

LARGE FILING SEPARATOR SHEET

CASE NUMBER: 14-1297-EL-SSO

FILE DATE: 1-27-2015

SECTION: 7

NUMBER OF PAGES: 109

DESCRIPTION OF DOCUMENT:

Public Comments

FENOC's Shield Building Monitoring Program AMPs to supply AEA and NEPA-required reasonable assurances of adequate protection of public health, safety, and the environment, as well as the required "hard look" at the environmental impacts, of a 20-year license extension at Davis-Besse, given the severe, and worsening, cracking of the Shield Building.

BASES FOR CONTENTION

1. A new wrinkle in time: admitted cracking propagation

FENOC states:¹⁵

The locations *{of the core bores} for the inspections are* chosen from the core bores that have been installed in the subcomponents of the Shield Building Wall, including new core bores installed as required to identify changes in the limits of cracking in areas with previously identified crack propagation. The representative sample size includes *{20} a minimum of 23* core bore inspection locations in the subcomponent population *(defined as Shield Building Wall subcomponents having the same material, environment, and aging effect combination).* The *{20} 23* core bore location *[sic]* distribution has been chosen to include core bore inspections in 8 of the 10 flute shoulders with a high prevalence of event-driven laminar cracking...In addition, past evidence of crack propagation is considered in choosing future inspection locations.¹⁶

There is other evidence cracking is growing worse with time, the phenomenon to which FENOC refers as "crack propagation."

Intervenors assert that FENOC is unduly and improperly vague in its assertion that,

The locations *{of the core bores} for the inspections are* chosen from the core bores that have been installed in the subcomponents of the Shield Building Wall,

¹⁵ As previously stated, deleted text is reproduced in Intervenors' memorandum using {parentheses}.

¹⁶ 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," the July 3, 2014 letter, ADAMS Accession No. ML14184B184, LRA Sections Affected: A.1.43; B.2.43, Affected LRA Section: A.1.43, LRA Page No.: Page A-25, Affected Paragraph and Sentence: 4th Paragraph, p. 2/8 (p. 8/14 on pdf counter).

including new core bores installed as required to identify changes in the limits of cracking in areas with previously identified crack propagation.

This is so ambiguous that it hardly comprises an aging management plan. No commitments are clearly expressed; it amounts to deferring a serious scientific or engineering commitment to monitoring, and given the three-year history since discovery of the cracking, is grossly inadequate. The scope – that is, the areas of the Shield Building to be monitored – is too narrow. FENOC mentions only “areas with previously identified crack propagation.” This excludes vast areas of the massive Shield Building, which could also be suffering cracking initiation and propagation.

Additionally, an increase by 3 of core bore locations is insufficient, given the significance of worsening cracking revealed in August-September, 2013, and the vital safety, health, and environmental protection roles the Shield Building is intended to fill.

In the extended section entitled “Detection of Aging Effects” (pp. 3-4/8 [pp. 9-10/14 on pdf counter]) FENOC has made the following modifications:

The Shield Building Monitoring Program provides for detection of aging effects prior to the loss of Shield Building intended functions. *The inspections, testing and analyses of the Shield Building concrete and rebar that was done to support the root cause evaluation report, "Concrete Crack within Shield Building Temporary Access Opening", and the follow-up report, "Shield Building Laminar Crack Propagation," {will} provide a baseline for future Shield Building Monitoring Program activities.*

Periodic visual inspections will be performed in accordance with an implementing procedure by inspectors qualified as described in Chapter 7 of ACI Report 349.3R. The visual inspections will be performed on a representative sample of Shield Building Wall structural subcomponents by inspection of the internal surfaces of core bores. *The locations of the {core bores have been} inspections will be chosen from the core bores that have been installed in the subcomponents of the Shield Building Wall, including new core bores installed as required to identify changes in the limits of cracking in areas with previously identified crack propagation. The representative sample size includes {20} 23 core bore inspection locations in the subcomponent population (defined as Shield Building Wall subcomponents having the same material, environment, and aging*

effect combination). A minimum of 10 of the core bores at inspection locations are currently uncracked; however, they are adjacent to areas of known cracking. This strategic location, and selection of core bores provides FENOC with the ability to monitor for crack propagation. The {20} 23 core bore location distribution has been chosen to include core bore inspections in 8 of the 10 flute shoulders with a high prevalence of event-driven laminar cracking. This distribution also covers shell sections above elevation 780 feet with 4 core bores (2 pairs), and each Main Steam Line penetration area with one core bore. In addition, past evidence of crack propagation will be considered in choosing future inspection locations. Visual inspections will be supplemented by other established nondestructive examination (NDE) techniques and testing, as appropriate.

The initial frequency of visual inspection of core bores and core bore samples will be based on the results of inspections conducted before the period of extended operation. {If no aging effects were identified by these visual inspections, then visual inspections will continue to be conducted at least once every two years during the period of extended operation.} The first inspection conducted during the period of extended operation is scheduled for 2017 and the next inspection is scheduled for {2019} 2018. If no aging effects are identified by the {two-year} one-year interval visual inspections (defined as no discernable change in crack width or the confirmation that no visible cracks have developed in core bores that previously had no visible cracks), then the frequency of visual inspections may be changed to at least once every {five} two years through 2026. If no aging effects are identified by the two-year interval visual inspections, then the frequency of visual inspections may be changed to at least once every four years. Any evidence of degradation will be documented and evaluated through the FENOC Corrective Action Program. The evaluation will include a determination of the need for any required change to the inspection schedule or parameters that need to be inspected...¹⁷

2. Better the devil you know: risks of known/unknown cracking propagation

Respecting FENOC's statement "including new core bores installed as required to identify changes in the limits of cracking in areas with previously identified crack propagation" (p. 3/8 [9/14 on pdf counter]), in August-September, 2013, FENOC discovered cracks where they had previously not been identified, and also discovered worsening cracking where none had been

¹⁷ Id., License Renewal Application Sections Affected: A.1.43; B.2.43, Affected LRA Section: A.1.43, LRA Page No.: Page A-25, Affected Paragraph and Sentence: 4th Paragraph, pp. 3-4/8 (pp. 9-10/14 on pdf counter).

previously identified, nor expected. Thus, limiting new core bores to “areas with previously identified crack propagation” is not sufficient, because new cracks, or worsening crack propagation, could develop in areas not under careful aging management surveillance by FENOC, and thereby go undetected for long periods of time.

This inattention has happened before at Davis-Besse, with serious implications. In FENOC’s own Blizzard of 1978 root cause conclusion, endorsed by the NRC Staff, the sub-laminar cracking discovered in October 2011 had been there since 1978, for 33 years, undetected because it was not visible on the surface, and FENOC’s aging management of the Shield Building was limited to visual inspections of the surface. Failing to investigate into large portions for evidence of the initiation or worsening of cracks in the Shield Building which FENOC does not expect is unacceptable as an AMP during the 20-year license extension period. For this reason, Intervenors call for additional testing methods, besides core bores, to be invoked.

Extensive and comprehensive complementary testing methods should be deployed to compensate for the limitations of FENOC’s small number of proposed core bore tests. These can and should include: electronic testing; impact response mapping or impulse response testing (IRT, a testing technique used to locate laminar cracking inside a concrete wall); creep testing; pull tests; ultrasonic testing; lab testing (such as chemical testing, for the presence of Ettringite, which would indicate moisture exposure, or testing for sulfates, or other chemicals known to have a deleterious effect on concrete, in order to determine if they are present in significant quantities in contact with the concrete containment structure), strength tests, and tensile tests. Given the vital safety and environmental role that the Davis-Besse Shield Building must perform from 2017 to 2037, such tests should be required to provide a comprehensive understanding of

the status of the Shield Building, and to guarantee its capability to perform its design functions. FENOC's incuriosity is not acceptable.

