

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
Before the Atomic Safety and Licensing Board**

In the Matter of:)	Docket No. 50-346-L
FirstEnergy Nuclear Operating Company)	September 8, 2014
Davis-Besse Nuclear Power Station, Unit 1)	
)	
)	

**INTERVENORS' MOTION TO AMEND AND SUPPLEMENT CONTENTION NO. 7
ON WORSENING SHIELD BUILDING CRACKING AND INADEQUATE
AMPs IN SHIELD BUILDING MONITORING PROGRAM**

Now come Beyond Nuclear, Citizens Environment Alliance of Southwestern Ontario (CEA), Don't Waste Michigan, and the Green Party of Ohio (collectively, Intervenor), by and through counsel, and move to amend and supplement their September 2, 2014 "Motion to Admit Contention No. 7 on Worsening Shield Building Cracking and Inadequate AMPs in Shield Building Monitoring Program." FirstEnergy Nuclear Operating Company ("FENOC") has modified its Aging Management Plans ("AMPs") within its Shield Building Monitoring Program in response to a worsening cracking problem in the reactor Shield Building at the Davis-Besse Nuclear Power Station, Unit 1 ("Davis-Besse").

/s/ Terry J. Lodge
Terry J. Lodge (Ohio Bar #0029271)
316 N. Michigan St., Ste. 520
Toledo, OH 43604-5627
Phone/fax (419) 255-7552
tjlodge50@yahoo.com
Counsel for Intervenor

MEMORANDUM

AMENDED CONTENTION

Intervenors amend their contention filed on September 2, 2014, by adding wording (italicized) as follows:

FENOC's revisions to the AMPs in its Shield Building Monitoring Program, dated July 3, 2014,¹ acknowledge not only the risk, but the reality, of aging-related cracking propagation - that is, worsening - in the already severely cracked Shield Building, an admission which brings the issue within the scope of this License Renewal Application proceeding. FENOC's proposed modifications to its Shield Building Monitoring Program AMPs, regarding the scope (areas of the Shield Building to be examined), sample size (number of tests to be performed), and the frequency of its surveillance activities, are woefully inadequate. Significantly more core bores, as well as a broader diversity of complementary testing methods should be required, and at a much greater frequency than FENOC has proposed. The cracking phenomena must be identified, analyzed and addressed within the Final Supplemental Environmental Impact Statement for the license renewal *both in the consideration of alternatives to granting the 20-year license extension for Davis-Besse as well as in the Severe Accident Mitigation Alternatives analysis (SAMA)*. *The cracking problems do not support a conclusion that there is "reasonable assurance" that Davis-Besse can be operated in a manner protective of the public health and safety under the Atomic Energy Act during the 20-year proposed license extension period.*

BACKGROUND

In LBP-12-27 (December 28, 2012), the Atomic Safety and Licensing Board rejected Intervenors' Contention 5 and its associated amending and supplemental filings, seeking consideration of widespread laminar cracking and other concrete damage in the Shield Building walls to be viewed as aging-related problems falling within the parameters of this license renewal

¹See FENOC's "Reply to Request for Additional Information for the Review of the Davis-Besse Nuclear Power Station, Unit No. 1, License Renewal Application (TAC No. ME4640) and License Renewal Application Amendment No. 51," Davis-Besse Nuclear Power Station, Unit No. 1, Docket No. 50-346, License Number NPF-3, sent by FENOC to the attention of the Document Control Desk at the U.S. Nuclear Regulatory Commission on July 3, 2014, per 10 CFR 54, Enclosure: Davis-Besse Nuclear Power Station, Unit No. 1 (Davis-Besse), Letter L-14-224, Enclosures 1 and 2, ADAMS No. ML14184B184 (hereinafter referenced as "FENOC's RAI Letter, July 3, 2014").

proceeding:

. . . Intervenors must point to the specific ways in which the Shield Building Monitoring AMP is wrong or inadequate to raise a genuine dispute with FENOC's LRA. This they have failed to do. ***Intervenors have provided no support for their argument that the cracking (1) is aging-related,*** and (2) prevents safe operation of the plant. These claims amount to bare assertions, which the Commission has made clear "are insufficient to support a contention." . . . However, a petitioner "'must present sufficient information to show a genuine dispute' and reasonably 'indicating that a further inquiry is appropriate.'"

(Emphasis added). *Id.*, LBP-12-27 at 30 (32 of .pdf).

However, in their "Motion for Admission of Contention No. 7" filed September 2, 2014, Intervenors exposed the distinct change of position of FENOC. Applicant now concedes that significant mistakes were made in remediation and in understanding the implications of the cracking phenomena which were first noticed in 2011. FENOC's latest, "ice-wedging" cracking propagation root cause is an admission that the Shield Building cracking is aging-related, which brings it within the scope of this LRA proceeding. FENOC acknowledged worsening cracking in August-September 2013; on July 8, 2014, FENOC provided, at long last, the supposed root cause of this worsening, or "propagating," cracking - ice-wedging, per PII's 9/11/13 RCA-2. So nearly at the end of this LRA adjudicatory proceeding, FENOC has admitted what was clear to Intervenors since 2011: the calculations of NRC staff engineers which suggest that the Shield Building is permeated by cracking which threatens the continued usefulness and stability of the structure itself, and the burgeoning evidence of increasing cracking, must be conceded validity, and there are serious questions surrounding the basis for granting a 20-year extension of Davis-Besse's operating life which must be adjudicated in this license renewal proceeding.

