attempting to persuade the NRC that its Davis-Besse Nuclear Power Station was safe to operate beyond December 31, 2001."

[http://kucinich.house.gov/News/DocumentSingle.aspx?DocumentID=272516]. In an editorial published on October 12, 2011 – just two days after Bechtel and Sargent & Lundy subcontractors discovered the shield building cracking, but still before it had been revealed to the public and the media – the *Toledo Blade* ran an editorial entitled "Nuclear watchdog needed." They wrote: "The 2002 reactor-head event cost FirstEnergy a record $33.5 million in fines for lying to the government. The former head of the U.S. Department of Justice's environmental crimes unit declared FirstEnergy showed 'brazen arrogance' and 'breached the public trust.'" [http://www.toledoblade.com/Editorials/2011/10/12/Nuclear-watchdogneeded.html].

17. Despite lessons that should have been learned, and despite assurances from within NRC and FENOC over the past decade, including that "safety culture" has been strengthened, and safety returned to its top priority status, NRC and FENOC's current actions belie their verbal assurances, and hark back to the "profit over safety" days of the Hole-in-the-Head debacle. The cracking phenomena suggest another round of "Radioactive Russian Roulette" at Davis-Besse. See the Beyond Nuclear backgrounder by that same title, posted online at http://www.beyondnuclear.org/storage/Davis_Besse_Backgrounder.pdf

18. On November 1, 2011, the *Toledo Blade* reported:

> More cracks were found in the concrete "shield building" at the Davis-Besse Nuclear Generating Station, including two areas of subsurface cracks "not associated" with cracks in the structure's architectural features, FirstEnergy said Monday in a letter to investors. The newly-discovered "indications" of cracks were identified during electronic testing and concrete sampling stemming from an initial discovery of a 30-foot hairline crack in the shield building that appeared after utility contractors cut a hole through its concrete for access to install a new reactor head. Davis-Besse has been shut down since Oct. 1 for that procedure.
>
> The testing has revealed "similar subsurface hairline cracks in most of the building's architectural elements," which protrude up to 18 inches beyond the main structure of 2½-foot-thick reinforced concrete, according to the letter. But the two areas of sub-surface cracking deemed "not associated" with that cracking are being

investigated "as a separate issue," the letter said.

[http://www.toledoblade.com/Energy/2011/11/01/More-cracks-are-found-in-Davis-Bessebuildin g.html]. Hence the early assurances by FENOC and NRC spokespeople, implying that the cracking was superficial, cosmetic, non-structural, etc. have been admitted to be false by FENOC itself in a letter to its own shareholders, as reported above. Reinforcing years of incredulity respecting FENOC's statements for public consumption, the company manipulates pronouncements about an issue of potentially serious safety significance in its pursuit of a 20-year license extension.

19. On November 4, 2011, David Lochbaum, Director of the Nuclear Safety Project at the Union of Concerned Scientists, wrote a "Conditional Allegation – Shield Building Design at Davis-Besse" to Cynthia Pederson, Regional Administrator (Acting), U.S. Nuclear Regulatory Commission Region III, in Lisle, IL. [posted online at http://www.beyondnuclear.org/storage/20111104-db-ucs-nrc-shield-bldg1.pdf]. Lochbaum stated:

> The purpose of this letter is to ask questions concerning the design evaluation and analysis of the shield building at the Davis-Besse nuclear plant. However, if the NRC's processes cannot support answering these questions before the plant restarts, please treat them as allegations.
>
> BACKGROUND
>
> Updated Final Safety Analysis Report (UFSAR) section 3.8.2.2 summarizes the design and associated analyses for the shield building. UFSAR section 3.8.2.2.2 states that dead loads were considered in the shield building design. UFSAR section 3.8.2.2.4 states that the dead loads included concrete (143 pounds per square foot) and steel reinforcing (489 pounds per square foot). UFSAR section 3.8.2.3.7 states that "Cement for all concrete except the Shield Building is Type II low alkali cement…The Shield Building has Type I cement above grade." UFSAR Figure 3.8-3 (left [see original document, at link provided]) illustrates a typical section of the containment vessel and shield building.
>
> The NRC's PNO-III-11-014 (ML11293A092) dated October 20, 2011 stated:

The reactor vessel closure head is bolted on top of the reactor vessel which is located inside a 1.5 inch thick steel containment vessel surrounded by a 2.5 foot thick freestanding, reinforced concrete, shield building. The majority of the shield building vertical exterior has additional nonstructural, architectural concrete up to 1.5 foot thick separated by grooves.

This plan diagram (overhead view [see original document]) of a section of the shield building wall shows the "nonstructural, architectural concrete" referred to in the NRC's PNO. As indicated by the two fishhook shaped devices in the drawing, the attachments are anchored to the shield building wall.

The media has reported that numerous cracks in the "non-structural, architectural concrete" have been identified. The NRC PNO stated "If there are any challenges identified to the design function of the shield building they will have to be resolved before the plant restarts."

QUESTIONS

1. The "non-structural, architectural concrete" elements do not appear in UFSAR Figure 3.8-3. The plan diagram indicates these elements are connected to the shield building wall. Are the dead loads from these concrete elements properly considered in the design analyses of the shield building?
2. The UFSAR does not explicitly describe these "non-structural, architectural concrete" elements. Thus, it is not clear if these elements have Type II concrete or Type I cement as explained in UFSAR section 3.8.2.3.7. What type of cement was used in the "nonstructural, architectural concrete?"
3. If the concrete/cement in the shield building is the same as that in the "non-structural, architectural concrete" elements and all have the same age and environmental exposure history, would numerous cracks identified in one suggest comparable conditions in the other? If not, why not?

UCS realizes that UFSAR Figure 3.8-3 is a simplified drawing and the design analysts hopefully used the more detailed civil/structural arrangement drawings, but it is prudent to check to verify it. Recall that the NRC team conducting the design inspection at the DC Cook nuclear plant in summer 1997 found that design analysts had failed to consider a wall inside containment that caused their calculations of water inventory available during the recirculation phase of an accident to be significantly non-conservative. Holes had to be cut through that wall to assure that adequate water inventory would be available.

UCS also understands that the numerous cracks, even if also within the shield building's walls, do not in themselves demonstrate that the design function has been compromised. But there's little reason that numerous cracking found in the "non-structural, architectural concrete" would not also be found in the shield building concrete

> unless (a) a different type of concrete was used, or (b) no one looked at the shield building concrete.
>
> CONDITIONAL ALLEGATIONS
>
> UCS would prefer that the NRC answer the questions above before Davis-Besse restarts. But we realize that the NRC may lack the process and means to do so. If that is the case, please consider the following two items with the agency's allegations program:
>
> 1. The design evaluation and analysis for the shield building did not properly consider the dead load from the "non-structural, architectural concrete" attached to it.
> 2. The shield building wall was not sufficiently examined for indication of cracking.

Intervenors concur with the above questions and allegations posed by David Lochbaum, and hereby incorporate them into the body of our contention.

20. On November 17, 2011, the *Toledo Blade* published an article entitled "Davis-Besse to stay shut until probe ends." [http://www.toledoblade.com/Energy/2011/11/17/Davis-Besse-tostay-shut-until-probe-ends.html] The article reports:

> …"Until we have confidence that the cracks in the Shield Building don't have any safety implications, the plant won't go back online," Viktoria Mytling, spokesman at the NRC's regional office in Chicago, said…
>
> Ms. Young [FENOC spokeswoman] said Wednesday the reactor head replacement had been completed and that the steel removed to create the access hole had been welded back into place and pressure tested. The shield building hole should be patched by week's end, she said.
>
> Ms. Mytling said such patching would not affect the NRC investigation, and no timetable is in place for restarting the plant…

Those patches are, of course, weak spots themselves, both the welded area on the inner steel containment, a mere 1.5 inches thick, as well as the "patched" area on the concrete shield building/secondary reactor containment structure, a mere 2.5 feet thick. As explained below, on January 4, 2012, David Lochbaum of UCS questioned whether the multiple holes cut in containment, and thus the multiple "patches" applied afterwards, overlapped, and how so. The "welds" on the inner steel container, and "repours" of concrete on the outer shield/secondary

containment building, are themselves weak spots – perhaps repeatedly so in spots that have been involved in more than one cut-through and repair. This is a safety-significant issue that will grow all the more so with age-related degradation, and the prospect for yet one more cut-through and "repair" (patch) for the 2014 steam generator replacement project. In fact, FENOC has answered Lochbaum's question about the overlap of the breaches. In its January 5, 2012 Camp Perry power point presentation cited previously, on Slide #18 (page 9 of the hardcopy handout), FENOC documents that indeed *all* of the first three breaches – 1970, 2002, and 2011 – have already overlapped, specifically in the top left-hand quadrant.