Regarding FENOC's statement "A minimum of 10 of the core bores at inspection locations are currently uncracked; however, they are adjacent to areas of known cracking. This strategic location and selection of core bores provides FENOC with the ability to monitor for crack propagation"(p. 3/8 [9/14 on pdf counter]) given the significance of the unexpected, newly detected cracks, and worsening of previously identified cracks, revealed in August-September 2013. "A minimum of 10 of the core bores at inspection locations [that] are currently uncracked" is a woefully inadequate sampling size across the vast, severely cracked -- and deteriorating -- safety and environmentally significant Shield Building. While FENOC should be on guard against propagation of known cracking, it must also be vigilant to root out unknown cracking, and guard against its advance. After all, FENOC was unaware of the sub-laminar cracking it claims was caused by the Blizzard of 1978 until October 2011, that is, for nearly 34 years. To be unaware of such a threat against the Shield Building's performance of intended safety and environmentally significant design functions for such a long period of time, cannot be allowed to happen again.

3. Cracking's significance demands statistical significance

As to FENOC's statement that "The {20} 23 core bore location distribution has been chosen to include core bore inspections in 8 of the 10 flute shoulders with a high prevalence of event-driven laminar cracking," (p. 3/8 [9/14 on pdf counter]) a mere increase of 3 core bores is insufficient, given the significance of the new cracking and advancing cracking revealed in August-September, 2013. (see f n. 5 above) The number of core bores must be significantly

increased. This is especially the case, given that FENOC has arbitrarily excluded large sections of the Shield Building from further examination under its proposed AMPs, such as two of the ten flute shoulders.

FENOC further intends to use past cracking evidence to choose future inspection locations: *“In addition, past evidence of crack propagation will be considered in choosing future inspection locations.”* Since FENOC had previously missed *“past evidence”* of cracking from 1978 to 2011, according to its self-report, it appears that “past evidence” is inadequate to choose “future inspection locations,” for it could easily miss unknown cracking across stretches of the Shield Building. Similarly, an unknown air void or gap, extending most of the way through the Shield Building side wall, was present during over two years of full-power operations (late 2011 to early 2014) simply because it was not visible at the surface. Even *known* cracking has failed to prompt action at Davis-Besse. FENOC and its predecessors actually were aware of cracking on the dome parapet as early as 1976, but did not reveal this information to the public until 2012, 36 years later.¹⁸

4. Time flies when your Shield Building is cracking: inspection frequency increase needed

Thus, *“choosing future inspection locations,”* based solely on considerations of *“past*

¹⁸“On August 15, 1976 the Toledo Edison Company construction superintendent documented an examination of the shield building dome parapet that found a cracked and broken architectural flute shoulder at approximately 292 degree azimuth. There were also other hairline shrinkage cracks in the dome parapet at both corners of each architectural flute shoulder, at mid-width of each flute, and vertical around the periphery of the parapet,” cited in INTERVENORS’ THIRD MOTION TO AMEND AND/OR SUPPLEMENT PROPOSED CONTENTION NO. 5 (SHIELD BUILDING CRACKING), In the Matter of First Energy Nuclear Operating Company (Davis-Besse Nuclear Power Station, Unit 1), Docket No. 50-346-LR, July 16, 2012, section 5, Shield Building Dome Parapet Cracking, Page 7. (italics in original FENOC document, its Revised Root Cause Analysis, RRCA, May 16, 2012, Page 34 of 131 on PDF counter, ADAMS Accession Number ML12142A053.)

evidence of crack propagation”(p. 4/8 [10/14 on pdf counter]) is not only unacceptably vague, it is also not acceptable in terms of reasonable assurance of adequate protection of public health, safety, and environment over the proposed 2017-2037 license extension.

FENOC’s statement setting huge time intervals between investigatory inspections is troublesome:

The first inspection conducted during the period of extended operation is scheduled for 2017 and the next inspection is scheduled for {2019} 2018. If no aging effects are identified by the {two-year} one-year interval visual inspections (defined as no discernable change in crack width or the confirmation that no visible cracks have developed in core bores that previously had no visible cracks), then the frequency of visual inspections may be changed to at least once every {five} two years through 2026. If no aging effects are identified by the two-year interval visual inspections, then the frequency of visual inspections may be changed to at least once every four years.

(p. 4/8 [10/14 on pdf counter]).

The unexpected August-September 2013 new cracking and crack propagation discovery was detected only because of an annual FENOC inspection. (See fn. 5 *infra*). Intervals of two or four years as proposed means that new or deteriorating cracking would be missed for years. The crucial role the Shield Building plays in containment, health, safety, and environmental protection makes it unacceptable for FENOC to relax inspections to less than annually. FENOC’s weak commitment to document and evaluate evidence of degradation of the Shield Building through the company’s Corrective Action Program and to “include a determination of the need for any required change to the inspection schedule or parameters that need to be inspected,” is largely meaningless with two or four-year testing intervals. A determined inspection schedule and clear requirements of parameters that need to be inspected must be made into license conditions for the license extension now. Intervenors urge NRC to require expanded sampling size across diverse areas of the Shield Building and increased frequency of inspections, as

compared to FENOC's present proposal, given the risks of Shield Building failure.

5. Sins of Omission: Corrective Actions Speak Louder than Inadequate Inspections

Notably, FENOC mentions no action, such as repairs to the Shield Building, to be undertaken under its Corrective Action Program. The only corrective action FENOC has taken in response to the cracking phenomena was to whitewash the exterior of the Shield Building in August 2012, 40 years too late. And Intervenor's have previously pointed out the inadequacy of the use of whitewash to seal the concrete.

Concerning "Monitoring and Trending" (pp. 4-5/8 [10-11/14 on pdf counter]) FENOC's modifications include:

The Shield Building Monitoring Program will include a baseline inspection, followed by periodic inspections. Visual inspections will be performed in accordance with the implementing procedure by personnel qualified as described in Chapter 7 of ACI Report 349.3R. *The representative sample size includes {20} a minimum of 23 core bore inspection locations in the Shield Building Wall subcomponent population having the same material, environment, and aging effect combination. A minimum of 10 of the core bores at inspection locations are currently uncracked; however, they are adjacent to areas of known cracking. This strategic location, and selection of core bores provides FENOC with the ability to monitor for crack propagation. The {20} 23 core bore location distribution has been chosen to include core bore inspections in 8 of the 10 flute shoulders with a high prevalence of event-driven laminar cracking.* This distribution also covers shell sections above elevation 780 feet with 4 core bores (2 pairs), and each Main Steam Line penetration area with one core bore. *In addition, past evidence of crack propagation will be considered in choosing inspection locations.* Inspection findings will be documented and evaluated by assigned engineering personnel such that the results can be trended. Inspection findings that do not meet acceptance criteria will be evaluated and tracked using the FENOC Corrective Action Program.¹⁹

6. Few and far between: sample size much too small, scope much too narrow

FENOC's sample size is troubling: "*The representative sample size includes {20} a*

¹⁹FENOC's RAI Letter, July 3, 2014, Sections Affected: A.1.43; B.2.43, Affected LRA Section: A.1.43, LRA Page No.: Page A-25, Affected Paragraph and Sentence: 4th Paragraph, pp. 4-5/8 (pp. 10-11/14 on pdf counter).

minimum of 23 core bore inspection locations in the Shield Building Wall subcomponent population having the same material, environment, and aging effect combination” (p. 4/8 [10/14 on pdf counter]) as mentioned above, 23 core bore inspection locations are too few across the vast surface area and volumetric depth of the Shield Building structure. Intervenors call for a significant increase in both the sample size (numbers of tests), scope of monitoring (locations to be monitored), as well as frequency of testing. Intervenors have previously argued before the ASLB panel in this proceeding that there are multiple kinds of cracking, located at diverse places across the huge Shield Building (exhibiting different “*material, environment, and aging effect combination[s]*”) (p. 4/8 [10/14 on pdf counter]), including sub-surface laminar cracking, surface cracking, dome cracking, micro-cracking, and radial cracking. And as of August-September, 2013, FENOC has been forced to admit that these cracks are propagating over time, which means that they are aging-related.

7. Timing (relatedness) is everything: contention within LRA scope

FENOC’s acknowledgment of an “aging effect” associated with the Shield Building cracking finally establishes what the ASLB has denied previously to the Intervenors: this contention is indeed within scope, and worthy of a hearing, given the aging-related risks of the Shield Building cracking and its propagation.

FENOC’s statement that “[a] minimum of 10 of the core bores at inspection locations are currently uncracked; however, they are adjacent to areas of known cracking” is grossly inadequate for sampling purposes, given the significance of the unexpected, newly detected cracks, and worsening of previously identified cracks, revealed in 2013.