***FACTS WHICH REQUIRE EXPANDED NEPA CONSIDERATION AND/OR
UNDERCUT A FINDING OF 'REASONABLE ASSURANCE'***

The document identified as “Enclosure 2,” the “Full Apparent Cause Evaluation” (hereinafter “FACE”) which is part of the FENOC RAI Letter dated July 3, 2014² but not disclosed to the ASLB, Intervenors and the public until July 8, 2014, is the focus of this filing.

The facts which justify reworking of the NEPA document for the license extension, and which additionally undercut a finding of “reasonable assurance” that the public health and safety would be adequately protected during the proposed 20-year license extension term are many.

**1. Water is saturating the shield building walls,
but not all sources have been considered**

FENOC’s consultant, Performance Improvement International (“PII”), conducted the investigation and compilation of the Apparent Cause Evaluation. PII learned that there is water saturating the Shield Building concrete at 10 inches of depth. FACE, p. 34/98 of .pdf. In 2012, FENOC or its contractors sealed bore holes made for investigation into the cracking, and water from within the walls appeared in them. *Id.* PII concludes that coating the outer walls of the Davis-Besse Shield Building has “prevented a finite amount of moisture from leaving the structure. Until this moisture dissipates it contributes to the water accumulation mechanism required for Ice-Wedging.” *Id.* at 35/98 of .pdf.

A petrographic examination of the core samples was also conducted. *Id.* at 34/98 of .pdf. Inspection under a Scanning Electron Microscope (SEM) revealed the presence of microcracks. *Id.* A quantitative approach was developed to assess the microcrack density in the core samples. *Id.* At multiple depths, evidence of Freeze-Thaw damage and evidence of water transport in the form of Ettringite crystals formation and microcracks emanating from pores was found. *Id.* The

²NRC ADAMS No. ML14184B184.

maximum microcrack density was near the outer most layer of the concrete (within the first 2 in). The microcracks emanating from pores at the laminar crack locations were present at a lower density than shallower locations. *Id.* On account of the water detection inside the bores, the water analysis, and the presence of microcracks emanating from pores at depths up to 10 in, the presence of excess water was confirmed. *Id.* Ettringite is a hydrous calcium aluminium sulfate mineral. FENOC asserted in its February 2012 Root Cause Analysis that when ettringite is found lining the air voids in shield building concrete it “suggests long-term exposure to moisture migrating through the concrete.” RRCA at 25.

Owing to a high content of salt within the structure’s walls, there is an ongoing water-borne corrosive effect which exceeds the corrosion from outside the Shield Building. FACE, p. 39/98 of .pdf. The presence of corrosive agents has serious implications for rebar embedded in the Shield Building walls:

Corrosion of embedded metal is one of the main causes of failure of concrete structures (ACI 201.2R, ACI 222R). The critical elements needed for corrosion to occur are water, oxygen, and chloride ions, which in turn makes permeability the main concrete property that influences corrosion resistance. The high alkalinity (pH>12.5) of the concrete protects the thin iron-oxide film on the surface of the steel, thus making the steel passive to corrosion.

“FENOC-Davis-Besse Nuclear Power Station, Unit 1, Submittal of Contractor Root Cause Assessment Report - Section 1,” ADAMS No. ML12138A037, pp. 180-181/257³ of .pdf.

In “Intervenors’ Third Motion to Amend and/or Supplement Proposed Contention No. 5

³At 180-181/257 of .pdf, 2012 Revised Root Cause Analysis by PII: “Corrosion of embedded metal is one of the main causes of failure of concrete structures (ACI 201.2R, ACI 222R). The critical elements needed for corrosion to occur are water, oxygen, and chloride ions, which in turn makes permeability the main concrete property that influences corrosion resistance. The high alkalinity (pH>12.5) of the concrete protects the thin iron-oxide film on the surface of the steel, thus making the steel passive to corrosion.”

(Shield Building Cracking)” (July 16, 2012), they pointed out that there was no examination of admitted cracking of the Shield Building Dome, or the below-grade Shield Building walls in the 2011-2012 investigation, despite the revelation that the shield building dome, built in 1973, was sealed in 1976 but not before it had displayed cracking (so three years’ worth of water soaking into dome, flowing down side walls occurred). Moreover, NRC RAIs in late 2011/early 2012 asked about the “Blizzard of 1977,” which was nearly as troublesome as the “Blizzard of 1978.” Water inflow through the Shield Building dome might have contributed to water in the walls which, once the blizzards and other freeze-thaw events initiated cracking, propagated it via ice-wedging. As Intervenors warned in 2012, the whitewashing of the Shield Building has now locked the water in the walls. Thus, every time it freezes, another 0.4 to 0.7 inches of circumferential ice-wedging crack spreading takes place, as Intervenors pointed out in their September 2, 2014 filing. This is aging-related, it gets worse with each winter freeze-thaw cycle.

In PII’s 2012 Revised Root Cause Analysis, FENOC asserts that a waterproofing membrane was installed below-grade on the shield building exterior. RRCA p. 33. The RRCA also reveals that the decision was taken in 1969 to not seal the interior or exterior of the shield building, nor the below-grade shield building walls. So the Shield Building was left wide open to damaging water infiltration, from above, the sides, and below, as well as inside-out, probably for economic reasons. Despite these moisture intrusion pathways dating to 40 years ago, FENOC persists in excluding from the AMP discussion any examination of the dome or the below-grade shield building walls. Cracks in the dome, failed sealant on the dome exterior, and certainly the sealant-lacking, degraded water-barrier at the base, and unsealed below-grade Shield Building walls, are all vulnerabilities to water inflow to the SB walls, that could worsen ice-wedging crack

propagation.