21. On November 19, 2011, the *Toledo Blade* reported that the hole cut for the lid transplant would be sealed shut that day, and that FENOC predicted the reactor would be re-started by the end of November:

> A 12-hour concrete pour is scheduled for Saturday at the Davis-Besse nuclear power plant, closing a hole in the reactor's outer shield building cut last month for access to install a new reactor head, a FirstEnergy spokesman said Friday.
>
> While declining to set a date when the utility plans to restart the plant, spokesman Jennifer Young said it remains on schedule to resume operation by the end of November, as forecast in a recent letter to FirstEnergy stockholders.
>
> By then, Ms. Young said, FirstEnergy also expects to have closed its investigation into hairline cracks discovered in the shield building's reinforced concrete after the access hole was made.
>
> FirstEnergy has submitted to the Nuclear Regulatory Commission its finding that the cracks are not a safety hazard, she said, and now is following up by submitting technical reports to the commission in response to its questions about the matter. "The cracks, as they are, do not impact the structural integrity of the building," Ms. Young said Friday. "There's plenty of margin in the building. It's a very, very robust building."
>
> Viktoria Mytling, a spokesman at the NRC's regional office in Chicago, said that as matters stand, FirstEnergy is free to restart Davis-Besse when it considers the plant to be ready, since the regulatory agency has made no finding of any safety hazard there. "If the plant does restart while our review isn't done, and we subsequently identify a safety issue, they are legally required to shut the plant down to resolve the safety issue," Ms. Mytling said. "If we are conducting a review and have a specific safety concern the company needs to address, but they tell us they will restart the plant before providing us with answers we need to make sure the plant will operate safely, we can and would order

> the plant to cease restart activities until they answer our questions."
>
> The NRC could also order "compensatory actions" -- essentially, special conditions -- for a restart or continued operation if the agency were to declare a safety issue, Ms. Mytling said.
>
> Ms. Young said FirstEnergy expects the "conversation" with the Nuclear Regulatory Commission to be concluded before the restart.
>
> After the shield building concrete is poured, the spokesman said, it will take several days to harden. Other maintenance that has been under way since Davis-Besse shut down Oct. 1 for the reactor-head replacement also needs to be finished before the plant's restart, she said.

[http://www.toledoblade.com/local/2011/11/19/Nuclear-plant-to-close-hole-made-forrepairs.html].

22. Intervenors do not understand how FENOC and the NRC can claim that the cracks are not safety-significant. NRC does not plan to publish its independent analysis until January 16, 2012. NRC is not requiring FENOC to provide its final analysis until February 28, 2012. NRC staff has made Requests for Additional Information (RAIs) to FENOC as far back as May 2011, relating to age-related degradation management issues, which are broad enough in nature to include this concrete shield building cracking problem of yet-unexplained origin. On December 27, 2011, as will be shown, NRC's RAIs extended directly to aging management *vis-a-vis* cracking in the concrete shield building. Because FENOC's responses to date to NRC's RAIs have been inadequate, the NRC has had to repeat its "requests for additional information." NRC has also postponed its due dates for FENOC's responses, and currently has provided FENOC the slack to postpone RAI response dates further off into the future. This approach appears more attuned to an arbitrary outage schedule, with a speedy return to economically-profitable "production" rather than taking a conservative, analytical approach to determination of root causes, extent, and safety-significance of cracking in the shield building. Such an approach imperils Intervenors, the people they represent, and countless residents downwind and

downstream of the aged and aging Davis-Besse atomic reactor in the Great Lakes Basin.

23. Of additional concern is that the pour of new concrete to re-seal the shield building foreclosed significant investigatory options for examination and further analysis of the cause, extent, and significance of the cracks, such as direct visual examination, direct measurement, direct sampling, etc. In effect, evidence of the cracking has been buried under inches or feet of concrete, due to FENOC's rush to re-start, and NRC's letting them get away with it.

24. On November 20, 2011, U.S. Representative Dennis Kucinich published an op-ed entitled "Time for truth about Davis-Besse" in the *Toledo Blade*, which stated:

> It's time for FirstEnergy Corp. to tell Ohioans the truth about the Davis-Besse nuclear power plant.
>
> Last month, FirstEnergy disclosed that workers who were replacing a deteriorating reactor head had found cracks in the concrete wall of the Davis-Besse shield building. FirstEnergy said they were "hairline" cracks, "barely visible" in an "architectural" or "decorative" section of the concrete. We were told that the shield building merely "provides protection from natural phenomena, including wind and tornados."
>
> Later, though, it was revealed that these cracks ran for about 30 feet along the line of steel reinforcing rods in the wall. A photo of the wall posted on the U.S. Nuclear Regulatory Commission's Web site appears to show cracks that are not "hairline" and are clearly "visible." [this photo is still posted at NRC's website, at the following link: http://www.nrc.gov/images/reading-rm/photogallery/ 20111021-001.jpg]
>
> This month, FirstEnergy acknowledged to investors that the wall of the shield building has many cracks. In fact, there are cracks in 15 out of 16 of what FirstEnergy calls "exterior architectural elements."
>
> The shield building provides the primary defense for Davis-Besse's nuclear reactor against terrorist attacks. It offers secondary defense against the release of radiation in the event of a nuclear accident and a breach of the inner containment vessel.
>
> The areas where most of the cracks have appeared have structural significance, and are not merely "architectural elements." A drawing provided by FirstEnergy - a cross-section of the wall where the cracks were discovered - shows that these areas have steel reinforcing rods within the concrete.
>
> These rods are anchored into the wall in two places. They provide an anchor to the bands of steel rods that run around the circumference of the shield building wall, and also a perpendicular anchor through most of the thickness of the wall.
>
> What FirstEnergy calls "architectural … attachments" are an integral part of the shield building wall. The concrete they contain was poured at the same time as the rest of

the concrete in the wall.

We should expect that the same age-related deterioration that has occurred in this concrete would occur throughout the wall. That is exactly what FirstEnergy is discovering.

In its letter to investors, FirstEnergy revealed it has found subsurface cracks in other areas of the wall that it does not even try to claim are "architectural." We still have no idea how many other cracks there are in areas of the shield building that have not been tested.

Davis-Besse's reactor is aging. Its concrete is more than 34 years old. It is likely that more concrete will crack during the remaining six years of the plant's operating license, and even more if FirstEnergy gets the 20-year license extension it is seeking from the Nuclear Regulatory Commission.

It's time for FirstEnergy to tell the truth about Davis-Besse. It's time to release all the photos, all the test results, and all the reports. It's time to stop the spin and start full disclosure. Rather than risk the future of our region and the contamination of the Great Lakes, we must safeguard the public interest. We must insist that First Energy be honest and forthcoming about the serious defects in its reactor containment.

(Emphasis supplied). [http://www.toledoblade.com/Op-Ed-Columns/2011/11/20/Time-for-truth-about-Davis-Besse.html].

25. Regarding accelerated breakdown phase problems, Rep. Kucinich said at a December 14, 2011 hearing of the U.S. House Oversight and Government Reform Committee, referring to analyses carried out in the aftermath of the 2002 Davis-Besse Hole-in-the-Head fiasco, that:

> FirstEnergy's insurance company became worried and commissioned an independent study to analyze the data from the incident. The study, which was released in April 2007, painted an even darker picture than the regulatory rebukes that came before it. The report found that *corrosion of the steel plate happened at a faster rate than was reported by FirstEnergy, bringing the reactor closer to a catastrophic incident than had previously been reported.*

(Emphasis added). [http://kucinich.house.gov/News/DocumentSingle.aspx?DocumentID=272516]. Such accelerating age-related degradation is entirely possible vis a vis the cracking of the concrete shield building, too. If so, Davis-Besse's shield building cracking will become more and more safety-significant with each passing year, especially during the extended operations

license. If the shield building loses its ability to perform its safety- and security-related functions, Davis-Besse should be immediately shut down, of course. But this very risk, the potential loss of shield building safety and security function over time, is exactly the kind of analysis that should be included in FENOC SAMA analyses regarding the Davis-Besse license extension. Such analyses have not been done. Similarly, the potential for Davis-Besse's cracked shield building to cause its early retirement, before its current license expiration in 2017, or before its extended 2037 license expiration proposed by FENOC, should be addressed by FENOC's reliability analyses, and its energy alternatives analyses. For, if Davis-Besse's days are numbered, due to its cracked shield building, then Intervenors' wind, solar, and compressed air energy storage contentions increase in merit. FENOC, and the Region of Interest as a whole, should be preparing now to replace Davis-Besse and the NRC should reflect such a reality through its own independent analysis in the Draft Environmental Impact Statement on the license extension proposal.

26. On November 21, 2011, U.S. Rep. Kucinich wrote a letter to Gregory B. Jaczko, Chairman, U.S. Nuclear Regulatory Commission, which reads:

> I am writing to ask that the NRC conduct a public hearing in Northern Ohio to reveal the facts surrounding the apparent delamination that has been discovered in the concrete wall of the shield building of the Davis-Besse nuclear power plant, and that this hearing be conducted before FirstEnergy is allowed to power up its reactor. A public hearing is necessary because FirstEnergy has been characterizing the situation at Davis-Besse in ways that I believe are misleading, and because representatives of the NRC seem to have adopted and repeated those characterizations in their statements.
>
> For example, FirstEnergy has characterized the cracks they have discovered as "hairline" and "barely visible." They have characterized the locations of these cracks as being "decorative elements" or "architectural elements" of the building that are separate or distinct from the "structural elements" of the building. And, they have characterized the shield building as something that merely "provides protection from natural phenomena including wind and tornados."
>
> In sharp contrast to these characterizations, the facts reveal that these "barely

visible" "hairline" cracks run for approximately 30 feet along the line of the steel reinforcing rods in the wall. A photo of the wall posted on the NRC website appears to show cracks that are not "hairline" and are clearly "visible."

FirstEnergy's diagram of a cross section of the wall shows that the "elements" in which the cracks have been found are "structural" and are part of that wall, not separate "decorative" elements.[1] And, First Energy has described the purpose of the shield building quite differently in its recent "License Renewal Application."