8. Loss of conformance: acrobatic 'aligning' on regulatory tightrope

FENOC also has modified its "Acceptance Criteria" as follows:

For core bore inspections, unacceptable inspection findings will include any indication of new cracking or a "discernable change" in previously identified cracks. Any indication of new cracking is defined as a visual inspection finding that visible cracks have developed in core bores that previously had no visible cracks. A discernable change in a previously identified crack is defined as a visual inspection finding that there has been a discernable change in general appearance or in crack width as identified by crack comparator measurement. Conditions to be evaluated following each inspection cycle for determination of "acceptable results" include conformance with the plant design and licensing basis, as well as with previously determined crack propagation rates. Comparison with previously determined propagation rates will be to identify any potential changes in the driving force of the condition.²⁰

These again are bare minimum requirements, and should be substantially strengthened.

"[C]onformance with the plant design and licensing basis" should be a basic requirement, and must be strictly enforced at all times. But as appears to be the problem in dealing with the Shield Building cracking trend, the NRC Staff has been too willing to ignore licensing and design basis violations.²¹

Such regulatory violations, and the absence of an agency interested in demanding compliance with them, cannot be allowed in the critical decision to grant a license extension. Short cuts on safety, allowed by regulator-industry collusion, were officially determined by the Japanese Diet (Parliament) to have been the root cause of the Fukushima Daiichi nuclear

²⁰FENOC's RAI Letter, July 3, 2014, LRA Sections Affected: A.1.43; B.2.43, Affected LRA Section: A.1.43, LRA Page No.: Page A-25, Affected Paragraph and Sentence: 4th Paragraph, pp. 5/8 (p. 11/14 on pdf counter).

²¹See "NRC acrobatic 'aligning' on a regulatory tightrope," and associated footnotes (#81 and following), citing documents obtained from NRC via FOIA, in *What Humpty Dumpty doesn't want you to know: Davis-Besse's Cracked Containment Snow Job*, Beyond Nuclear Fact Sheet, August 8, 2012, pp. 8-10 (posted online at: <http://www.beyondnuclear.org/storage/Snow%20Job%20Recent%20Revelations%208%208%202012.pdf>).

catastrophe.²² The NRC has acknowledged the need to learn lessons from Fukushima.²³ Avoiding a potential nuclear catastrophe should be the aim.

9. The roots of the problem: cracking acceleration, with multiple drivers

FENOC's reference, "[c]omparison with previously determined [crack] propagation rates...to identify any potential changes in the driving force of the condition"(p. 5/8 [11/14 on pdf counter]), is an overt admission by FENOC that the cracking is aging-related. Ironically, FENOC, and NRC staff for that matter, have previously argued before this ASLB panel that Intervenor's Shield Building containment cracking-related contentions are not proper for adjudication because of FENOC's determination that the root cause of the cracking was the Blizzard of 1978, and so the cracking is not aging-related. But now, FENOC acknowledges that cracking could well grow worse with time (that is, "propagate"), due to "potential changes in the driving force of the condition." Even as FENOC and the NRC staff stand by the dubious Blizzard of 1978 root cause conclusion, FENOC now seems willing to admit another "driving force of the condition"(p. 5/8 [11/14 on pdf counter]) – that is, another root cause – is likely at work initiating new cracks and worsening previously detected ones, perhaps even accelerating their spread over time. FENOC's admission is conclusive that Davis-Besse's Shield Building cracking is aging-related, making Intervenor's contention within scope, and worthy of a hearing on the merits.

10. Shaky shell games demand concrete AMP solutions

FENOC's Shield Building Monitoring Program modifications concerning age-related

²² National Diet [Parliament] of Japan, Official Report of the Fukushima Nuclear Accident Independent Investigation Commission, Executive Summary, posted online at <http://warp.da.ndl.go.jp/info:ndljp/pid/3856371/naic.go.jp/en/report/>.

²³ <http://www.nrc.gov/reactors/operating/ops-experience/japan-dashboard.html>

degradation of rebar, while outside the 60-day period to become part of a contention, nonetheless relates to the need for reconsideration of the news that the Shield Building cracking is aging-related:

The acceptance criteria for rebar corrosion found during visual inspections will be that there is no evidence of corrosion indicated by loose, flaky rust or reinforcement section loss. Given the inherent variability of reinforcement cross section, and the encompassing concrete, **no measurement technique is employed.** (Emphasis added).²⁴

Despite their being unable to challenge this aspect of FENOC's AMPs, Intervenor's emphasize that their other points on this new Contention 7 should be the more compelling and urgent, given the utter lack of adequate aging-management on the critical rebar reinforcement in the Shield Building.²⁵ Mere visual inspection, and an utter lack of any measurement technique represents an astounding deficiency in aging management during the 2017-2037 license extension. If FENOC refuses to improve its aging management of the rebar, then the aging management of the severely cracked concrete, becomes all the more important – especially given the August-September 2013 revelation of new crack initiation, and worsening cracking. In particular, this conclusion in the July 3 letter is suspect:

The Shield Building laminar cracking condition has been evaluated with respect to the design basis functions of the Shield Building. The condition is documented in FENOC calculation C-CSS-099.20-063, as supported by Bechtel report "Effect of Laminar Cracks on Splice Capacity of No. 11 Bars based on Testing Conducted at Purdue University and University of Kansas for Davis-Besse Shield Building," that the

²⁴FENOC's RAI Letter, July 3, 2014, License Renewal Application Sections Affected: A.1.43; B.2.43, Affected LRA Section: A.1.43, LRA Page No.: Page A-25, Affected Paragraph and Sentence: 4th Paragraph pp. 5-6/8 (pp. 11-12/14 on pdf counter).

²⁵Intervenor's Contention No. 6, opposed by FENOC and NRC staff, and rejected by this ASLB panel, also raised concerns about significant damage FENOC has inflicted on the rebar of the Shield Building, such as during the early 2014 steam generator replacement project. See fns. 1, 5, *infra*.

Shield Building "...meets all design requirements specified in USAR and will perform its USAR described design functions." This analysis bounds the identified changes in the laminar cracking condition from the conditions identified in 2011.²⁶

As Intervenors have mentioned above, Davis-Besse's compliance with licensing and design bases, due to the severe and worsening Shield Building cracking, is dubious at best.

11. Diverse testing techniques needed to avoid blind spots

FENOC's "Operating Experience"-related modifications in light of changed laminar cracks are inadequate. In the "Operating Experience" section of the July 3 letter, the company states:

Inspections of 12 core bores were completed in 2013 under the "Design Guidelines for Maintenance Rule Evaluation of Structures" Procedure EN-DP-01511. During that cycle of inspections, a crack was observed in one of the core bores. This finding, upon a review of the records was determined to be a pre-existing crack given that the extracted concrete core was cracked at the location identified. Given this finding, the inspection population was increased, eventually leading to inspection of all available core bores. This re-inspection identified a total of 7 core bores with similar conditions that were determined to be pre-existing. This re-inspection also identified 8 conditions where the laminar cracking conditions were determined to have undergone a discernable change.²⁷ (emphasis added).

So FENOC overlooked pre-existing cracks, only to find them later. This underscores the need, as mentioned above, for diverse testing methods, so that "blind spots" can be avoided, and existent cracks can be detected, instead of going unnoticed and being overlooked. FENOC's admission that "re-inspection also identified 8 conditions where the laminar cracking conditions were determined to have undergone a discernable change," and the AMP modifications this has led to,

²⁶FENOC's RAI Letter, July 3, 2014, Enclosure L-14-224, p. 7/8 (p. 13/14 on pdf counter).

²⁷*Id.*, License Renewal Application Sections Affected: A.1.43; B.2.43, Affected LRA Section: A.1.43, LRA Page No.: Page A-25, Affected Paragraph and Sentence: 4th Paragraph, pp. 6-7/8 (pp. 12-13/14 on pdf counter).

is new, significant, material information. “[A] discernable change” is indicative of an aging-related mechanism and brings it within the scope of this LRA proceeding. Now that even FENOC acknowledges what Intervenors have argued since January 2012 before this very ASLB panel – that the cracking is aging-related, and subject to worsening – Intervenors urge the ASLB panel to grant a hearing on their contention, in order to address Intervenors’ material dispute with FENOC regarding the adequacy of its AMPs in the Shield Building Monitoring Program.