PII concludes that “the [exterior Shield Building] coating has effectively blocked out external water intrusion and locked in moisture or water existing in the structure prior to the coating. This condition will have an impact on the moisture movement and distribution within the shield building wall as described.” FACE, p. 41/98 of pdf.

PII concludes that “[w]hile application of the coating has effectively prevented water from entering the shield building, its application has also prevented a finite amount of moisture from leaving the structure (failure mode 6). Until this moisture dissipates it provides the water accumulation mechanism required for Ice-Wedging, and therefore is identified as Causal Factor 2.” FACE, p. 55/98 of .pdf. PII reached this conclusion after admitting gravely mistaken assumptions at the time the decision to coat the Shield Building was taken:

The presence of moisture is inherent in any concrete structure, and as in the case of the shield building, it was not believed to pose any challenges to the coating effort. Water discovered in plugged bores prior to coating application was believed to have entered from the outside environment, however the possibility of existing water within the shield building was posed as feasible. However, the belief was that had the water come from inside of the shield building, the amounts discovered were small enough to present no adverse effect to the shield building.

FACE, p. 63/98 of .pdf.

Until the moisture within the walls “dissipates, it provides the water accumulation mechanism required for ice-wedging, and therefore is identified as the Contributing Cause to the laminar cracking propagation.” *Id.*, p. 65/98 of .pdf. The moisture level in the Shield Building concrete increased from 65% as measured in 2011 to 90-100% as measured in 2013. *Id.*, 76/98 of .pdf.

**2. There is an issue of fact as to whether
the Shield Building conforms to its licensing basis**

PII concludes that “[a] review of engineering analysis documentation developed following the initial laminar crack condition, demonstrated that the shield building remained structurally adequate for the controlling load case(s) and is in compliance to the current design and licensing bases.” FACE, p. 55/98 of .pdf. This statement is highly suspect, and probably false.

In a May 8, 2012 email from Timothy Riley of NRC’s office of OCA to Ohio’s two U.S. Senators (Exh. A hereto), Riley noted that FENOC “concluded in its Shield Building Root Cause Report dated February 27, 2012, that the SB [Shield Building], with the laminar cracking in its walls, was operable but non-conforming to the current design and licensing bases with regard to the design stress analysis methodology, and the tornado allowable stress values.”

In an NRC Inspection Report covering the period December 1, 2011 through May 9, 2012, referenced in the Riley email, the NRC confirms that the Shield Building cracking meant that the building failed to meet its licensing basis:

For the Direct Cause CA No. 2, the licensee will develop an engineering plan to re-establish design and licensing basis for the SB. Hence, the licensee will meet their procedure requirements for addressing the Direct Cause (Reference NOBP-LP-2011, "FENOC Cause Analysis"). Based upon the proposed actions and ongoing NRC reviews for this area, the NRC team concluded that the continued capability of the SB to perform the design safety functions would be assured. In particular, the NRC LRA reviews will include an evaluation of the program for monitoring of the shield building cracking. The NRC team also confirmed that that licensee had assigned site staff (e.g., owners) to each Direct Cause CA with reasonable due dates.

ADAMS no. ML12173A023.

In “Intervenors’ Fifth Motion To Amend and/or Supplement Proposed Contention No. 5 (Shield Building Cracking)” (Aug. 16, 2012), the Intervenors amassed considerable evidence mostly gleaned from FOIA requests concerning departures of the Shield Building from Davis-

Besse's current licensing basis (CLB). For example, Document B/23 [11/17/11; Davis-Besse Containment System Primary Steel Containment and Shield Building. (1 page)], at Page 28 of 101 on PDF counter, contains the statement that "[t]he shield building was designed to withstand forces generated by design bases seismic events," but this assertion is challenged, if not outright undermined, by Document B/1's revelations. Intervenor cited NRC's admission, "The existing as-found condition of cracking in the concrete of the shield building has raised questions on the ability of the structure to maintain its ability to perform its design functions under conditions that would introduce active forces (such as a seismic event or potentially rapid changes in the environmental conditions)," as supportive of its call for a hearing on the merits of these issues.

At pp. 41-42 from Intervenor's Document B/26 [11/22/11; Email from A. Sheikh, NRR to E. Sanchez Santiago, RIII on Questions for the Conference Call. (1 page)] [beginning on Page 39 of 101 on PDF counter], at p. 41 [NRC staffer] Sheikh's states: "The licensee is using numerous assumptions in his summary report and calculations that are not described in the UFSAR and ACI 318-63, and still calls it a design basis calculation. Can the licensee provide justification for this approach."

From Intervenor's Document B/36 [12/02/11; Email from B. Lehman, NRR to S. Sakai, NRR et al. FW: Davis Besse POP. (2 pages)] [which begins at Page 52 of 101] [commencing at Page 55 of 101 on PDF counter]: "The licensee still has unresolved questions to answer regarding the design basis of the plant. Basically, when the SB was built the requirements and codes it was built under were for an uncracked building. Because the building is now cracked, the question of whether the SB still meets the requirements as stated in the FSAR [Final Safety Analysis Report] and licensing basis needs to be evaluated."

In Intervenor's section discussing Document B/44 [12/13/11; Email from M. Galloway, NRR to A. Sheikh, NRR et al., RE: Davis-Besse Shield Building. (1 page)], at Page 66 of 101 on PDF counter, they observed that "Abdul Sheikh admits 'Davis Bessee [sic] shield building has not been designed for containment accident pressure and temperature.'" Abdul Sheikh also stated in Document B/26 that "I am concerned that the concrete will fail in this region due to bending in this region even under small loads."