"The Shield Building is a concrete structure surrounding the Containment Vessel. It is designed to provide biological shielding during normal operation and from hypothetical accident conditions. The building provides a means for collection and filtration of fission product leakage from the Containment Vessel following a hypothetical accident through the Emergency Ventilation System, an engineered safety feature designed for that purpose. In addition, the building provides environmental protection for the Containment Vessel from adverse atmospheric conditions and external missiles."[2]

I am also concerned because the few facts that have been disclosed about the cracks seem to indicate a widespread problem that will undermine the structural integrity of the shield building. The fact that the visible cracking is 30-feet long, the fact that the cracking runs along the line of the outermost steel reinforcing bars (rebar), the fact that further testing has discovered similar cracking in 15 out of 16 of the "wings" or "shoulders" of the building, the fact that cracking has been discovered in other areas of the wall, all suggest a delamination of the concrete, at the outermost rebar, caused by concrete carbonation.

Concrete carbonation is a process of deterioration of concrete that is caused by the seepage of CO2 through the concrete wall. As the CO2 seeps through the concrete wall, it creates a chemical reaction that lowers the alkalinity of the concrete. On average, CO2 seepage occurs at a rate of approximately 1 mm per year.[3] The problem arises when the CO2 seepage reaches the steel rebar, because it is the high alkalinity of the concrete that protects the steel from corrosion. When carbonation lowers the alkalinity of the surrounding concrete, the steel can begin to corrode. As the steel corrodes, it expands and creates cracks in the concrete that run along the line of the steel rebar.[4]

Obviously, the outermost rebar is the first steel that the carbonation would reach. The rebar in the "wings" of the wall is the closest to the surface and would be affected first, followed shortly thereafter by the rebar at the midpoint between the wings where the main circumferential rebar is closest to the outside surface of the wall. And, since this process should be occurring uniformly around the circumference of the building, it should exist to about the same extent in all the "wings."

This scenario seems to fit the situation discovered at Davis-Besse perfectly. Cracks have been discovered in 15 of the 16 wings, and the process of carbonation almost certainly has reached the rebar in the 16th wing, but corrosion of the rebar there has not yet progressed enough to open cracks in the adjoining concrete.

In 2006, Oak Ridge National Laboratory performed a study for the NRC "to support the NRC's efforts to understand containment degradation … and how changes in concrete material properties may affect the performance of [nuclear power plant]

concrete structures." The resulting Report [5] contains a number of findings that are very worri-some when applied to the Davis-Besse situation.

First, cracks that "follow the line of the steel reinforcement," like those discovered at Davis-Besse, are called "coincident cracks." [6] The Report calls those cracks "of more importance than transverse cracks relative to accelerating corrosion." [7]

Second, the Oak Ridge study "concluded that there is little evidence to support the idea that wide cracks will promote corrosion faster than narrow cracks." [8] "[I]t was concluded that the corrosion rate is…independent of crack width." [9] So, characterizing the cracks at Davis-Besse as "hairline" or "barely visible" may soothe the concerns of the public, but it does not reduce the severity of the problem.

Finally, with respect to "coincident cracks", "the passivity [ability to resist corrosion] of the reinforcing steel may be lost at several locations with the same crack being able to readily transmit oxygen and moisture to the cathodic areas of the steel. Since there is no way of inhibiting or confining the corrosion process, corrosion may then proceed unchecked and possibly accelerate." [10]

In summary, the kind of cracks found at Davis-Besse "are of more importance … relative to accelerating corrosion." With respect to that rate of corrosion, it doesn't matter that they are small cracks. And, in the case of this kind of cracks, "there is no way of inhibiting or confining the corrosion process," which "may then proceed unchecked and possibly accelerate."

FirstEnergy has publicly stated that it expects to have Davis-Besse back on line and producing electricity in late November. That kind of accelerated schedule is unreasonable, given that this problem was only discovered a month ago, that FirstEnergy has only tested a very small fraction of the shield building wall, that none of the testing or results have been made public, and that the statements that have been made by First-Energy have been misleading at best.

FirstEnergy has a long history at Davis-Besse of placing profit ahead of safety. I want to make certain that Davis-Besse is not rushed back into operation before the NRC and the people of Northern Ohio have a full and complete opportunity, through the vehicle of a public hearing, to evaluate both the cause and the extent of the problem.

Footnotes:

[1] They could, legitimately, be characterized as "additional" to the 2.5-foot thickness of the wall, but they are clearly structural.

[2] "License Renewal Application," p. 2.4-3

[3] American Concrete Institute, http://www.concrete.org/FAQ/afmviewfaq.asp?faqid=50

[4] See generally, Containment Liner Corrosion Operating Experience Summary Technical Letter Report – Revision 1 http://adamswebsearch.nrc.gov/idmws/DocContent.dll?library=PU_ADAMS^pbntad01&LogonI D=06340b961c634f3d934580551d394520&id=112220033

[5] "Primer on Durability of Nuclear Power Plant Reinforced Concrete Structures - A Review of Pertinent Factors."

[6] Id., p. 103.

[7] Id., p. 110.
[8] Id., p. 105.
[9] Id., p. 106.
[10] Id., p. 103.

27. The prospects that " 'there is no way of inhibiting or confining the corrosion process,' which 'may then proceed unchecked and possibly accelerate,'" and that "the kind of cracks found at Davis-Besse 'are of more importance…relative to accelerating corrosion,'" point directly to the concern that the cracking of the concrete shield building may be an accelerating process with age and time, just as the corrosion of the reactor vessel head seems to have been in 2001-2002. Thus, the concrete shield building cracking is aging-related, and entirely worthy of an in-depth hearing on the merits before the ASLB in this license extension proceeding.

28. FirstEnergy has denied that carbonation is a problem. On November 22, 2011, the *Toledo Blade* quoted FENOC as saying:

> A FirstEnergy spokesman said the company has a "root cause team" looking at the problem but that carbonation appears not to be an issue.
>
> "Our testing on a number of concrete samples showed no carbonation on any of the crack surfaces of those that we tested, and [from] our inspections of the rebar, the rebar looks very good and healthy. There was no corrosion of the rebar," said spokesman Jennifer Young.
>
> "[Mr. Kucinich's] letter suggested we weren't telling the full story. I don't believe that to be the case. The NRC understands everything we've looked at," Ms. Young said…
>
> FirstEnergy has submitted to the NRC its finding that the cracks are not a safety hazard and is following up by submitting technical reports to the commission in response to its questions about the matter.

[http://www.toledoblade.com/local/2011/11/22/Kucinich-seeks-NRC-hearing-about-cracks-at-Davis-Besse-2.html]

29. The contradiction between Congressman Kucinich's analysis of the concrete shield building cracking and FENOC's is just the sort of factual dispute that is worthy of an ASLB

hearing. Moreover, FENOC's claims to be "submitting technical reports to the commission in response to its questions about the matter" are belied by the fact that some NRC Requests for Additional Information (RAIs) have gone unanswered by FENOC for well over half a year, and due dates for responses have been postponed, despite the controversial nature and safety significance of the shield building cracking. NRC's RAIs from May, 2011 had to do with aging management issues, which include shield building cracking. NRC's RAIs from December, 2011 have directly to do with shield building cracking, a critical safety-significant aging management issue that should be addressed in the license extension proceeding, as urged by this contention.

30. On December 2, 2011, the *Toledo Blade* reported that NRC had granted FENOC permission to re-start Davis-Besse:

> The Nuclear Regulatory Commission has given FirstEnergy a green light to restart the Davis-Besse nuclear power plant while ordering the company to investigate further the cause and extent of cracks discovered during October in the plant's concrete shield building.
>
> In a "confirmatory action letter" to FirstEnergy Nuclear Operating Co., Cynthia Pederson, the NRC's acting regional administrator, wrote that her agency had been provided "reasonable assurance that the shield building is capable of performing its safety functions" despite the multiple hairline cracks discovered after a hole was cut in the concrete through which reactor heads were swapped out.
>
> But the letter requires FirstEnergy to "provide the results of the root cause evaluation and corrective actions to the NRC, including any long-term monitoring requirements, by Feb. 28, 2012" and describes the nature of further testing necessary to determine if the cracks are spreading or widening.
>
> Further study also will be required during a refueling outage scheduled for next year, Ms. Pederson wrote.
>
> NRC also announced that a public meeting will be held, on a date and at a place to be determined, during which FirstEnergy will "discuss their technical analysis and explain why the plant is safe to continue to operate with the cracks in the shield building."
>
> The commission said it would issue its own inspection report and conclusions about the plant on Jan. 16.
>
> Jennifer Young, a FirstEnergy spokesman, confirmed that the re-start go-ahead had been received, but declined to say when Davis-Besse would be back on-line.
>
> "We are wrapping up our outage activities, and beginning the re-start," Ms. Young said Friday.

> The Davis-Besse plant's reactor chamber is enclosed by a 1.5-inch thick steel containment vessel and the shield building, made of concrete 2.5 feet thick. Officials have described the shield building's primary role as protection of the plant against terrorism or natural disasters, but it also would provide secondary containment if the steel enclosure were breached. FirstEnergy is in the midst of applying for an extension of Davis-Besse's operating license, which expires in 2017. Anti-nuclear activists have argued that the cracking concrete in the shield building is yet another reason, on top of the plant's troubled safety history, for Davis-Besse's license not to be renewed or, alternatively, to be extended for a shorter time than the 20-year extension FirstEnergy has requested.
>
> A 30-foot, barely visible crack was discovered in "architectural concrete" adorning the outside of the Shield Building after workers used hydro-demolition — high-pressure water — Oct. 10 to cut the hole for the reactor-head exchange.
>
> Additional, similar cracks were later discovered during investigation. Michael Keegan, one of several critics who have intervened in the re-licensing proceedings, called the Confirmatory Action Letter "a big fat nothing" and repeated his doubts about the wisdom of re-starting Davis-Besse.
>
> The NRC's re-start approval, he said, is "a promise to kick the can down the road and roll the dice one more time. The concept of 'Use As Is,' when it comes to operating a nuclear power plant, is a risky proposition."
>
> In a Nov. 21 letter to the NRC, U.S. Rep. Dennis Kucinich (D., Cleveland) questioned the Shield Building's structural soundness in light of the crack and requested a hearing like the one the agency said it will hold — except that Mr. Kucinich wanted the hearing held before the plant's restart.