12. Clear as ice on the Great Lakes shore: Locking cracking propagation under belated whitewash

FENOC further admits that cracking propagation occurred for some four decades:

The cracking propagation was determined to be a result of ice-wedging (freezing water at a pre-existing crack leading edge). This condition requires water, freezing temperatures, and pre-existing cracks. Because the Shield Building has been coated it contains a finite amount of water. It is not practical to remove the water in an accelerated manner given the cumulative magnitude of leading crack edges and transportability of water. It is also not practical to remove the existing cracks or prevent freezing temperatures. The rate of cracking propagation is estimated at 0.4 to 0.7 inches per freezing cycle based on laboratory simulation. By application of the evaluation criteria hierarchy of ACI 349.3R, “Evaluation of Existing Nuclear Safety-Related Concrete Structures,” Figure 5.1, the condition was acceptable through evaluation. The condition was not passive; however, it was bounded by design basis documentation. The Shield Building Monitoring Program was changed to ensure conformance with the design requirements and to maintain the USAR functions.²⁸

According to FENOC, “ice-wedging” went on from construction of the Shield Building in the 1970's until August 2012, when the company whitewashed the Shield Building exterior. The NRC Staff itself brought to light that Davis-Besse’s Shield Building concrete was of inferior quality, allowing not only water saturation, but also freezing temperatures to penetrate well into

²⁸ *Id.*, License Renewal Application Sections Affected: A.1.43; B.2.43, Affected LRA Section: A.1.43, LRA Page No.: Page A-25, Affected Paragraph and Sentence: 4th Paragraph, p. 7/8 (13/14 on pdf counter).

the thick walls.²⁹

Davis-Besse's August 2012 whitewash may prevent moisture from penetrating the Shield Building side wall. However, moisture could still be penetrating the Shield Building from other pathways. For example, the previously cited PII revised root cause analysis document brought to light a "top-down" moisture infiltration pathway.³⁰ There is even a "down-up" moisture

²⁹FENOC subcontractor Performance Improvement International, or PII, brought this issue to Intervenor's attention in its revised root cause assessment report. PII documented one of many NRC Requests for Additional Information: '16. Item 56: Why was the thermal conductivity of the SB [Shield Building] concrete 50% higher than the highest range expected for concrete? Did this contribute to an increased depth of freezing such that the area susceptible to cracking was at the outer rebar mats?' FENOC-Davis-Besse Nuclear Power Station, Unit 1, Submittal of Contractor Root Cause Assessment Report [Revised Root Cause Assessment Report, or RRCAR]-Section 1, from B.S. Allen, FirstEnergy Nuclear Operating Company, to Cynthia D. Pedersen, NRC, NRC/RGN-III/ORA, L-12-196, May 24, 2012, see p. iii (19/257 on pdf counter), ADAMS Accession No. ML12138A037.

This led Intervenor to ask the following: "If Davis-Besse's shield building concrete conducts heat 50% faster than it is supposed to, this may have allowed or caused deeper cracking in the shield building. Did Davis-Besse use substandard concrete in the shield building construction? Is this another design and/or construction error in the Davis-Besse shield building? Is this also a non-conformance to licensing and design bases? Why, when FENOC has blamed the Blizzard of 1978 and lack of a weather sealant on the shield building exterior as root causes of the subsurface laminar cracking in the shield building wall, didn't the utility also mention this concrete thermal conductivity issue? What other negative properties does the substandard Davis-Besse shield building concrete have? What other natural or man-made assaults is it therefore vulnerable to? A hearing on the merits of Intervenor's cracked concrete containment contention, as supplemented, might illuminate answers to these important questions." No such illumination was allowed, however – the contention was rejected in its entirety. See *INTERVENORS' FOURTH MOTION TO AMEND AND/OR SUPPLEMENT PROPOSED CONTENTION NO. 5 (SHIELD BUILDING CRACKING)*, First Energy Nuclear Operating Company (Davis-Besse Nuclear Power Station, Unit 1), Docket No. 50-346-LR, July 23, 2012, pp. 28-30, ADAMS No. ML12205A507.

³⁰At p. 18 [38/257] of PII RRCAR, per fn. 28 immediately above, PII states: "The top-down moisture transport process assumes that the water comes from the top of the structure and slowly penetrates down within the concrete wall. During the construction of the Shield Building, the wall was built first and the dome was subsequently constructed two years and four months later. So, the jacking bars, dense rebar, and top of the concrete wall were all exposed to the environment. Moreover, initial defects may be generated by the jacking bars and dense rebar, together with the large aggregate used in the concrete. These factors resulted in the potential for high porosity concrete near the rebar and jacking bars allowing for water penetration. Due to the heterogeneous characteristics of concrete, the water comes down along random paths of least

infiltration pathway, given the “wicking” dynamic due to aggressive, standing groundwater saturating the base of the Shield Building wall, and a degraded moisture barrier.³¹ It follows that any flaws or degradation in the whitewash on the Shield Building side wall during the 2017-2037 license extension would allow water to penetrate Davis-Besse’s substandard concrete during precipitation events, which are common on the Lake Erie shoreline. This highlights the need for a comprehensive sealant AMP as well.

Also common on the Lake Erie shore are freeze/thaw cycles. As FENOC stated, “*It is also not practical to remove the existing cracks or prevent freezing temperatures*” (p. 7/8 [13/14 on pdf counter]). The impracticality of removing the existing cracks underscores a point made above by Intervenors: FENOC has done nothing to address the Shield Building cracking, other

resistance which may tend to explain the sporadically distributed cracks in the wall. This moisture transport mechanism is illustrated in Figure 4.” (p. 14, citations omitted) And, as mentioned on p. 14, any failure of the dome’s/parapet’s waterproof sealant would allow water to percolate down into the SB wall below. This top-down water flow could worsen cracking over time – that is, cause age-related degradation – due to rains, melting of snow, etc., which are common occurrences on the shoreline of the Great Lakes. So, if “an uneven snow load” is as bad as “the entire roof filling up with water,” this is of great concern to Intervenors, not only due to the weight of the snow/water, but to the potential for water to flow through roof/sealant flaws into the shield building wall, causing further damage below.” (pp. 32-33). INTERVENORS’ FOURTH MOTION TO AMEND AND/OR SUPPLEMENT, per fn. 28 *infra*.

³¹“Moreover, Davis-Besse has other water problems inside the shield building. In RAI responses dated May 24, 2011 (ML11151A90), the NRC staff had noted a ‘history of ground water infiltration into the annular space between the concrete shield building and steel containment.’ 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.” INTERVENORS’ MOTION TO AMEND AND SUPPLEMENT PROPOSED CONTENTION NO. 5 (SHIELD BUILDING CRACKING), *First Energy Nuclear Operating Company* (Davis-Besse Nuclear Power Station, Unit 1), Docket No. 50-346-LR, June 4, 2012, p. 12 (internal citations omitted).

than the August 2012 whitewash (40 years late), and its inadequate attempts at AMPs. No other corrective actions, such as physical structure repairs have been done, nor are any planned. This does not provide reasonable assurance of adequate protection of health, safety, and the environment through the 2017-2037 license extension, given the Shield Building's questionable capability of fulfilling vital design functions. Even without flaws or degradation, however, FENOC has not established that the whitewash coating the exterior of the Shield Building actually insulates the side wall thickness against freezing and thawing temperatures. This is a problem, as apparently, there is enough water in the Shield Building side wall to continue to carry out freeze and thaw cycles, causing significant damage each time, in terms of cracking growth. Also, the whitewash has sealed off the wall, has now locked that water inside, so there is no getting it out. In addition to the trapped water continuing to inflict significant damage by propagating cracks, there are other potential water infiltration pathways, as well. Cracking propagation could simply accelerate and worsen over time.

As FENOC states in the July 3 RAI Letter, "It is not practical to remove the water in an accelerated manner given the cumulative magnitude of leading crack edges and transportability of water" (p. 7/8 [13/14 on pdf counter]). However, impracticality cannot excuse FENOC under the Atomic Energy Act, from legal or regulatory compliance. FENOC chose to build Davis-Besse on the Great Lakes shoreline. It chose not to seal the Shield Building in the early 1970s, or afterwards, until August 2012, apparently in order to save money. FENOC is responsible for its actions, and inactions.