Given that according to PII in the FACE report, "the laminar cracking of the shield building is unique with respect to reinforced concrete" (FACE, p. 63/98 of .pdf); that FENOC has just belatedly admitted a complete reversal of its former positions and acknowledged that there is an ongoing cracking problem related to an as-yet unresolved concrete water saturation situation; that coating the exterior of the Shield Building has "apparently" visited unexpected complications upon FENOC; and that continued cracking is so probable that a monitoring effort throughout the 20-year license extension has been postulated, there is an issue of fact as to whether the Shield Building conforms to its current licensing basis.

3) Inaction is not effective Corrective Action

The "corrective action" which is proposed for the Shield Building is merely "monitoring the crack propagation condition." FACE, p. 66/98 of .pdf.

FENOC's policy of opposing repairs of small exterior cracks may be counterproductive. The assertion that "the shield building coating was completed in October of 2012 and would therefore prevent subsequent water intrusion" ignores the potential for new outer-wall cracks as fissures to continue to foster water intrusion. *Id.*, 40/98 of .pdf. On the same page, PII points out that "[t]he Davis-Besse maintenance rule manual states that cracks 1/16 in or less do not need to

be repaired.” *Id.* FENOC’s policy against repairing cracks may promote the spread of new or additional exterior wall cracking.

The remedy proposed by FENOC and PII is minimal expansion of bores (4 more) to try to capture info on what the severe 2013-2014 winter weather might have caused to the Shield Building, to conduct annual monitoring and sampling through 2018, then to go to biannual monitoring and sampling through 2026, and ultimately to move to every-four-year monitoring and sampling at that point through 2037. FACE, pp. 67-68/98 of .pdf.

PII admits that “there are no Corrective Actions being implemented to mitigate adverse conditions,” only shield building monitoring activities which will be tracked through the Corrective Action program. FACE, p. 70/98 of .pdf.

In 2012, Intervenors identified the microcracking phenomena and called for tests to investigate for them extensively. The PII “Revised Root Cause Analysis⁴” of spring 2012 mentioned micro-cracking, and Intervenors petitioned for adjudication to investigate in detail the possibility that the cracking problems were not contained by coating the Shield Building and that they were indeed aging-related and thus within the scope of this LRA proceeding. PII and FENOC now admit that micro-cracking, caused by freeze-thaw cycles, is aging-related.

Contemporaneously in 2012, FENOC was discovering excessive water presence in test boring holes in the Shield Building and not telling the ASLB, the parties to this proceeding, or the public, not even its contractor, PII, which discovered the water presence in bore holes in late 2013. FACE, p. 22/98 of .pdf. The two years of concealment of the presence of increased water concentrations in the Shield Building walls, especially through the uniquely severe winter of

⁴<http://pbadupws.nrc.gov/docs/ML1213/ML12138A037.pdf>

2013-2014, has almost certainly worsened the spread of cracking. PII's September 2013 FACE admits that there is 0.4 to 0.7 inches of circumferential crack growth per freeze and acknowledges up to 10.8 inches of additional cracking per two years because of the water presence and ice-wedging it causes.

By “Intervenors’ Third Motion to Amend and/or Supplement Proposed Contention No. 5 (Shield Building Cracking)”⁵ (July 16, 2012), they brought microcracking to the ASLB’s attention. *See id.*, pp. 3-5. In “Intervenors’ Motion to Amend and Supplement Proposed Contention No. 5 (Shield Building Cracking)” (July 23, 2012),⁶ they mention micro-cracking at pp. 7-8, 27, 40, and 46.

In “Intervenors’ Motion to Amend and Supplement Proposed Contention No. 5 (Shield Building Cracking)” (June 4, 2012),⁷ Intervenors mentioned (at p. 6):

The conclusion that “the Blizzard of ‘78 did it” is viewed with skepticism because the engineering literature is disputed over how forceful the delivery of precipitation must be for it to penetrate concrete. In an article, “Quantification of Water Penetration Into Concrete Through Cracks by Neutron Radiography,” The 3rd ACF International Conference-ACF/VCA 2008, 925, M. Kanematsu, Ph.D., I. Maruyama, Ph.D., T. Noguchi, Ph.D., H. Iikura, Ph.D. and N. Tuchiya, research engineers, found that:

[W]ater penetrates through the crack immediately after pouring and its migration speed and distribution depends on the moisture condition in the concrete. With another detailed analysis, it is understood that the water has reached around 50mm depth in the horizontal crack, but 20-30mm depth in the vertical crack immediately after pouring water. From these result it is detected that water reaches to the 25-30mm depth in few minutes after it is exposed to water and in 30 minutes it reaches to the 80mm. This means water will be supplied to the rebar with few minutes’ scattered showers.

⁵<http://www.beyondnuclear.org/storage/3rd%20Motion%20COMPLETE%20supp%20cracked%20concrete%20containment%20contention%20July%2016%202012.pdf>

⁶<http://www.beyondnuclear.org/storage/4th%20Motion%20PII%20COMPLETE.pdf>

⁷<http://www.beyondnuclear.org/storage/June%204%202012%20Motn%20to%20Amend%20Supp%20Contn%205%20COMPLETE-1.pdf>

(Emphasis supplied). Intervenors asserted further in that filing that Davis-Besse has other water problems inside the shield building, pointing out that in RAI responses dated May 24, 2011 (ML 11151A90), the NRC staff had noted a “history of ground water infiltration into the annular space between the concrete shield building and steel containment.” And that during a 2011 AMP audit, NRC staff also reviewed documentation that:

[I]ndicated the presence of standing water in the annulus sand pocket region. The standing water appears to be a recurring issue of ground water leakage and areas of corrosion were observed on the containment vessel. In addition, during the audit the staff reviewed photographs that indicate peeling of clear coat on the containment vessel annulus area, and degradation of the moisture barrier, concrete grout, and sealant in the annulus area that were installed in 2002-2003. *Id.* at 47/280 of .pdf.