[http://www.toledoblade.com/Energy/2011/12/02/Davis-Besse-allowed-to-restartoperations.html]

31. The January 16, 2012 issuance of NRC's own inspection report and conclusions about the shield building cracking, and the February 28, 2012 due date for FENOC to "provide the results of the root cause evaluation and corrective actions to the NRC, including any long-term monitoring requirements," show that previous publicly stated assurances by FENOC and NRC - that full understanding of the causes, extent, and significance of the cracking would be resolved *prior* to restart -- were empty promises. Public confidence is completely undermined at this point.

32. On Monday, December 5, 2011, Congressman Kucinich issued the following

statement:

> Test results, analyses, and reports on which this decision has been based have not been revealed to the public. It is one thing to conceal this information from the public while the reactor is idle. It is quite another to restart the reactor without making full disclosure to the public why it thinks we should accept a nuclear power plant operating at full power with a building containing cracks of unknown origin.

33. Intervenors call upon both FENOC and NRC to make their shield building cracks related documentation accessible to the Interveners and public in order to make the license extension proceeding and its treatment of this safety-significant aging related issue fully transparent and accountable.

34. On December 7, 2011, after a December 6, 2011 meeting between his staff and representatives of the U.S. Nuclear Regulatory Commission, U.S. Representative Dennis Kucinich (D-OH) issued a strongly worded statement critical of nuclear utility FirstEnergy's public assurances about the problem of cracking, claiming that the NRC's detailed description of the cracking revealed that the cracks in the Davis-Besse shield building are more numerous and more widely distributed than FirstEnergy has publicly portrayed. Congressman Kucinich and his staff prepared a comparison of FirstEnergy statements with known fact. Congressman Kucinich's statement read, in full:

> Congressman Dennis Kucinich (D-OH) today questioned whether FirstEnergy has been entirely upfront with the people of Ohio over the extent of the damage to the Davis-Besse nuclear power plant. Kucinich requested full public disclosure of all relevant photographs, test results, analyses and reports by FirstEnergy after comparing reassuring public statements made about the damage by FirstEnergy officials to disquieting information received from the NRC during a briefing yesterday for the Congressman's staff.
>
> Descriptions by the NRC, which receives non-public reports from FirstEnergy, revealed that the damage to the Davis-Besse plant is greater than has previously been portrayed in public statements made by FirstEnergy officials. Kucinich called upon FirstEnergy to release all photographs, test results, analyses

and reports to the public in order to verify the accuracy of FirstEnergy's public statements.

"In response to inquiries by my staff, the NRC provided a detailed description of the cracking at FirstEnergy's Davis-Besse plant. That description revealed that the cracks in the Davis-Besse 'shield' building are more numerous and more widely distributed than FirstEnergy has publicly portrayed," said Kucinich.

Cracks were initially discovered by accident in the concrete shield wall that protects the reactor from physical attacks and prevents radiation release into the air, water and soil. FirstEnergy publicly claimed the damage was limited as to the size and the location of the cracks.

As a result of information shared by the NRC, it was revealed that the extent of those cracks is greater than portrayed to the public by FirstEnergy. Cracks have been found in additional locations not revealed in public statements by FirstEnergy, including cracks around the top twenty feet of the building.

"The NRC's decision to approve the restart is based solely on information and reports prepared by FirstEnergy and consultants that FirstEnergy has hired and paid. We do not fully know what is in the reports made by FirstEnergy to the NRC, but we must reveal that the description of damage by the NRC does not mirror public statements made by FirstEnergy officials. FirstEnergy should release all the documents it has in order to ensure that the public has a full and accurate understanding of the situation," said Kucinich.

"Full disclosure is mandatory. FirstEnergy risks loss of public confidence if it continues to tell the people of Ohio one thing and the NRC another. Since we are talking about a nuclear power plant with a troubled history, the public has a powerful health and safety interest in full and immediate disclosure," Kucinich said.

Last Friday evening, the NRC announced it would allow FirstEnergy to restart Davis-Besse even though the cause of the cracking and the extent of the cracking is still unknown. The investigation into the cause of the widespread cracks is not expected to be completed until February.

(Emphasis added). [http://kucinich.house.gov/UploadedFiles/Factual_Analysis_of _FirstEnergy_Statements.pdf].

35. Congressman Kucinich's December 7, 2011 "Factual Analysis of FirstEnergy's Recent Statements About Damaged Shield Building at Davis-Besse Nuclear Power Plant" reveals as follows:

FirstEnergy Statements: FirstEnergy originally announced that, while

cutting an opening in the shield building of its aging Davis-Besse nuclear reactor, to replace a deteriorating reactor head for the second time, workers discovered cracks in the concrete shield building wall. FirstEnergy called this a “barely visible indication” of a crack, which ran for approximately 30 feet along the line of the steel reinforcing rods in the wall.[http://www.cleveland.com/business/index.ssf/2011/10/nrc_firstenergy_concerned_abou.html]

Fact: A photo of the wall posted on the website of the Nuclear Regulatory Commission appears to show cracks that are not “hairline” and that are clearly visible.[http://www.sanduskyregister.com/carroll-twp/news/2011/nov/23/kucinich-urgespublichearing-proposed-davis-besse-restart]

FirstEnergy Statements: We were told by FirstEnergy that the cracks were not a problem because they were in “architectural elements” of the concrete wall [http://www.cleveland.com/business/index.ssf/2011/10/firstenergy_reveals_it_has_fou.html] or “architectural design components” of the wall, [http://www.sanduskyregister.com/carroll-twp/news/2011/nov/01/more-cracksfounddavis-besse-nuclear-power-station], that were, somehow, different from the “structural” elements of the wall. The NRC initially accepted this characterization and issued a statement that the cracking was in “non-structural architectural” concrete [http://blog.cleveland.com/metro/2011/10/crack_at_davis-besse_nuclear_p.html] On October 31, in a letter to its “Investors,” FirstEnergy wrote that there are cracks in “most” of the “exterior architectural elements” of the shield building that merely “serve as architectural features and do not have any structural significance.” [http://phx.corporateir.net/External.File?item=UGFyZW50SUQ9MTEzMjEwfENoaWxkSUQ9LTF8VHlwZT0z&t=1]. On November 1, we learned that “most” meant 15 out of 16 of what FirstEnergy still claimed were merely “architectural elements.”[http://www.sanduskyregister.com/carrolltwp/news/2011/nov/01/more-cracks-founddavis-besse-nuclear-power-station]

Fact: The areas where most of the cracks have been discovered do have structural significance. They are not merely “architectural elements.” The drawing that FirstEnergy provided, of the cross-section of the wall where the first cracks were discovered, shows that the “flutes” contain steel reinforcing rods within the concrete and that those rods are anchored to the rest of the wall in two ways—first, an anchor to one of two of the bands of steel rods that run around the full circumference of the shield building wall, and second, a perpendicular anchor through most of the thickness of the wall itself. [see diagram in primary document]

Furthermore, what FirstEnergy calls “architectural flute attachments” in this drawing are not “attachments” at all. They are an integral part of the concrete shield building wall and the concrete they contain was poured at the same time as the rest of the concrete in the shield building wall. In both briefings that the NRC has provided us, their employees volunteered that this was one continuous concrete wall that was poured at the same time. There is no “architectural” element that is distinct from the structure of the wall.

FirstEnergy Statements: FirstEnergy has tried to minimize the significance of the cracks by describing the shield building as something that merely “provides protection from natural phenomena including wind and tornados.”[http://phx.corporateir.net/External.File?item=UGFyZW50SUQ9MTEzMjEwfENoaWxk SUQ9LTF8VH lwZT0z&t=1]

Fact: However, First Energy described the purpose of the shield building quite differently in its recent “License Renewal Application.” That document states that the primary purpose of the shield building is to provide protection from radiation leakage in accident situations:

> “The Shield Building is a concrete structure surrounding the Containment Vessel. It is designed to provide biological shielding during normal operation and from hypothetical accident conditions. The building provides a means for collection and filtration of fission product leakage from the Containment Vessel following a hypothetical accident through the Emergency Ventilation System, an engineered safety feature designed for that purpose. In addition, the building provides environmental protection for the Containment Vessel from adverse atmospheric conditions and external missiles.”

[Footnote 1 in original, “License Renewal Application,” p. 2.4-3] “Environmental protection” is only an “additional” purpose of the shield building. And, FirstEnergy has totally omitted the fact that one “additional” purpose of the shield building concrete is to protect against “external missiles.”