The "ice-wedging (freezing water at a pre-existing crack leading edge)"(p. 7/8 [13/14 on pdf counter]) represents a different root cause of the Shield Building cracking from the purported

Blizzard of 1978 root cause previously argued. As Intervenor contended in previous contention filings related to the Shield Building cracking problem, the root cause is likely multi-faceted and synergistic, as NRC staff's own RAI questions suggested, and as revealed in PII's RRCA. This "ice-wedging" cracking propagation will inflict damage in addition to the severe cracking already inflicted ostensibly by the Blizzard of 1978, and numerous other possible root causes.

13. Off to the ice races: startling cracking propagation rate

FENOC's admission that *"The rate of cracking propagation is estimated at 0.4 to 0.7 inches per freezing cycle based on laboratory simulation"* suggests a very high rate of cracking growth! It raises many questions, including: How long has it already been going on? Since the Blizzard of 1978? Earlier? Does the freeze-thaw cycle still penetrate the Shield Building side wall, due to the whitewash's inability to insulate? How long before circumferential cracking goes all the way around the diameter of the Shield Building? How long before through-wall cracking goes all the way through the Shield Building side wall, which is 30 inches thick? How soon before the severely cracked Shield Building simply collapses under its own weight, due to a tornado, missile, earthquake, or internal pressure build up, as NRC Staff conjectured in internal emails in 2011 which were brought to light by FOIA, and cited repeatedly by Intervenor in previous cracking-related contention filings in this case.³²

³² See, for example: **"If this assumption is correct only 3-4 inches of the concrete on the inside face can be used in the structural analysis.** In the response to the questions, the applicant stated that, 'Since we assume that outside reinforcement is to be treated ineffective in carrying any additional stress beyond 12.4 ksi, under accident thermal loads that may cause stresses in excess of what the rebar can carry (assumed 12.4 ksi), **the reinforcement is assumed to detach itself from the outer section of the shell.'** These statements seems (sic) to be contradictory. In addition, I am concerned that the concrete will fail in this region due to bending in this region even under small loads." NRC's engineer Pete Hernandez wrote **"I think the greater concern is will the SB stay standing and not whether or not the decorative concrete will fall off.** Because the licensee has not performed core bores to see if there is

FENOC's "Operating Experience" discussion contains a highly-suspect conclusion:

Referencing the Evaluation Criteria hierarchy of ACI 349.3R, Figure 5.1, the 2013 condition was determined to be acceptable through evaluation. The condition was not passive; however, it was bounded by design basis documentation. The condition will therefore be subjected to increased monitoring to ensure conformance with the design requirements and USAR functions.³³

Intervenors submit that the Shield Building's condition is **not** "bounded by design basis documentation." Internal NRC Staff emails obtained by Intervenors under FOIA show that design and licensing bases are very questionable at Davis-Besse, due to Shield Building damage, which Intervenors now understand, per FENOC admission, is likely significantly worsening with the passage of time. FENOC's vague commitment that "[t]he condition will therefore be subjected to increased monitoring to ensure conformance with the design requirements and USAR functions" is no commitment at all.

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.

cracking in the credited concrete, **do they have a basis to say that the structural concrete will maintain a Seismic II/I condition?**" (emphases added) See *INTERVENORS' FOURTH MOTION TO AMEND AND/OR SUPPLEMENT PROPOSED CONTENTION NO. 5 (SHIELD BUILDING CRACKING)*, First Energy Nuclear Operating Company (Davis-Besse Nuclear Power Station, Unit 1), Docket No. 50-346-LR, July 23, 2012, pp. 22-23, ML12205A507.

³³FENOC's RAI Letter, July 3, 2014, Enclosure L-14-224, p. 7/8 (p. 13/14 on pdf counter).

In late December 2002, the NRC OIG warned that FENOC had put profits ahead of safety at Davis-Besse. The OIG reported that also NRC was guilty of allowing this at the very highest levels of the agency. Certainly FENOC should not be allowed to again place its profits ahead of public safety, as by being allowed to operate Davis-Besse for 20 additional years with a Shield Building of dubious structural integrity and functionality.

WHEREFORE, Petitioners pray the Atomic Safety and Licensing Board panel admit Contention 7 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 during a meet-and-confer phone conference on September 2, 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**

In the Matter of:	)	Docket No. 50-346-L
FirstEnergy Nuclear Operating Company	)	September 2, 2014
Davis-Besse Nuclear Power Station, Unit 1)	
)	

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing INTERVENORS' MOTION FOR ADMISSION OF 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 2nd 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

**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:

. . . Intervenor 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, Intervenor 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 Intervenor 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. Intervenors 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 Intervenors' 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 Intervenors' 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%20COMPLET%20supp%20crack%20concrete%20containment%20contention%20July%2016%202012.pdf>

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

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

(Emphasis supplied). Intervenor 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.

"Intervenor's Motion to Amend and Supplement Proposed Contention No. 5 (Shield Building Cracking)" at 12.

Intervenor 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 Intervenor's challenges about cracking outside the scope of this proceeding. As Intervenor 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 Intervenors 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 Intervenors, 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, Intervenors, 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 Intervenors 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 Intervenors' 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), Intervenors 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).

Legalistically, 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; Intervenors 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

**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	)	October 10, 2014
Davis-Besse Nuclear Power Station, Unit 1)	
)	
)	

**INTERVENORS' REPLY IN SUPPORT OF 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 reply in support of their "Motion to Amend and Supplement Contention No. 7 on Worsening Shield Building Cracking and Inadequate AMPs in Shield Building Monitoring Program." Specifically, Intervenor herein respond to "FENOC's Answer Opposing Admission of Intervenor's Original and Amended Contention No. 7" of FirstEnergy Nuclear Operating Company ("FENOC Answer") and the "NRC Staff's Answer to Intervenor's Motion for Admission of Contention No. 7 on Worsening Shield Building Cracking and Inadequate AMPs in Shield Building Monitoring Program" ("Staff Answer") filed by the NRC Staff.

A. Reply to NRC's claimed lack of new and materially different information

The Staff misleadingly maintains that "Intervenor have not shown that Contention 7 is based on new and materially different information." Staff Answer at 16. It is clear that the Shield

Building problems of today are cumulatively and causally different from those identified in 2011-2012. FENOC acknowledges that a significant mistake was made by painting the Shield Building, which has blocked the release of moisture from the outer 10" of concrete of the Shield Building. As a consequence, the Shield Building wall is saturated. And each time its walls freeze, another 0.4 to 0.7 inches of crack growth occurs on each and every crack, FENOC has now admitted, due to ice-wedging crack propagation.

Additionally, FENOC's consultant, Performance Improvement International ("PII"), has acknowledged more than one cause of the cracking, and now agrees that not all cracks are visible to the naked eye. The latest, "apparent" root cause pronounced by PII - "ice-wedging" cracking propagation - clearly identifies the Shield Building cracking as aging-related. Consequently the Licensing Board may now juristically accept that there is ongoing structural degradation of the Shield Building which will require monitoring, mitigation, intrusive investigation and analysis for years to come, well into the 20-year license extension period. There surely is new information which should make a material difference in the ASLB's assessment of Contention 7's suitability for admission into this proceeding.

Intervenors remind the Board that PII's September 11, 2013 "FACE" - "Full Apparent Cause Evaluation," and the ascertainment of water saturating the Shield Building, which in turn causes ice-wedging and more cracking, are "new" facts to Intervenors, and also that this critical information was kept from public view as to the saturation problem for two (2) years; and as to the differential root cause, until July 2014. This four-year-old LRA adjudication is near its close, and it is oddly coincidental that two significant Shield Building discoveries were not divulged to the public, particularly in light of Beyond Nuclear's standing FOIA request for information to the

NRC Staff which dates to 2012. This new engineering evidence suggests that Shield Building cracking continues to threaten the continued viability and usefulness of the structure itself, sufficient to add to the serious questions about granting a 20-year extension of Davis-Besse's operating license.