“Intervenors’ Motion to Amend and Supplement Proposed Contention No. 5 (Shield Building Cracking)” at 12.

Intervenors submit now, as they did in 2012, that “there has been no consideration nor discussion which addresses the possibility that much less than the drama of the Blizzard might have produced the damage.” FENOC argued the “Blizzard of ‘78” in 2012, to deny aging-relatedness and render Intervenors’ challenges about cracking outside the scope of this proceeding. As Intervenors were suggesting on June 4, 2012 that greater significance should attach to mere “scattered showers” and their possible influence on the cracking issue, FENOC was either concealing, or, at best, ignorant of the significance of, the presence of water in the walls.

FENOC had found water in the bore holes "in 2012," PII reported on September 11, 2013. But FENOC had considered it so little water as to be insignificant. And, FENOC assumed, the water must have come in through the bore holes themselves, from the exterior SB side wall surface, due to rain. PII in September 2013 confirmed that the water in the walls was internal in

nature, not sneaking in through the bore holes on the exterior surface. And PII also found that the water in the walls was symptomatic and a key cause of the ice-wedging crack propagation.

Without a full-spectrum investigation into water sources, it is not likely that the dehydration of the Shield Building walls can be accomplished. This source of standing groundwater identified above by Intervenor could well be wicking water up into the walls. PII in the FACE tries to assure that the water in the walls will dissipate over time, but there is no explanation as to how this will happen, or when. The whitewash prevents the water in the walls from escaping that way. The standing water on the ground is a source of which could well be moving into the walls.

And so FENOC, acknowledged only in August-September 2013 that it had supposedly learned for the first time that the cracking was getting worse. And it was not until July 2014 that the company disclosed this revelatory PII FACE report to the ASLB, the Intervenor, and the public. For two years the facts of water saturating the Shield Building, with ice-wedging effect through the most difficult and bitterly cold winter of the 21st Century, was kept from the Licensing Board, Intervenor, and the public.

LEGAL STANDARDS

a. Timeliness of this Amended/Supplementation

Under the ASLB panel's Initial Scheduling Order ("ISO") in this proceeding, a new contention must meet the requirements of the former (that is, pre-August 2012) 10 C.F.R. § 2.309(f)(2)(i) through (iii), which provided that Intervenor may submit a new contention only 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;

(iii) The amended or new contention has been submitted in a timely fashion based on the availability of the subsequent information.⁸

The presiding ALSB in this case stated at p. 12 of the Initial Scheduling Order, ASLBP No. 11-907-01-LR-BD01 (June 15, 2011) that “The Board directs that a motion and proposed new contention shall be deemed timely under 10 C.F.R. § 2.309(f)(2)(iii) if it is filed within sixty (60) days of the date when the material information on which it is based first becomes available to the moving party through service, publication, or any other means.”

Intervenors respectfully submit that their amendment and supplementation of Contention 7 are timely filed because this Motion has been filed within sixty (60) days of the provision of the July 3, 2014 RAI letter and its enclosures by FENOC’s counsel on July 8, 2014. CA’s May 16 posting date and conforms with the ASLB’s Initial Scheduling Order. *Shaw Areva MOX Services, Inc.* (Mixed Oxide Fuel Fabrication Facility), LBP-08-10, 57 NRC 460, 493 (2008). Intervenors have also moved in a timely manner under 10 C.F.R. § 2.309(f)(2)(i)-(iii).

1) Information not previously available

The information upon which Intervenors’ amendment and supplemental facts are based was available for the first time when distributed to the ASLB and the parties by FENOC’s counsel on July 8, 2014. This filing is timely as it is being made on the first business day after the 60th day following July 8, which was September 6, 2014, which fell on a weekend. 10 C.F.R.

⁸ Licensing Board Order (Initial Scheduling Order) at 12 (June 15, 2011) (unpublished) [hereinafter ISO].

§ 2.306(a).⁹ Although the ASLB panel stated in its July 25, 2014 order in this case that FENOC's modifications to Davis-Besse's Shield Building Monitoring Program were provided on July 3, 2014, Amendment No. 51 to the Davis-Besse LRA actually was distributed on July 8, 2014.¹⁰ (*See also* fn. 1, *infra*). Intervenors could not file this contention regarding modifications to Davis-Besse's Shield Building Monitoring Program until they were placed in the public domain on July 8.

If a contention satisfies the timeliness requirement of 10 C.F.R. § 2.309(f)(2)(iii), then, by definition, it is not subject to 10 C.F.R. 2.309(c), which specifically applies to nontimely filings. The three (f)(2) factors are not mere elaborations on the "good cause" factor of § 2.309(c)(1)(I), since "good cause" to file a nontimely contention may have nothing to do with the factors set forth in (f)(2). *Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), LBP-06-14, 63 NRC 568, 573 (2006).

2) Materially different information

The information upon which this new contention is based is materially different than information previously available prior to July 8, 2014. The Atomic Safety and Licensing Board ("ASLB") panel itself indicated as much in its own July 25, 2014 ruling by pointing out this opportunity for Intervenors to file a new contention. In the July 25 order, the ASLB wrote:

⁹"The last day of the period so computed is included unless it is a Saturday or Sunday, a Federal legal holiday at the place where the action or event is to occur, or a day upon which, because of an emergency closure of the Federal government in Washington, DC, NRC Headquarters does not open for business, in which event the period runs until the end of the next day that is not a Saturday, Sunday, Federal legal holiday, or emergency closure."