FirstEnergy Statements: In its letter to investors, FirstEnergy stated that it had discovered cracks in two other locations that were not “flute shoulders.” [http://phx.corporateir.net/External.File?item=UGFyZW50SUQ9MTEzMjEwfENoaWxkSUQ9LTF8VHlwZT0z&t=1]. FirstEnergy subsequently described those two areas as places where the steam lines entered and exited the shield building. [cite]

Fact: **On December 6, 2011, the NRC informed us that “impact response mapping” had revealed similar cracks in “various areas of**

> **the top 20 feet of the building" that were not flute shoulders. This cracking seems to be "more extensive on the south side of the building." They also described the cracking as "laminar cracking" that is "circumferential to the entire outer rebar map." While only a small percentage of the wall has actually been tested, they are assuming for purposes of evaluation that the flute shoulders have laminar cracking "all the way up and down" the concrete wall.** (emphasis added)
>
> Glossary of Terms: "Containment"—The structure enclosing a nuclear reactor and designed to contain the results of an anticipated nuclear accident and to prevent release of radiation into the environment. At Davis-Besse, the containment system includes the containment vessel and the shield building.
>
> "Containment vessel"—At Davis-Besse, the containment vessel is a 1.5-inch-thick steel structure that encloses the reactor vessel and the heat exchanger.
>
> "Shield building"—At Davis-Besse, the shield building is a reinforced concrete building that encloses the containment vessel, separated by 4.5 feet of interior space.
>
> "Flutes"—there are 8 vertical flutes evenly spaced around the circumference of the shield building. They appear to be vertical grooves in the wall, where the thickness of the wall is less than the edges on either side of the flute. [See diagram in primary document, mentioned above]
>
> "Flute shoulder"—there are 16 shoulders—two on each side of each flute. The flute shoulders become thicker as they approach the flute. [See diagram in primary document, mentioned above]
>
> "Laminar cracking" or "Delamination"—A mode of failure of composite materials, including concrete, in which the "layers" or "lamina" of the material separate. In reinforced concrete structures, laminar cracking or delamination usually occurs as a result of corrosion of the steel reinforcing rods, which expand as they corrode and cause cracking along the line of the steel reinforcement.
>
> "Impact response mapping"—term used by NRC representative for testing to locate laminar cracking inside a concrete wall. The wall is struck with a hammer and an instrument records and evaluates the response.
>
> "Rebar map"—term used by NRC representative to describe the system of steel reinforcing bars inside the concrete wall.

To summarize, NRC staff's admissions to Congressman Kucinich's staff represent significant evidence that the concrete shield building cracking is *structural, not cosmetic.* NRC staff's admission to Congressman Kucinich's staff that "While only a

small percentage of the wall has actually been tested, they [NRC staff] are assuming for purposes of evaluation that the flute shoulders have laminar cracking 'all the way up and down' the concrete wall" means that the NRC staff are assuming the cracks are not 30 feet long, as originally reported in the media, but rather 225 feet long – the full height of the concrete shield building. In fact, FENOC's Davis-Besse Site Vice President, Barry Allen, confirmed this very point towards the very end of a long, grueling NRC public "Informational Presentation" meeting at Camp Perry in Port Clinton, Ohio on January 5, 2012 – namely, that FENOC (as with NRC) is assuming that the cracking extends for 225 feet from the bottom of the concrete shield building to the top.

36. On December 7, 2011, FENOC submitted to the Document Control Desk at NRC a 14 page letter entitled "SUBJECT: Davis-Besse Nuclear Power Station, Unit No. 1, Docket No. 50-346, License Number NPF-3, Reply to Request for Supplemental Information for the Review of the Davis-Besse Nuclear Power Station, Unit No. 1, License Renewal Application (TAC No. ME4640)." [posted online at http://www.beyondnuclear.org/storage/DB%2012-7-11% 20Methodology%20for%20Visual%20Inspection%20of%20Reactor%20Building1.pdf] The cover letter, signed by Barry S. Allen, Vice President – Nuclear, FENOC, explains: "During a telephone conference held on November 22, 2011, the Nuclear Regulatory Commission (NRC) requested supplemental information to complete its review of the License Renewal Application (LRA)." The cover letter's enclosure, "Document Sections Described in the FENOC Response to NRC Request for Additional Information (RAI) Followup B.2.1-2," is FENOC's response to NRC's request. [this FENOC response is posted online at http://www.beyondnuclear.org/storage/DB%2012-7-11%20Methodology%20for%20Vis

ual%20Inspection%20of%20Reactor%20Building1.pdf]. The first document in the enclosure is entitled: Davis-Besse Nuclear Power Station, SURVEILLANCE TEST PROCEDURE, DB-PF-03009, CONTAINMENT VESSEL AND SHIELD BUILDING VISUAL INSPECTION, REVISION 07, Prepared by: Maik Swain, Procedure Owner: Supervisor - Nuclear Engineering Programs, Effective Date: JUN 17 2011.

37. Under "Purpose," at Section 1.1, is written:

> The visual examination of the Containment Vessel and Shield Building is performed of the accessible interior and exterior surfaces of the containment system in order to detect any structural deterioration which may affect the containment leak-tight integrity.

38. The containment system, including the shield building, is safety-significant and vulnerable to age-related degradation, especially during extended operations from 2017 to 2037. Thus, it is subject matter worthy of a hearing.

39. In a yellow highlighted section is written:

> 2.1.2 Personnel who perform general visual examinations of the exterior surface of the Containment Vessel and the Interior and exterior surfaces of the Shield Building shall meet the requirements for a general visual examiner in accordance with NOP-CC-5708, Written Practice for the Qualification and Certification of Nondestructive Examination Personnel. These individuals shall be knowledgeable of the types of conditions which may be expected to be identified during the examinations.

40. A problem with this examination protocol is that this visual inspection program is limited to external surfaces. The present cracking controversy involves internal cracking, not visible to the naked eye on the surface. That is another reason that Interveners are concerned that the early December pouring of the concrete to patch the shield building hole may have covered up evidence of cracking that could only be obtained through direct visual inspection, but is now

under inches or feet of concrete.

41. Further on in the enclosure, under WRITTEN PRACTICE FOR THE QUALIFICATION AND CERTIFICATION OF NONDESTRUCTIVE EXAMINATION PERSONNEL, Effective Date: 04/30/10, Approved by Colin P. Keller, Program Manager on 4/21/2010, at section 4.2.5, General Visual Examiner (IWE / IWL), is written:

> For Davis Besse: The General Visual examiner visually assesses the general condition of Class MC or metallic liners of CC containment components. General Visual examinations shall be performed by, or under the direction of a Registered Professional Engineer or other individual knowledgeable in the requirements for design, inservice inspection, and testing of MC or CC containments. The examination type is described simply as General Visual.

While visual inspection is necessary, it is far from sufficient.

42. The same part of the enclosure, at "Page 41 of 59," in ATTACHMENT 1: TRAINING, EXPERIENCE, AND EXAMINATION REQUIREMENTS ("Page 2 of 9") states:

> 10) (a) **Formal training is not required** for MWE/IWL General Visual examination personnel, however, individual shall receive sufficient general familiarization under the direction of a knowledgeable individual experienced in performing CTMT exams and the requirements for design, inservice inspection, and testing of the Class MC and metallic liners of Class CC pressure retaining components. No qualification or training examinations are required. Document familiarization training. (b) Alternatively, VT personnel with MC endorsement are approved to perform the general visual examinations.

(Emphasis added). Intervenors are alarmed that this necessary, but far from sufficient, visual inspection methodology is so informal, regarding the high safety significance of the containment system.

43. The final section of the enclosure, Davis-Besse Nuclear Power Station Unit #1, Third Ten Year Inservice Inspection Program, Revision 5, June 9, 2009, poses concerns. The infrequency of the inspections and the long intervals between inspections, seems unacceptable,

given the safety-significance of the containment system. This infrequency of, and long interval between, inspections risks missing the development of new problems, which could break at an accelerating speed, as mentioned previously, especially considering the advanced age and state of disrepair of Davis-Besse, particularly regarding its cracked concrete shield building. Also, given Rep. Kucinich's revelations about cracking in the top 20 feet of the concrete shield building/secondary radiological containment structure, Intervenors seek to understand FENOC's specific methodology for visually inspecting that elevated region of the structure.

44. On December 12, 2011, NRC's Office of Congressional Affairs Director, Rebecca L. Schmidt, sent the following letter to Congressman Dennis Kucinich (please see next page):

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 12, 2011

The Honorable Dennis Kucinich
United States House of Representatives
Washington, D.C. 20515

Dear Representative Kucinich:

Pursuant to your request, the U.S. Nuclear Regulatory Commission (NRC) is providing documents that First Energy Nuclear Operating Company (FENOC) provided to the NRC for its consideration in evaluating the functionality of the Davis-Besse shield building. We are continuing to gather additional documents and will be providing them to you.

Please note that the majority of these documents have not been released to the public and have been marked "Not for Public Disclosure." The NRC may use some of this pre-decisional information to support potential enforcement actions associated with ongoing inspections. For these reasons, the NRC does not typically provide this type of information to Members of Congress during the pendency of ongoing inspections. Recognizing your interest in this matter, we are providing the requested material, but respectfully request that none of this sensitive material be made public.

We also emphasize that the material we are providing represents FENOC's analysis and the NRC staff does not necessarily agree with all aspects of the analysis or calculations. After evaluating the material provided to it by FENOC, including responses to NRC staff questions, the NRC staff made its own professional judgment regarding the functionality of the shield building.

Sincerely,

Rebecca L. Schmidt

Rebecca L. Schmidt, Director
Office of Congressional Affairs

Enclosures:
As stated

If NRC is so confident of the maintenance of safety function of the Davis-Besse cracked concrete shield building, it is unclear why NRC feels the need to withhold documents, especially technical data, from the public. However, given Interveners' standing in the license extension proceeding, they have an added claim to access to significant age-related safety documentation concerning Davis-Besse, information that should have been publicly disclosed in the first place. It is also unclear what information NRC is withholding from the public, vis a vis the information that it, as well as FENOC, publicly presented at the January 5, 2012 meeting held at Camp Perry in Port Clinton, Ohio. Interveners urge NRC to immediately publish any and all documentation made public at the January 5, 2012 Camp Perry meeting, as well as any and all additional information relating to the cracked Davis-Besse concrete shield building that has still been withheld from the public. This would be in keeping with one of President Obama's very first acts in office, his declaration that his administration would maximize transparency and accountability in government. Given NRC's mandate, to protect public health, safety, and the environment against nuclear power's many risks, such transparency and accountability is of paramount importance.