A. The Shield Building Purposes

The NRC Staff maintains that the Shield Building exists to protect the nuclear reactor inside it from accidents originating from outside. Staff Answer at 5. But the building also has an "Emergency Ventilation System" through which radioactive vapors and volatile particulates would be deliberately allowed to flow into the outside biosphere in the event of a nuclear reactor accident and an accompanying pressure buildup within the reactor containment structure. The Staff asserts that the steel containment vessel inside the Shield Building protects the outside environment from radiation inside the reactor. *Id.* Nonetheless, the Shield Building fills a role in protecting the external environment from radiation leakage, as well as shielding the reactor from external threats. This is a 30-inch-thick, rebar-reinforced, huge cylindrical structure; trivialization of its functions belies the reasons it exists.

The Shield Building also is supposed to serve as a "biological shield," both during normal operations, and during accident conditions. This means that the building provides biota, which includes human beings, from penetrating radioactivity, such as neutrons and gamma radiation, by serving as radiation shielding to the external environment.

B. Ice-Wedging Is New, Not Old, News

The NRC Staff Answer rationalizes that "the Shield Building Monitoring AMP explicitly indicated that it would examine potential aging mechanisms related to freezing of water that has

permeated the concrete structure, corrosion of the rebar, and coating effectiveness,” and that a cracking phenomenon called “ice-wedging” has, consequently, been identified. Staff Answer at 18.

The Staff’s Answer implies that this new, materially different information is neither of those things. But ice-wedging has been identified as the result of the act of painting the Shield Building, which has caused the water saturation of the outer 10" of concrete and so ice is a new, maybe even premier, cause of cracking propagation. Perhaps the Staff knew this two years ago when FENOC discovered the apparently unforeseen saturation problem (and did not mention it publicly for that entire period) , but ice-wedging is new and materially different from the public understanding hitherto, since it was disclosed to the public only in July 2014: PII concluded in its “Full Apparent Cause Evaluation” (hereinafter “FACE”), included with FENOC’s RAI response letter dated July 3, 2014¹ 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. That is “new and materially different information.” 10 C.F.R. § 2.309(f)(2). While the NRC Staff pillories Intervenors for pressing to have a legal say in the scope, methods and approaches of the Shield Building Monitoring Aging Management Plan (“AMP”), the Staff admits that “the Shield Building Monitoring AMP, as modified by FENOC’s July 3, 2014 submittal, *still indicates that it will identify and/or examine potential aging mechanisms.*” (Emphasis added). So the Staff and FENOC presently (and finally) acknowledge

¹NRC ADAMS No. ML14189A452.

that the cracking problem is not isolated, nor discretely solved.

The Staff does not comprehend that the years of recurring incompetence and denial manifest in Davis-Besse's structural, safety, and facilities management inadequacy crises - where there repeatedly are incompetent responses and a lack of candor with the public, coupled with utility and/or agency minimizations of the scope, causation and safety significance of the particular crisis - have undermined public confidence that there are genuine, "reasonable assurances" that the plant can continue to function safely for 20 more years.

C. Calling Cracking a 'Current Operating Concern' Is a Diversionary Conceit

Repeatedly, the Staff scores Intervenor for transmuted what the Staff calls "current operating concerns" about the Shield Building into a longer-term problem. The Staff offers this conclusion:

[T]he operation of Davis-Besse from now through April 22, 2017 is a current operating issue, not a license renewal issue. Likewise, the ability of the shield building to perform its intended function is a current licensing issue, not an issue unique to license renewal. Similarly, Intervenor's claims about the structural integrity of the shield building are an out-of-scope current operating issue.

And so the Staff argument fragments the evidence of the fragmenting Shield Building, atomizing the facts to argue that there is nothing remarkable about a unique engineering challenge that could become a structural catastrophe, the root cause(s) of which are still evolving and being investigated. Ongoing cracking, unremedied by the act of painting the Shield Building, is now believed to have, in reality, been exacerbated by it. There is water in the walls of the building, as revealed in investigatory core bore holes, which promises to cause more "ice-wedging," hence more cracking. This is today's problem, but when it persists into the first day of a 20-year extension on April 23, 2017, FENOC and the Staff will claim that waterlogging and

associated crack propagation is a “current” problem while the Shield Building cracking persists, unresolved, for decades. The current timeline for resolution requires years of monitoring of only limited, targeted parts of the Shield Building to discern whether the cracking - which PII findings suggest will continue, actually continues. Though FENOC and the NRC Staff no longer insist that the cracking problem has been “solved,” the Staff clings to the view that recurring cracking phenomena do not indicate long-term deterioration nor raise structural concerns. Yet FENOC’s creation of AMPs for the Shield Building recognizes that these “current operating concerns” are destined to remain “current concerns” throughout the 20-year extension period. Water buildup may have been a “current operating concern” when saturation of the outer 10" of concrete was discovered two years ago; but at some point it is chronic and challenges FENOC’s ability to meet the CLB expectations during the license extension period of 2017-2037.

D. ‘Relitigation’ of Contentions 5 and 6

1. Contention 7 Lays the Foundation of Information On Cracking Using Contentions 5 and 6

In its critique of the supposed untimeliness of Contention 7’s filing, the NRC Staff incessantly suggests that Intervenors are merely trying to “rehash” and “relitigate” Contentions 5 and 6. Contention 5 was the 2012 series of motion compilations Intervenors filed on Shield Building cracking, based on FOIA documents provided Intervenors.² Contention 6 was the 2014 challenge Intervenors brought, alleging concrete voids and rebar defects caused during the 2011 sealing up of the Shield Building and the new breach in late winter 2014. *See* Staff Answer at

²The initial contention filing was on Jan. 10, 2012. The first supplement, on Feb. 27, 2012, was in response to FENOC’s Blizzard of 1978 root cause report. The second supplement, of June 4, 2012, was in response to FENOC’s initial SB AMP. The next three supplements, on July 16, July 23, and August 16, were based on NRC’s FOIA response.

14, 16, 25-26 (“rehash”); 3, 11, 55-59 (“relitigate”). The rehash/relitigate mantra is the Staff’s attempt to negate Intervenor’s logical presentation of history - FENOC’s cracking denial, Staff and Utility misinforming of the public, and FENOC’s bungled remediation, for example. An understanding of this history is prerequisite to analysis of new cracking discoveries, new, now “apparent,” root causes, and the belated insights acquired by FENOC and the NRC Staff once denial of the true nature and extent of the cracking problems proved to be a poor approach.

Incorporation by reference is a common, efficient means of creating a record on which to litigate. Rule 10(c) of the Federal Rules of Civil Procedure, which are constantly looked to by the NRC for procedural guidance,³ states that “A statement in a pleading may be adopted by

³F.R.C.P. authorities and court decisions pertaining to Rule 26 of the Federal Rules of Civil Procedure provide appropriate guidelines for interpreting NRC discovery rules. *Allied- General Nuclear Services* (Barnwell Fuel Receiving and Storage Station), LBP-77-13, 5 NRC 489 (1977); *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 & 2), LBP-83-17, 17 NRC 490, 494-95 (1983), citing *Toledo Edison Co.* (Davis-Besse Nuclear Power Station), ALAB-300, 2 NRC 752, 760 (1975).

If there is no NRC rule that parallels a Federal Rule of Civil Procedure, the Board is not restricted from applying the Federal Rule. While the Commission may have chosen to adopt only some of the Federal Rules of Practice to apply to all cases, it need not be inferred that the Commission intended to preclude a Licensing Board from following the guidance of the Federal Rules and decisions in a specific case where there is no parallel NRC rule and where that guidance results in a fair determination of an issue. *Seabrook*, supra, 17 NRC at 497.

Where an NRC Rule of Practice is based on a Federal Rule of Civil Procedure, judicial interpretations of that Federal Rule can serve as guidance for the interpretation of the analogous rule. *Louisiana Energy Services* (Claiborne Enrichment Center), LBP-93-3, 37 NRC 64, 68-69 (1993) (citing *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 & 2), LBP-83-17, 17 NRC 490, 494-95 (1983)). See also *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), LBP-82-82, 16 NRC 1144, 1159-62 (1982).