¹⁰The Licensing Board acknowledged in the July 25, 2014 order that the July 3, 2014 letter from FENOC's counsel to the ASLB and parties "is dated July 8, 2014. Enclosure 1 to the letter is dated July 3, 2014." Order, fn. 89.

To the extent that Intervenor has proffered Contention 6 in advance of future modifications to the relevant AMPs that they assume will occur as a result of the recently identified structural problems, it is premature. The Board notes that the modifications to Davis-Besse's Shield Building Monitoring Program, anticipated by the Intervenor, were provided on July 3, 2014 in Amendment No. 51 to the Davis-Besse LRA. Specific intervenor concerns regarding specific portions of LRA Amendment No. 51 may be submitted to the Board in a timely manner for its consideration as specified by our Initial Scheduling Order.¹¹

With the July 3, 2014 "modifications to Davis-Besse's Shield Building Monitoring Program," FENOC saw it as necessary to modify its monitoring program due to receiving confirmation from its contractor, PII, in August-September, 2013 that there was previously undetected cracking, and worsening cracking, in the Shield Building. PII's "Full Apparent Cause Evaluation" ("FACE") represents significant, new, material information.

3) Timeliness of the amended or new contention

This new contention has been submitted in a timely fashion, within sixty (60) days of the availability of the subsequent information, namely, the July 8, 2014 notification to the ASLB and the parties of modifications to Davis-Besse's Shield Building Monitoring Program, accompanied by the disclosure of PII's "Full Apparent Cause Evaluation."

ADMISSIBILITY CRITERIA

Contentions must meet the admissibility criteria set forth in 10 C.F.R. § 2.309(f)(1), which requires each contention to: (1) provide a specific statement of the issue of law or fact to be raised; (2) provide a brief explanation of the basis for the contention; (3) demonstrate that the issue raised in the contention is within the scope of the proceeding; (4) demonstrate that the issue

¹¹MEMORANDUM AND ORDER (Denying Intervenor's Motion for Admission of Contention No. 6 on Shield Building Concrete Void, Cracking and Broken Rebar Problems), *FirstEnergy Nuclear Operating Company* (Davis-Besse Nuclear Power Station, Unit 1), Docket No. 50-346-LR, ASLBP No. 11-907-01-LR-BD01, July 25, 2014, Page 16, internal citations omitted.

raised in the contention is material to the findings the NRC must make to support the licensing action; (5) provide a concise statement of the alleged facts or expert opinions in support of the petitioner's position on the issue and on which the petitioner intends to rely at hearing; and (6) provide sufficient information to show that a genuine dispute exists with the applicant/licensee on a material issue of law or fact, with reference to specific disputed portions of the application.

A failure to meet any of these criteria renders the contention inadmissible. 10 C.F.R. §

2.309(f)(1)(I)-(vi). These admissibility criteria are addressed in turn below.

1) Specific statement of the issue of law or fact to be raised

The proposed contention appears below. Amended wording appears in italics.

FENOC's revisions to the AMPs in its Shield Building Monitoring Program, dated July 3, 2014,¹² acknowledge not only the risk, but the reality, of aging-related cracking propagation - that is, worsening - in the already severely cracked Shield Building, an admission which brings the issue within the scope of this License Renewal Application proceeding. FENOC's proposed modifications to its Shield Building Monitoring Program AMPs, regarding the scope (areas of the Shield Building to be examined), sample size (number of tests to be performed), and the frequency of its surveillance activities, are woefully inadequate. Significantly more core bores, as well as a broader diversity of complementary testing methods should be required, and at a much greater frequency than FENOC has proposed. The cracking phenomena must be identified, analyzed and addressed within the Final Supplemental Environmental Impact Statement for the license renewal *both in the consideration of alternatives to granting the 20-year license extension for Davis-Besse as well as in the Severe Accident Mitigation Alternatives analysis (SAMA). The cracking problems do not support a conclusion that there is "reasonable assurance" that Davis-Besse can be operated in a manner protective of the public health and safety under the Atomic Energy Act during the 20-year proposed license extension period.*

The FACE evaluation provided as Enclosure 2 to FENOC's July 3 RAI letter verifies to a degree of scientific certainty, aging-related cracking is spreading through the Shield Building walls, which buttresses Intervenor's September 2, 2014 Contention 7 filing and ensures that this issue falls within the scope of this License Renewal Application proceeding. FENOC's proposed

¹²See "FENOC's RAI Letter, July 3, 2014," Enclosure 2.

modifications to its Shield Building Monitoring Program AMPs, regarding the scope (areas of the Shield Building to be examined), sample size (number of tests to be performed), and the frequency of its surveillance activities, are woefully inadequate. Significantly more core bores, as well as a broader diversity of complementary testing methods should be required, and at a much greater frequency than FENOC has proposed. The cracking phenomena must be identified, analyzed and addressed within the Final Supplemental Environmental Impact Statement for the license renewal, both as part of the Severe Accident Mitigation Alternatives analysis (SAMA) and as part of the consideration of alternatives to a 20-year operating license extension. .