45. Also on December 12, 2011, NRC Inspector M. Holmberg requested the following information from FENOC regarding the cracked concrete shield building:

> "December 12, 2011
>
> Davis Besse Information Request – Inspector M. Holmberg - (630) 829-9748, msh@nrc.gov
>
> To support an NRC inspection (followup review) please have the following information provided to the Site Resident Inspectors Office on Monday January 9, 2012. This information is needed to support NRC review of the root

cause of cracking in the shield building (SB) identified during the recent 17-M Davis-Besse outage. This inspection will be conducted in accordance with Section 02.04.c and Appendix B "Temporary Containment Opening Review Guidance" of NRC inspection procedure IP 71007 "Reactor Head Replacement." If any records are not available on January 9, 2012, please identify a date when this information will be available.

1) All site and vendor corrective action records related to the identification of cracks in the SB.

2) Copy of corrective action records (for past 5 years) that identify degraded conditions associated with the shield building.

3) Composition of Root Cause Team (RCT) investigating the SB cracks (including contractors) – Please identify the Team Lead, Members (with a short biography/resume) and contact numbers.

4) Identify the corrective action record associated with the RCT efforts to determine the cause of the SB cracking.

5) RCT- Charter defining scope and methods used to identify the root cause of the SB cracking.

6) Current (draft) of the list of potential causes considered and preliminary status (e.g. possible cause or ruled out). Additionally, provide the draft RCT assessment with respect to the potential cause of these cracks associated with concrete carbonation (CC). CC is caused by the seepage of carbon dioxide through the concrete wall creating a chemical reaction that lowers the alkalinity of the concrete leading to corrosion of the steel reinforcing materials (rebar). As the steel corrodes, it expands and creates cracks in the concrete that may run adjacent to the steel rebar.

7) Identify (if) and to what extent the RCT has considered the information developed by Oak Ridge National Laboratory related to concrete degradation (reference NUREG/CR NUREG/CR- 6927 - ORNL/TM-2006/529- in Primer on Durability of Nuclear Power Plant Reinforced Concrete Structures - A Review of Pertinent Factors published in February 2007). If this information was not considered explain why it was not considered applicable to this root cause investigation.

8) Identify and describe any nonconformances for the SB concrete or steel reinforcement (rebar) with applicable specifications, standards or design that have been identified to date (e.g. up thru January 1, 2012) by the RCT investigation of the SB cracking.

9) Drawings/maps that identify the extent of SB cracking identified to date and document which identifies any additional plans to further define the extent of SB cracking.

10) Drawings/maps that identify the extent of nondestructive examinations and location of core bores used to confirm the current extent of SB cracking to date.

11) Plan/instruction which identifies the concrete samples removed from the SB to be subjected to further examination or testing in support of the RCT investigation.

12) Identify list and provide a copy of the vendor procedures or applicable American Society for Testing and Materials (ASTM) standards applied for each test or examination performed on SB concrete samples in support of the RCT investigations and the intended purpose for each test/exam performed. If any testing or examination of concrete were conducted without approved procedures identify these tests or examinations and the extent to which this information is relied upon by the RCT.

13) Provide the owner's acceptance review of the vendor tests/exams discussed in question 12 above. If an owner's acceptance review is not required, explain.

14) Qualifications and certifications for contractors performing tests and examinations in support of the SB root cause investigation.

15) Schedule for completion of root cause report and any interim milestones (e.g. core bore testing complete, creep testing complete, data analysis complete, etc).

16) Schedule for completion of extent of condition review for cracking.

17) Purchase Orders for vendors performing work or testing in support of SB root cause (e.g. testing, examination of core bores).

18) Copy of the following site or corporate procedures associated with:

a) The corrective action process including screening and defining significance of corrective action records.

b) Defining quality assurance requirements applicable to vendors that perform tests or examinations in support of root cause investigations.

19) Copy of vendor procedure used for impulse response testing (IRT) and mapping of crack locations in the SB.

20) If the extent of SB cracking is reliant upon IRT, provide the bases document which validates this method (e.g. confirmatory core bore tests with statistically valid sample size). Additionally, provide the owner's acceptance review of this document."

These questions and demands for documentation are most appropriate for a safety regulator to demand of a nuclear licensee, as in this case of a cracked shield building. What is

most inappropriate is the fact that the NRC demand is dated December 12, 2011 – ten days after NRC authorized restart at Davis-Besse, and six days after FENOC actually restarted the reactor with a cracked shield building. January 9, 2012 – the date Inspector Holmberg asked FENOC to comply with his demands – is a five weeks after NRC already approved restart, as well as four days after the NRC public meeting at Camp Perry in Port Clinton, Ohio, at which NRC repeatedly declared Davis-Besse's restart as "safe." This is a most odd sequencing of events. Jan. 9 is after Dec. 2 restart authorization, Dec. 6 restart, and Jan. 5 public meeting.

NRC also seems to give FENOC an unlimited amount of time to provide the requested information: "If any records are not available on January 9, 2012, please identify a date when this information will be available." A hard and fast due date is necessary, given the safety significance of this issue.

Regarding "2) Copy of corrective action records (for past 5 years) that identify degraded conditions associated with the shield building," why limit it to just the past five years? At the January 5, 2011 Camp Perry NRC public meeting in Port Clinton, FENOC's slide show presentation (at Slide 18, on page 9 of the hardcopy of the presentation), FENOC documents 1970 and 2002 breaches of the concrete shield building, in addition to the very recent 2011 breaching. Why doesn't NRC also look for documentation of potential shield building degradation associated with those earlier breaches of the concrete shield building?

Regarding "3) Composition of Root Cause Team (RCT) investigating the SB cracks (including contractors) – Please identify the Team Lead, Members (with a short biography/resume) and contact numbers," and a number of similar questions/demands, it seems that NRC simply trusted FENOC to have deployed qualified personnel to examine the root cause

of the cracking up to this point, to determine its extent, and to work out appropriate corrective action. Trust devoid of verification and oversight is an unacceptable regulatory practice vis a vis nuclear safety. Verification and oversight long *after restart* authorization is a very dubious approach to safety regulation enforcement. This is especially unacceptable at Davis-Besse in 2011-2012, given the December 2002 NRC Office of Inspector General Report on Davis-Besse's Hole-in-the-Head fiasco, which found that not only did FENOC place profits ahead of safety (earning a record fine from NRC, amounting to $33.5 million altogether), but also that NRC – at the highest levels of the agency – also put FENOC's profits ahead of public safety. The December 2, 2011 NRC restart authorization, without resolving the root cause, extent, or solution to the concrete shield building cracking problem, is a repeat of FENOC putting profits ahead of safety, and NRC letting FENOC get away with it. As Intervener Michael Keegan of Don't Waste Michigan put it at the January 5, 2012 meeting at Camp Perry, "The lesson I have learned from over 30 years of research on nuclear safety issues is that NRC is incapable of learning lessons."

Intervenors request that as soon as FENOC provides the above demanded information to NRC, that it be provided not only to Interveners, but also released to the public, in the interests of transparency and accountability.

Intervenors question with alarm the safety significance of the potential for worsening concrete shield building cracking over the next five years of licensed operations. Contemplating such worsening cracking for the next *quarter century*, considering the 20 year license extension proposed, raises the level of alarm considerably. Interveners contend that Davis-Besse should be

shut down on Earth Day (April 22), 2017 – its last licensed date for operations under the original 40 year license – at the very latest.

46. On December 13, 2011, NRC's Samuel Cuadrado de Jesus, Project Manager, Projects Branch 1, Division of License Renewal Office of Nuclear Reactor Regulation, published "SUMMARY OF TELEPHONE CONFERENCE CALL HELD ON NOVEMBER 22, 2011, BETWEEN THE U.S. NUCLEAR REGULATORY COMMISSION AND FIRSTENERGY NUCLEAR OPERATING COMPANY, CONCERNING REQUESTS FOR ADDITIONAL INFORMATION PERTAINING TO THE DAVIS-BESSE NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION (TAC. NO. ME4640)."

Regarding "Followup RAI B.2.1-2 (ASME Section XI general visual examiner qualification requirements)," it contained:

> Discussion: The staff stated that although the response to followup RAI 8.2.1-2 provided in RAO response letter dated August 26, 2011, was acceptable, additional information provided by the applicant via e-mail was needed under the docket to support the staff review. The staff asked whether the applicant would docket the highlighted copy of the procedures sent to the staff by e-mail on July 21, 2011. The applicant agreed to docket the highlighted procedure sections provided in the e-mail dated July 21, 2011. The applicant also stated that the highlighted procedure sections would be included in the next license renewal letter to the NRC.
>
> There was no further discussion and the call was concluded.
>
> Action: The applicant will include the highlighted procedure sections in the next license renewal letter to the NRC.

Intervenors point out that visual examination quality assurance is relevant to many age-related degradation issues in the license extension application proceeding, including concerning

the concrete shield building's recently revealed cracking problem. This NRC documented December 13, 2011 is the first indication Interveners had that NRC had concerns about the qualifications of FENOC's Davis-Besse visual examiners' qualifications. This communication from NRC essentially constituted a reminder to FENOC to provide an adequate response to an RAI issued many months earlier. No explanation for FENOC's inadequate responses to date was given.