The NRC’s standard for summary disposition in 10 C.F.R. § 2.710 is based upon the standard for summary judgment under Rule 56 of the Federal Rules of Civil Procedure. *Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC ____ (March 26, 2010) (slip op. at 11-12). Decisions arising under the Federal Rules may serve as guidelines to Licensing Boards in applying 10 C.F.R. § 2.710 (formerly § 2.749). *Dairyland Power Coop.* (La Crosse Boiling Water Reactor), LBP-82-58, 16 NRC 512, 519 (1982), citing *Cleveland Elec. Illuminating Co.* (Perry Nuclear Power Plant, Units 1 & 2), ALAB-443, 6 NRC 741, 754 (1977); *Pub. Serv. Co. of N.H.* (Seabrook Station, Units 1 & 2), LBP-74-36, 7 AEC 877, 878-79 (1974). Subsequent decisions of Licensing Boards have analogized 10 C.F.R. § 2.710 (formerly § 2.749) to Rule 56 to the extent that the Rule applied in the cases in question. See, e.g., *Pub. Serv. Co. of Okla.* (Black Fox Station,

reference elsewhere in the same pleading or in any other pleading or motion.” Indeed, incorporation by reference is explicitly recognized in the NRC’s procedural regulations. See 10 CFR § 30.32(a) (“Information contained in previous applications, statements or reports filed with the Commission or the Atomic Energy Commission may be incorporated by reference, provided that the reference is clear and specific”); *see, also*, 10 CFR 70.21(A)(3) (“Information contained in previous applications, statements, or reports filed with the Commission may be incorporated by reference if the references are clear and specific”).

2. There is No Res Judicata Effect Implicit in the
ASLB Rejection of Contentions 5 and 6

The NRC Staff appears to be arguing something akin to the bar of *res judicata* - that since Contentions 5 and 6 dealt with shield building cracking, and both were decided against Inter-venors, the question of Shield Building cracking may not be raised ever again in this proceeding, even in the face of new and troubling information about the cracking which has portents for the license extension period. Notably, the Staff does not directly assert the bar of *res judicata*, but relies instead on innuendo. *Res judicata* does not attach when the foundation for a proposed action arises after the prior ruling advanced as the basis for *res judicata*. *Pub. Serv. Co. of N.H.* (Seabrook Station, Units 1 & 2), ALAB-349, 4 NRC 235 (1976). Collateral estoppel precludes relitigation of issues of law or fact which have been finally adjudicated by a tribunal of compe-

Units 1 & 2), ALAB-573, 10 NRC 775, 787 n.51 (1978); *Gulf States Util. Co.* (River Bend Station, Units 1 & 2), LBP-75-10, 1 NRC 246, 247 (1975); *Seabrook*, LBP-74-36, 7 AEC at 878; *Entergy Nuclear Vermont Yankee, L.L.C.* (Vermont Yankee Nuclear Power Station), LBP-06-5, 63 NRC 116, 121 (2006), *citing Advanced Med. Sys., Inc.* (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 102 (1993). It has long been held that federal court decisions interpreting and applying like provisions of Rule 56 are appropriate precedent for the Commission’s rules. *Safety Light Corp.* (Bloomsburg Site Decommissioning and License Renewal Denials), LBP-95-9, 41 NRC 412, 449 n. 167 (1995) *citing Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986); *Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-05-4, 61 NRC 71, 79 (2005).

tent jurisdiction. *Toledo Edison Co.* (Davis-Besse Nuclear Power Station, Units 1, 2, & 3), ALAB-378, 5 NRC 557, 561 (1977); *Alabama Power Co.* (Joseph M. Farley Nuclear Plant, Units 1 & 2), ALAB-182, 7 AEC 210, *remanded on other grounds*, CLI-74-12, 7 AEC 212 (1974).

Moreover, *res judicata* need not be applied by an administrative agency where there are overriding public policy interests which favor relitigation. *U.S. Dept. of Energy, Project Mgmt. Corp., Tenn. Valley Auth.* (Clinch River Breeder Reactor Plant), CLI-82-23, 16 NRC 412, 420 (1982), *citing Int'l Harvester Co. v. Occupational Safety & Health Review Comm'n*, 628 F.2d 982, 986 (7th Cir. 1980); *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-02-20, 56 NRC 169, 182 (2002). When an agency decision involves substantial policy issues, an agency's need for flexibility outweighs the need for repose provided by the principle of *res judicata*. *Clinch River, supra*, 16 NRC at 420, *citing Maxwell v. NLRB*, 414 F.2d 477, 479 (6th Cir. 1969); *FTC v. Texaco*, 555 F.2d 867, 881 (D.C. Cir. 1977), *cert. denied*, 431 U.S. 974 (1977), *reh'g denied*, 434 U.S. 883 (1977). An agency must be free to consider changes that occur in the way it perceives the facts, even though the objective circumstances remain unchanged. *Clinch River*, CLI-82-23, 16 NRC at 420, *citing Maxwell*, 414 F.2d at 479; *Texaco*, 555 F.2d at 874.

Where circumstances have changed (as to context or law, burden of proof or material facts) from when the issues were formerly litigated or where public interest calls for relitigation of issues, neither collateral estoppel nor *res judicata* applies. *Farley, supra*, ALAB-182, 7 AEC at 203; *Duke Power Co.* (William B. McGuire Nuclear Station, Units 1 & 2), LBP-77-20, 5 NRC 680 (1977); *Gen. Pub. Util. Nuclear Corp.* (Three Mile Island Nuclear Station, Unit 1), LBP-86-10, 23 NRC 283, 286 (1986); *Toledo Edison Co.* (Perry Nuclear Power Plant, Unit 1; Davis-

Besse Nuclear Power Station, Unit 1), LBP-92-32, 36 NRC 269, 285 (1992), *aff'd on other grounds, City of Cleveland v. NRC*, 68 F.3d 1361(D.C. Cir. 1995); *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-04-27, 61 NRC 145, 154 (2004).

E. 'Good Cause' Exists for the Contention Filing on September 8

The Staff makes a great deal out of the supposed lack of "good cause" for what it calls a late filing (Staff Answer at 24-27). At Staff Answer p. 24, the NRC Staff launches the surprising argument that "Intervenors' proposed Contention 7 should be dismissed because Intervenors have not successfully challenged the Shield Building Monitoring AMP without these enhancements." The Staff maintains that "Intervenors failed to adequately challenge the Shield Building Monitoring AMP when it was first introduced," and cite *Amergen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-09-7, 69 NRC 235 (2009) ("*Oyster Creek*") as support. The Staff somehow missed the six filings on Davis-Besse Shield Building cracking tendered by Intervenors in 2012, some of which alleged specific deficiencies with the AMP. The Staff fails fatally to explain how Intervenors failed of their "regulatory obligation to challenge" the AMP in their first round of Shield Building challenges in 2012. The flaw in the Staff's argument is that Intervenors filed six motions and memoranda consisting of some 200 pages of factual recitation along with argument. Intervenors also filed dozens of pages of exhibits on which they relied in their six Shield Building motions.

Intervenors definitely took advantage of earlier information and opportunities to challenge the Shield Building AMPs (which Intervenors most certainly did, repeatedly, in 2012, most notably with "Intervenors' Motion to Amend and Supplement Proposed Contention No. 5

(Shield Building Cracking)” (June 4, 2012).⁴

The Staff also claims that there was no new information cited by Intervenor. However, the “new information” Intervenor included in their September 2014 filings included the hitherto-unknown information about the water saturation of the outer 10" of Shield Building Concrete and the new, improved root cause findings, information which was concealed or withheld from public accessibility by FENOC (and perhaps the Staff) for two years, and for 9 months, respectively.

The availability of new information provides good cause for late intervention. The test is when the information became available and when the petitioner reasonably should have become aware of the information. The petitioner must establish that (1) the information is new and could not have been presented earlier, and (2) the petitioner acted promptly after learning of the new information. *Texas Utils. Elec. Co.* (Comanche Peak Steam Electric Station, Units 1 & 2), CLI-92-12, 36 NRC 62, 69-73 (1992). *See Texas Utils. Elec. Co.* (Comanche Peak Steam Electric Station, Unit 2), CLI-93-4, 37 NRC 156, 164-65 (1993); *Amergen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), LBP-06-22, 64 NRC 229, 234 (2006); *Crow Butte Res., Inc.* (North Trend Expansion Project), LBP-08-6, 67 NRC 241 (2008).