Moreover, the presence of unresolved and continuing cracking of the Shield Building, which performs several key safety and protective functions relative to the Davis-Besse nuclear reactor, should be held not to suffice to provide “adequate assurance” as required by 10 C.F.R. § 54.29:

A renewed license may be issued by the Commission up to the full term authorized by § 54.31 if the Commission finds that:

(a) Actions have been identified and have been or will be taken with respect to the matters identified in Paragraphs (a)(1) and (a)(2) of this section, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB, and that any changes made to the plant's CLB in order to comply with this paragraph are in accord with the Act and the Commission's regulations. These matters are:

(1) managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under § 54.21(a)(1);

2) Provide a brief explanation of the basis for the contention

In light of the revelations in August-September 2013 of previously undetected cracks and the conclusion that they were worsening (propagating), Intervenor challenge the adequacy of FENOC’s Shield Building Monitoring Program AMPs proposed for the 2017-2037 license

extension period. Specifically, FENOC's testing frequency is inadequate, and may become less adequate over time (via relaxed, less frequent testing). The Shield Building walls are saturated with water, and there is no formal explanation as to how that circumstance, which helps to cause cracking of the concrete walls, will be remedied. In light of recently-misidentified cracking, which was underestimated, investigatory inspections and concrete sample analysis must take place on a more frequent basis than biannually or every fourth year, which FENOC proposes. The number of core bores to be examined should be significantly increased over the meager number proposed by FENOC. Vast areas of the Shield Building surface area, and volume, would fall outside of FENOC's Monitoring Program AMPs, as currently construed, in light of the meager sampling program proposed. The scope of the testing should also be significantly expanded.

Given the importance of the Shield Building to radiological containment, such as the proper functioning of the Emergency Ventilation System,¹³ as well as a biological shield, and a tornado and missile shield,¹⁴ and thus to public health, safety, and environmental protection, and

¹³ Davis-Besse Nuclear Power Station/License Renewal Application/Technical Information, section 2.3.3.13 Emergency Ventilation System. Page 2.3-88 [184/1,810 on pdf counter]. This document, dated August 30, 2010, appears to have not been posted at ADAMS nor assigned an ML number. However, it is posted at the following link on NRC's website: <http://www.nrc.gov/reactors/operating/licensing/renewal/applications/davis-besse/davis-besse-lra.pdf>.

¹⁴ At section 2.4.1 CONTAINMENT (INCLUDING CONTAINMENT VESSEL, SHIELD BUILDING, AND CONTAINMENT INTERNAL STRUCTURES)–SEISMIC CLASS I, of the Davis-Besse Nuclear Power Station/License Renewal Application/Technical Information, FENOC states: "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

in consideration of the already severe, and worsening, cracking of the Shield Building, these inadequacies in the Monitoring Program AMPs are unacceptable, and must be rectified.

3) Demonstration that the issue raised in the contention is
within the scope of the proceeding

FENOC has reversed its former position on cracking of the Shield Building and considers there to be aging-related risks of cracking propagation. As previously noted, 10 C.F.R. § 54.29 allows a license renewal if the Commission finds that “(a) Actions have been identified and have been or will be taken . . . such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB, and that any changes made to the plant's CLB in order to comply with this paragraph are in accord with the Act and the Commission's regulations.” These matters include “(1) managing the effects of aging during the period of extended operation on the functionality of structures and components. . . .”

Respecting the NEPA portions of the contention, Intervenors seek Severe Accident Mitigation Alternatives (SAMAs). FENOC’s consulting contractor, PII, considers the cracking of the Davis-Besse Shield Building to be “unique.” FACE, p. 63/98 of .pdf. Since the cracking is clearly site-specific, NEPA requires SAMAs as a Category 2, site-specific, consideration. 10 C.F.R. § 51.53(c)(3)(ii)(L). SAMAs are the only Category 2 issue with respect to severe accidents. *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), LBP-01-6, 53 NRC 138, 160-161 (2001).

Respecting a more serious inquiry into alternatives to continued operation of Davis-

atmospheric conditions and external missiles.” Page 2.4-3 [263 of 1,810 on PDF counter]
This Davis-Besse NPS/LRA/Tech. Info. document, dated August 2010, is posted at
<http://www.nrc.gov/reactors/operating/licensing/renewal/applications/davis-besse/davis-besse-lra.pdf>.

Besse, it is a given that the Commission may accord substantial weight to FENOC's preferences and economic goals. *Nuclear Management Co., LLC* (Monticello Nuclear Generating Plant), LBP-05-31, 62 NRC 735, 753 (2005). But an agency must not craft a set of alternatives so narrowly as to render it a foregone conclusion that the proposed action will be deemed superior. *Exelon Generation Company* (Early Site Permit for Clinton ESP Site), LBP-05-19, 62 NRC 134, 158 n.77 (2005). NEPA does not require an applicant to look at every conceivable alternative, but rather requires only consideration of feasible, nonspeculative, reasonable alternatives. Respecting the compromised Shield Building, "reasonable consideration of alternatives" should mean that an accurate economic costing of the replacement of the Shield Building should be included in the NEPA analysis, along with other remedial steps, such as replacement of portions of the reinforced concrete walls. "Reasonable alternatives for license renewal proceedings are limited to discrete options that are feasible technically and available commercially, as well as the GEIS requirement that the "no-action" alternative address energy conservation. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 & 3), LBP-08-13, 68 NRC 43, 205 (2008).

Legally, Intervenor's contention controversies fall well within the scope of this LRA proceeding.

4. Demonstration that the issue raised is material to the findings
the NRC must make to support the licensing action

The NRC is mandated by the Atomic Energy Act and National Environmental Policy Act to provide reasonable assurance of public health and safety, and environmental protection, during the proposed 20-year license extension at Davis-Besse, and to take a "hard look" at environmental impacts, as by making predictive safety findings and conducting an environmental

analysis regarding the safety and environmental impacts of the 20-year license extension.