47. On December 14, 2011, Rep. Kucinich (D-OH) continued to press the case on safety, by raising questions about Davis-Besse Power Plant during an NRC oversight hearing before the U.S. House Committee on Oversight and Government Reform, upon which he serves as a subcommittee ranking member. His full statement reads:

> "In February 2001, the NRC began investigating an aging mechanism that often caused cracking in reactors. As a result of these findings, in late September 2001, the NRC determined that the Davis-Besse plant was at risk and should shut down by December 31, 2001. FirstEnergy, the owner of Davis-Besse, resisted the order, claiming that it could stay open without incident until March 2002. FirstEnergy argued that a shutdown would cause an unnecessary financial burden."
>
> "Rather than following its own safety procedures and shutting down Davis-Besse, the NRC relented and allowed the plant to operate until February 2002. After the Davis-Besse plant had been shut down, workers repairing one of five-cracked control rod nozzles discovered extensive damage to the reactor vessel head. The workers found a large, corroded crater the size of a football in the reactor vessel head next to one of the nozzles. Only three-sixteenths of an inch of steel remained intact at the bottom. Even that began to crack and bulge."
>
> "The NRC later found that the plant might have been as close as 60 days from bursting. If it did, there could have been a major release of radioactivity. It would have jeopardized the immediate and long-term safety of millions of Americans near my district not to mention the single biggest source of fresh water in the world, the Great Lakes."
>
> "The Government Accountability Office later called it 'the most serious safety issue confronting the nation's commercial nuclear power industry since 'Three Mile Island.'' The Department of Justice said that FirstEnergy admitted that they

'knowingly made false representations to the Nuclear Regulatory Commission (NRC) in the course of attempting to persuade the NRC that its Davis–Besse Nuclear Power Station was safe to operate beyond December 31, 2001.'"

"FirstEnergy's insurance company became worried and commissioned an independent study to analyze the data from the incident. The study, which was released in April 2007, painted an even darker picture than the regulatory rebukes that came before it. The report found that corrosion of the steel plate happened at a faster rate than was reported by FirstEnergy, bringing the reactor closer to a catastrophic incident than had previously been reported."

"Despite the findings of these three bodies, just a few weeks before that study was released, FirstEnergy asked the NRC to remove the requirement for independent assessments of Davis Besse's operations. They asked for less oversight."

"The NRC's 2004 Confirmatory Order Modifying License lists some of FirstEnergy's malfeasant policies and actions that led to the 2002 incident, providing more evidence that profits were prioritized over safety. It specifically lists the key reasons the leak was allowed to persist and grow; FirstEnergy's self-policing mechanisms failed. Worse, FirstEnergy tried to convince the NRC that the problems were solved when in fact they were not."

"FirstEnergy continues to try to prioritize profits over safety. Since I don't have time here to cover in detail the full history of FirstEnergy's bad decisions, near misses and safety lapses, I ask unanimous consent to place into the record a document prepared by Beyond Nuclear that does just that."

[Beyond Nuclear's document, "Davis-Besse Atomic Reactor: 20 MORE Years of Radioactive Russian Roulette on the Great Lakes Shore?!" is posted online at: http://www.beyondnuclear.org/storage/Davis_Besse_Backgrounder.pdf]

"Several weeks ago, FirstEnergy had to shut down Davis-Besse to replace yet another reactor head because its design has flaws that create leaking problems. In so doing, they found cracks in the building designed to protect the core from external missiles like planes, but also to prevent the release of radioactive air and steam in the event of a problem with the reactor. The latter scenario is what almost happened in 2001 at Davis-Besse and is exactly what happened at Fukushima, when the containment buildings blew up from steam build up. A structurally compromised building affords less protection to the public."

"True to form, there were important differences between the story FirstEnergy told the public and the real story which I only uncovered because of my own investigation and because of my staff. Specifically, FirstEnergy tried to convince the public that the cracks were only cosmetic in nature, were few in number, and were not widely distributed. None of the above was accurate. And yet FirstEnergy was eager to restart Davis-Besse, even though they will not know the cause of the cracking until February."

> "We should be looking at this. The corporations that run nuclear power plants are fundamentally no different than the corporations that drove our economy off a cliff. They will cut corners to maintain or increase profits in the absence of sufficient incentives to act differently. They must be sufficiently and carefully regulated. The consequences of failing to do so are simply unthinkable. I hope we will reflect on the NRC's position here and help to achieve a culture of independence, objectivity, public interest over corporate interest and will have complete dedication to safety."
>
> [http://kucinich.house.gov/News/DocumentSingle.aspx?DocumentID=272516]

48. On December 27, 2011, NRC staff sent a Request for Additional Information (RAI) to FENOC on Davis-Besse. Very critical questions were asked – not for the first time – by NRC Staff to FENOC, regarding age-related degradation, including its impacts on worsening concrete shield building/secondary radiological containment building cracking.

Regarding RAI B.1.4-2, NRC provided the following "Background":

> "In request for additional information (RAI) B.1 4-1, issued on May 19, 2011, the staff asked the applicant to describe the programmatic activities that will be used to continually identify aging issues, evaluate them, and as necessary, enhance the aging management programs (AMPs) or develop new AMPs for license renewal. In its response dated June 24, 2011, the applicant stated that it currently has a procedurally controlled operating experience review process, as required by NUREG-0737, "Clarification of TMI Action Plan Requirements," Item I.C.5, "Procedures for Feedback of Operating Experience to Plant Staff." The applicant stated that this process provides for the systematic identification and transfer of lessons learned from site and industry experience into fleet and station processes to prevent events and enhance the safety and reliability of its operations."

The "Issue" that NRC had with FENOC is that it woefully inadequately responded to this RAI.

Thus, NRC made the following "Request" to FENOC (page 3 to 4):

> "Provide a response to each item below.
>
> (a) Describe the sources of plant-specific operating experience that are monitored on an ongoing basis to identify potential aging issues.

(b) Indicate whether plant-specific and industry operating experience is only considered from a prescribed list of sources. If only prescribed sources are considered, provide a justification as to why it is unnecessary to consider other sources.

(c) Indicate whether guidance documents are considered as a source of operating experience information. If they are considered as a potential source, provide a plan for considering the content of guidance documents, such as the GALL [Generic Aging Lessons Learned] Report, as operating experience applicable to aging management.

(d) Describe how operating experience issues will be identified and categorized as related to aging.

(e) Describe the training requirements on aging issues for those plant personnel responsible for screening, evaluating, and submitting operating experience items.

(f) Describe how evaluations of operating experience issues related to aging will consider the following:

--systems, structures, or components
--materials
--environments
--aging effect
--aging mechanisms
--AMPs

(g) Describe how the results of the AMP inspections, tests, analyses, etc .. will be considered as operating experience.

(h) Describe the operating experience evaluation records with respect to what is considered for aging. Indicate whether these records are maintained in auditable and retrievable form.

(i) Provide details on the operating experience evaluation schedules and justify why they provide for timely evaluations. Also, describe how the relative significance of operating experience items is determined so that the reviews can be prioritized appropriately.

(j) Justify why the corrective action program has an appropriate threshold for capturing issues concerning aging.

(k) Describe the criteria for considering when AMPs should be modified or new AMPs developed due to operating experience. Also, describe the process for

> implementing changes to the AMPs or for implementing new AMPs; describe how these changes are implemented in a timely manner,
>
> (l) Provide criteria for reporting plant-specific operating experience on age-related degradation to the industry.
>
> If enhancements are necessary, provide an implementation schedule for incorporating them into the existing programmatic operating experience review activities."

NRC's background, "issue," and "request" regarding RAI B.1.4-2 is on age-related degradation management plans, making it entirely relevant to such issues as the risk associated with cracking and other deterioration of the concrete shield building, which Interveners raise in this contention.

Regarding RAI B.1.4-3, NRC provided the following "Background" (page 4):

> "In RAI B.1.4-1, the staff asked the applicant to provide, in accordance with 10 CFR 54.21(d), a USAR [Updated Safety Analysis Report] supplement a (sic) summary description of the programmatic activities for the ongoing review of operating experience, as required by 10 CFR 54.21(d). By letter dated August 17, 2011, the applicant provided this description:
>
> > Existing FENOC processes require reviews of relevant site and industry operating experience and periodic benchmarking to ensure program enhancements are identified and implemented. Such ongoing reviews identify potential needs for aging management program revisions to ensure their effectiveness throughout the period of extended operation.

NRC's "Issue" with RAI B.1.4-3 involves the following:

> As described above in RAI B.1.4-2, the applicant described generally how it intends to consider operating experience on an ongoing basis; however, it did not provide specific information on how its operating experience review activities address issues related to aging. Similarly, the above entry for USAR supplement also lacks details on how aging is considered in the ongoing operating experience reviews.

Thus, NRC's "[r]equest" is:

> Consistent with the response to RAI B.1.4-2, provide additional details in the USAR supplement on how the ongoing operating experience review activities address issues specific to aging.

Certainly, if FENOC plans to use "ongoing operating experience review activities to address issues specific to aging," such as the problem of cracks in the shield building, then it must be considerably more forthcoming with detail.

49. It's most troubling that NRC issued (RAI) B.1 4-1 on May 19, 2011, and yet FENOC's June 24, 2011 response was so woefully inadequate that NRC was forced to repeat itself with RAIs B.1.4-2 and B.1.4-3, essentially repeating RAI B.1.4-1 seven long months later, but urging FENOC to provide sufficiently detailed responses. It's disconcerting that it took NRC over half a year to assert itself for the second time. And it's further troubling that NRC is giving FENOC another 30 days to respond to the now seven month old RAIs. Why does NRC have to repeat its RAIs, and have to wait eight months to get answers back from FENOC? Giving that these RAIs implicate aging management issues, FENOC is obviously not ready for a license extension at Davis-Besse by 2017. It's not even able to safely manage aging issues today, in 2012. This has been true for a decade or more already, as shown by the 2002 Hole-In-The-Head fiasco.

50. Although the above RAIs touch upon the cracked shield building, RAI B.2.39-13, discussed beginning on page 5, is a direct bull's eye. In its "Background," NRC states:

> In order to perform a scheduled reactor head replacement, a construction opening was made in the concrete shield building. During hydro-demolition of the concrete shield building, cracks were identified in the 'architectural shoulders' of the shield

building. While investigating the extent of the cracking, additional cracks were identified around the shield building. These additional cracks were identified using an Impulse Response (IR) technique and core bores were used to verify the IR results.

NRC's "Issue" states:

> Extensive cracking in the shield building could affect the structural integrity of the shield building and may impact its ability to perform its intended function during the period of extended operation.

NRC's "Request" then includes:

> 1. Summarize the shield building degradation, the root cause, and the expected corrective actions.
>
> 2. Explain how the recent plant-specific operating experience impacts the Shield Building's ability to perform its intended functions during the period of extended operation. Include a list of any additional aging effects that may require management based on this operating experience.
>
> 3. Explain how the recent plant-specific operating experience will be incorporated into the Structures Monitoring Program AMP, and whether the current program will be adequate to manage aging of the shield building during the period of extended operation, based on this operating experience. Specifically address the following:
>
> (a) Details of tests planned to determine the long term effect of the concrete cracks on the ability of the rebars to carry design loads.
> (b) Plans, if any, to repair the crack or reinforce the shield building concrete.
> (c) Detailed plans to monitor the extent and thickness of cracks, and corrosion of the rebars over the long term.
> (d) Plans, if any, to perform detailed structural analysis, with explicit modeling of rebars, cracks, and concrete, to demonstrate that the shield building will perform its intended design function over the long term. This analysis should also consider the effect of

> shrinkage and environment on the concrete and rebar during the period of extended operation.
>
> 4. Identify and explain any changes to the license renewal application based on the recent plant specific operating experience.

Interveners have exactly the same questions as NRC does above, and incorporates them by reference into this contention regarding Davis-Besse's shield building cracking. If FENOC insists on pursuing a license extension, it should explain in detail the answers to these safety-significant questions in this ASLB licensing proceeding before the 20 additional years is approved.

51. NRC's DB RAI 3.1.2.2.16-3, on page 6, also directly touches upon Intervenors' present contention. This is due to the fact that degradation of the steam generators will require their premature replacement, requiring yet another breach of the Davis-Besse concrete shield building. FENOC already plans such an organ transplant in 2014. But if FENOC screws up this aging management program badly enough, it could very well have to replace steam generators yet again in the future, during the license extension, even after the 2014 steam generator replacement. Given the fact that Davis-Besse currently has its third lid, with no guarantees that a fourth lid will not be needed, necessitating yet another concrete shield building breach, it is not far fetched to raise the concern about yet more steam generator replacements post-2014. Each breach of the concrete shield building risks introducing more weakness into the structure, and undermining its vital safety function.

NRC's "Background" states:

> By letter dated November 23, 2011, the applicant responded to RAI 3.1.2.2.16-2, which addresses the extent and method of the inspections to manage cracking due to primary water stress corrosion cracking (PWSCC)

> of the steam generator (SG) tube-to-tubesheet welds. In its response, the applicant indicated that a gross visual inspection coupled with eddy-current inspections will be performed on the SG tube-to-tubesheet welds. The applicant also indicated that the inspection schedule will be concurrent with the eddy-current inspections of the SG tubes in accordance with Davis-Besse Technical Specification 5.5.8, "Steam Generator (SG) Program." The applicant further indicated that at a minimum, 100% of the tubes are inspected at sequential periods of 60 effective full power months.

NRC's "Issue" states:

> In its review, the staff noted that it is not clear whether the gross visual inspection of the tube-to tubesheet welds will include the welds on the hot leg, cold leg, or both legs. The staff also needs more clarifications on the extent and method of the visual inspection addressed in the applicant's response.

NRC's "Request" then states:

> 1. Clarify whether the visual inspection will be conducted on the welds on the hot leg, cold leg, or both legs. In addition, describe the extent of the visual inspection (i.e., what percentage of the welds will be inspected), and clarify whether the visual inspection will be conducted on each tube-to-tubesheet weld.
>
> 2. Provide information on the objective, equipment, and method of the visual inspections.

52. Of course, given the danger of a single steam generator tube rupture causing a cascade of tubes ruptures, which could lead to a Loss of Coolant Accident and melt down in the reactor core, a once every five years inspection of all tubes is unacceptable to Interveners, especially at the 40 year old Davis-Besse atomic reactor starting in 2017 with a license extension. Also, the basic questions NRC asks clarification on above, regarding SG tube inspections, raises concern that FENOC is not on top of such safety significant aging management issues. Interveners incorporate NRC's concerns as their own, in this shield building cracking contention.

53. On December 29 and 30, 2011, the *Toledo Blade* reported that a January 5, 2012 meeting had been announced by the NRC. [http://www.toledoblade.com/Energy/2011/12/29/Nuclear-Regulatory-Commission-to-discuss-reopening-Davis-Besse.html andhttp://www.toledoblade.com/local/2011/12/30/Meeting-on-Davis-Besse-restart-set.html]. The January 5, 2012 date replaced the previously announced, December 15, 2011 date, which NRC postponed and re-scheduled due to an unexplained scheduling conflict.

54. An earthquake registering 4.0 on the Richter Scale, which occurred on December 31, 2011, epi-centered in Youngstown, Ohio, about two miles below the surface of the earth, has added to concerns about Davis-Besse's cracked concrete shield building/secondary radiological containment building. If the structural integrity of the shield building is in question – a problem that very well could be growing worse over time, even accelerating with age – then seismic activity in the area raises even more concerns. The NRC and U.S. nuclear power utilities harbor an apparent disregard of the need for seismic safety, even post-Fukushima. The NRC blessed nuclear utility Dominion's post-quake re-start at North Anna in short order in fall 2011, despite a large number of lingering safety significant concerns and questions. Beyond Nuclear, an intervening organization in this proceeding, helped lead a 10 CFR 2.206 emergency enforcement petition effort to stop the North Anna re-start, at least until certain safety conditions were satisfied, but the NRC approved the re-start, despite numerous lingering questions and concerns.

55. Per David Lochbaum, Nuclear Safety Project Director at the Union of Concerned Scientists, on the eve of the Camp Perry, Ohio meeting on Jan. 5, 2012, the following questions remain unclear, unanswered or only partially answered as of the date of filing of this Motion:

1) Did workers notice/detect cracking in the concrete shield building wall in 2002-2003?

1a) If they did, why weren't the extent of condition assessments and root cause evaluations that were done/are being done currently conducted back then as well?

1b) If they did not, why not and doesn't that failure suggest that workers, if looking at all, are only looking for problems du jour (Crystal River 3 and Seabrook had concrete problems in recent years, so FENOC's workers are narrowly looking for concrete issues)?

2) Since there apparently were no concrete cracks observed back in 2002, is it possible that there were no cracks and all the cracks identified last year formed and propagated since 2002?

2a) If the shield building concrete aged so well from the 1970s until 2002 that no visible cracks formed during these decades and then aged so badly that many cracks became readily available during the relatively short intervening years, doesn't that onset of rapid degradation suggest that the plant cannot safely operate to the end of its existing license, let alone to an extended license?

2b) If the concrete cracks have been there all along and workers in 2002 didn't report them because they and others didn't care about concrete integrity or didn't grasp the big wall having lots of cracks, how much faith can the public possibly have in periodic and one-time inspections of safety components and structures?

3) NRC inspectors were criticized for having been handed the infamous "red photo" of the Davis-Besse reactor vessel head during the 2000 refueling outage, but not pursuing it. Did NRC inspectors examine the holes cut through the concrete shield building wall and metal containment liner in 2002? [the Davis-Besse "red photo," showing boric acid crystal and carbon steel rust "red lava" flowing from the reactor lid, is posted online at: http://www.beyondnuclear.org/storage/davisbesseredphoto.jpg]

3a) If so, why didn't they notice all - or any - of the cracks?

3b) If not, why not?

4) Did NRC inspectors examine the holes cut through the concrete shield building wall and metal containment liner in 2011? How closely? What tests were done? What measurements taken? What data collected?

56. Intervenors reserve the right to supplement this contention as NRC and/or FENOC reveal more information on the cracking in the future. Significantly, NRC is due to publish a report on January 16, 2012 regarding the Davis-Besse shield building cracking. FENOC is due to publish a report on February 28, 2012 regarding the Davis-Besse shield building cracking. Intervenors reserve the right to supplement this contention based on those, and future, revelations by NRC and FENOC regarding shield building cracking at Davis-Besse.

WHEREFORE, Intervenors pray the ASLB admit their Contention No. 5 for adjudication in this proceeding.

Respectfully submitted,

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
		Docket No. 50-346-LR
First Energy Nuclear Operating Company	)	
(Davis-Besse Nuclear Power Station, Unit 1)		January 10, 2012
.	)	

* * * * *

CERTIFICATE OF SERVICE

We hereby certify that a copy of the foregoing "Motion for Admission of Contention No. 5 on Shield Building Cracking" was sent by us to the following persons via electronic deposit filing with the Commission's EIE system this 10th day of January, 2012:

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