The Shield Building at Davis-Besse is critical to radiological containment during reactor emergencies, such as meltdowns or other radioactive releases. It can filter radioactivity to a certain extent before it is expelled to the external atmosphere, and it is also essential to defending the Inner Steel Containment Vessel, and Reactor Pressure Vessel against external threats, such as tornadoes or missiles. The Shield Building further provides biological shielding during normal operations. (See fns. 12 and 13 *infra*).

The severe, and finally-admitted increased cracking of the Shield Building threatens to fail the Shield Building from performing its vital design safety and environmental functions. Intervenors challenge the adequacy of FENOC's Shield Building Monitoring Program AMPs to guarantee the Shield Building fulfills its vital safety functions, as required by applicable laws and regulations.

Also, the NEPA document requires a realistic Severe Accident Mitigation Alternatives analysis which includes among its assumptions a flawed Shield Building which may not meet its current licensing basis (CLB).

The requisite decisions on the issues raised by this contention are directly material to a license extension decision for Davis-Besse.

5. Concise statement of the alleged facts or expert opinions in support of the petitioner's position and on which the petitioner intends to rely at hearing

Intervenors incorporate herein by reference and re-allege as if written herein "Intervenors' Motion for Admission of Contention No. 7 on Worsening Shield Building Cracking and Inadequate AMPs in Shield Building Monitoring Program," and the section *infra* entitled "Facts Which Require Expanded NEPA Consideration and/or Undercut a Finding of 'Reasonable

Assurance.””

6. Showing of a genuine dispute between the licensee on a material issue of law or fact, with reference to specific disputed portions of the application

There are several genuine disputes. FENOC’s credibility as nuclear manager and operator of Davis-Besse is brought squarely into focus by the revelations that the root cause(s) (for there have been two prior to the current “apparent cause”) do not adequately encompass or explain the cracking phenomenon.

There is a dispute over whether Davis-Besse conforms to its current licensing basis (CLB) merely by providing a slightly more engaged monitoring program. Part of that dispute is how and why FENOC intends principally to take samples from areas where there already are known cracks, as opposed to sampling from a more dispersed set of locations on the Shield Building exterior.

The scope of causation of the water saturation within the Shield Building walls is disputed; Intervenor contend that insufficiently-inclusive analysis of potential water sources has been undertaken.

There is a dispute over whether the SAMA portion of the NEPA document for the license renewal must take cognition of the deteriorating state of the Shield Building. There is a dispute over whether the NEPA-required “hard look” at alternatives to a 20-year license extension has been achieved in light of the reversal of position by FENOC that admits the cracking problems are likely to be permanent and increasingly intrusive into the structural integrity of the Shield Building.

CONCLUSION

If FENOC cannot assure Davis-Besse’s safety, then the plant must be permanently shut

down, not granted a 20-year license extension. It has become increasingly clear that Davis-Besse fails the reasonable assurance of adequate protection test, given its Shield Building's aging-related degradation, its severe and worsening cracking, and its susceptibility to not properly perform vital design functions. FENOC cannot be allowed to endanger the public throughout its region by operating Davis-Besse for 20 additional years in such a degraded, and worsening, state.

WHEREFORE, Petitioners pray the Atomic Safety and Licensing Board panel allow the amendments and supplementation as explained hereinabove, and that it admit Contention 7 as amended and supplemented for full adjudication.

Executed according to 10 C.F.R. § 2.304(d)

/s/ Terry J. Lodge
Terry J. Lodge (Ohio Bar #0029271)
316 N. Michigan St., Ste. 520
Toledo, OH 43604-5627
Phone/fax (419) 255-7552
tjlodge50@yahoo.com
Counsel for Intervenors

CONSULTATION PURSUANT TO 10 C.F.R. § 2.323(b)

Undersigned counsel hereby certifies that he made a sincere attempt to consult with opposing counsel for the Nuclear Regulatory Commission Staff and for FirstEnergy Nuclear Operating Company in an effort to resolve the concerns raised in the foregoing Motion. Counsel for FirstEnergy Nuclear Operating Company indicated in an email on September 8, 2014 that FENOC would oppose Intervenors' Motion. Counsel for the NRC Staff stated that the Staff did not oppose Intervenors' right to file this Motion, given the ASLB's mention of the possibility in its July 25, 2014 order, but reserved the right to oppose it upon review.

Executed in Accord with 10 C.F.R. § 2.304(d)

/s/ Terry J. Lodge
Terry J. Lodge
Counsel for Intervenors

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
Before the Atomic Safety and Licensing Board**

In the Matter of:)	Docket No. 50-346-L
FirstEnergy Nuclear Operating Company)	September 8, 2014
Davis-Besse Nuclear Power Station, Unit 1)	
)	

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing “INTERVENORS’ MOTION TO AMEND AND SUPPLEMENT CONTENTION NO. 7 ON WORSENING SHIELD BUILDING CRACKING AND INADEQUATE AMPS IN SHIELD BUILDING MONITORING PROGRAM” was deposited in the NRC’s Electronic Information Exchange this 8th day of September, 2014 and was served upon all parties of record.

Executed in Accord with 10 C.F.R. § 2.304(d)

/s/ Terry J. Lodge
Terry J. Lodge (Ohio Bar #0029271)
316 N. Michigan St., Ste. 520
Toledo, OH 43604-5627
Phone/fax (419) 255-7552
tjlodge50@yahoo.com
Counsel for Intervenors