By filing within the 60 days following discovery of the existence of this momentous new information, the Staff’s suggestion of untimeliness is a bit galling, since it was FENOC’s counsel who expressly brought the FACE to the ASLB’s and Intervenor’s attention. Obviously FENOC considered the information to be new and important, to have gone to the trouble of expressly

⁴<http://www.beyondnuclear.org/storage/June%204%202012%20Motn%20to%20Amend%20Supp%20Contn%205%20COMPLETE-1.pdf>

transmitting it to the ASLB.

**F. The More Serious Potention Shutdown Is Not of the Reactor,
But of Criticism of Current CLB Arrangements**

At page 52 of the Staff Answer, the NRC Staff questionably pronounces that "If the shield building was not operable, *then the plant must shut down* and correct the problem to operate," citing 10 C.F.R. § 54.30 as authority. (Emphasis supplied). But § 54.30 says nothing about shutting down a licensed, operating facility. Instead, it protects licensees from criticism or legal challenges during the current license period related to the licensee's efforts to return the reactor to its current licensing basis (CLB) before the 2017 effect date of Davis-Besse's license renewal.⁵ The NRC Staff has difficulty imposing a regime of faithful CLB adherence by FENOC. In 2002, the NRC Staff Director declined to order the shutdown of a bulging, dangerously close-to-rupturing reactor head at Davis-Besse which NRC Staff engineers had assessed was in a dangerous state. The historic record of Davis-Besse CLB noncompliance oversight by the Staff simply does not exist. The Staff has ignored the advice of its own engineers, witness the NRC Inspection Report covering the period December 1, 2011 through May 9, 2012, referenced in Intervenor's initial filings as an internal (Riley) email; the NRC Staff confirmed that the Shield Building cracking meant that the building failed to meet its licensing basis:

⁵ § 54.30 states: "(a) If the reviews required by § 54.21 (a) or (c) show that there is not reasonable assurance during the current license term that licensed activities will be conducted in accordance with the CLB, then the licensee shall take measures under its current license, as appropriate, to ensure that the intended function of those systems, structures or components will be maintained in accordance with the CLB throughout the term of its current license.

(b) The licensee's compliance with the obligation under Paragraph (a) of this section to take measures under its current license is not within the scope of the license renewal review."

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.

(Emphasis added). ADAMS no. ML12173A023. Other evidence of the Shield Building's CLB noncompliance⁶ includes:

> Document B/23 [11/17/11; Davis-Besse Containment System Primary Steel Containment and Shield Building. (1 page)], at p. 28/101 on .pdf counter, which 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. Intervenors 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 Intervenors' 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 states: "The licensee is using numerous assumptions in his summary report and calculations that are not described in the UFSAR and

⁶Intervenors cited this information in their initial Contention 7 filings; it first appeared in "Intervenors' Fifth Motion To Amend and/or Supplement Proposed Contention No. 5 (Shield Building Cracking)" (August 16, 2012).

ACI 318-63, and still calls it a design basis calculation. Can the licensee provide justification for this approach.”

> From Intervenors’ 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 Intervenors’ 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 66/101 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, a Staff engineer well familiar with the cracking problem and the uses for which the Shield Building exists, 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.”

While the above observations were comments about Davis-Besse’s current (pre-April 22, 2017) CLB compliance, management of the effects of aging during the 2017-2037 license extension period at Davis-Besse must “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 [must be] in accord with the

Act and the Commission's regulations." 10 C.F.R. § 54.29.⁷ Instead, FENOC and the NRC Staff have made conjectural arrangements commencing in 2017 to be predicated upon information learned about the cracking which FirstEnergy has not yet identified (much less absorbed).

A commitment to develop a program - and FENOC has only a plan to have a plan by the time the 20-year extension begins - does not demonstrate that the effects of aging will be adequately managed. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 & 3), LBP-08-13, 68 NRC 43, 86 (2008). Notwithstanding the NRC Staff's and FENOC's insistence that current response activities to the cracking are irrelevant, the "reasonable assurance" findings required by 10 C.F.R. § 54.29(a) are founded upon past, present and future actions - actions that "have been or will be taken." *Entergy Nuclear Vermont Yankee, LLC and Energy Nuclear Operations, Inc.*, (Vermont Yankee Nuclear Power Station) CLI-10-17, 71 NRC ____ (July 8, 2010) (slip op. 44). Perhaps the Staff and FENOC argue so vigorously that the Board may not look at actions that "have been . . . taken" because the present arrangements lack credibility. After all, issues of root cause, the degree of investigation to yield adequate information, the prospective monitoring needed to understand the condition of the Shield

⁷ 10 C.F.R. § 54.29 states: "A renewed license may be issued 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); and

(2) time-limited aging analyses that have been identified to require review under § 54.21(c);

(b) Any applicable requirements of Subpart A of 10 CFR Part 51 have been satisfied.

(c) Any matters raised under § 2.335 have been addressed.

Building, and what is necessary to remediate past cracking - these questions are either not answered sufficiently, or are going completely unasked, or implementation has been bungled badly.

For those structures, systems and components ("SSCs") subject to aging management review that are not current licensing basis (CLB) issues, evidence of proposed inspection and monitoring details comes before the ASLB only insofar as they may be necessary to demonstrate that the applicant's AMP does or does not achieve the desired goal of providing assurance that the intended function of relevant SSCs discussed herein will be maintained for the license renewal period. *Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations Inc.* (Vermont Yankee Nuclear Power Station), LBP-08-25, 68NRC 763, 786 (2008); *Entergy Nuclear Operations, Inc. (Indian Point Nuclear Generating Units 2 & 3)*, LBP-08-13, 68 NRC 43, 81 (2008). But Davis-Besse poses CLB issues, which makes the converse true: Contention 7 must be adjudicated by the Board, not as a determination of the adequacy of present CLB activities, but to ascertain whether there is reasonable assurance that the present CLB efforts will tandem into the obligatory Shield Building CLB activities of 2017-2037.

Whether Davis-Besse's Shield Building meets its CLB is a source of much controversy. Although Intervenors may not question within this license renewal proceeding FENOC's day-to-day attempts at CLB compliance between now and April 22, 2017, the Board nonetheless is constrained to note the dubious CLB compliance situation today (actions that "have been . . . taken" per 10 C.F.R. § 54.29(a)) in developing the factual foundation for the determination it must make concerning whether FENOC has demonstrated the requisite "reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance

with the CLB. . . .” The Shield Building is decades beyond status as a pristine structure, and its cracking was exacerbated over the past two years by the decision to paint the building, 40 years too late, in 2012. FENOC has learned in only the past two years that the outer concrete is water-saturated, 10" deep. FENOC now recognizes ice-wedging as a new, additional root cause of cracking - and it was prompted by the supposedly remedial paint job. Despite this troubling major new development, all FENOC offers by way of aging management response is to undertake 23 core bores (3 more than postulated in 2012, and drilled into presumably saturated concrete where the saturation was caused by painting). Further, visual inspections to identify cracking (including, one supposes, cracking not visible to the unaided eye) are to be undertaken annually only until 2018. The core borings will be taken adjacent to presently-identified cracking, and not more randomly, especially in areas where cracking has not been assayed in scientific depth. FENOC continues to evade the major project of conducting a structure-wide assessment which is essential to having as complete an understanding as possible of the extent of cracking damage from multiple root causes, in multiple locations, with synergistic effects on the SB's structural integrity and ability to meet its design safety functions. FENOC persists in evasion and denial despite mounting evidence that earlier root cause analysis has been speculative and incomplete, and after learning that the paint job to erase the effects of the Blizzard of '78 has, to the contrary, created an entirely new contributing cause to the cracking.

Even FENOC's consultant, PII, postulates that the when Shield Building exterior walls freeze during the winter season, another 0.4 to 0.7 inches of circumferential ice-wedging crack spreading takes place. This aging-related problem is all new; the original, February 2012 Root Cause Analysis predicted *no* worsening of the then-known cracks. The prediction is now

completely the opposite: the crackig will get worse with each winter freeze-thaw cycle. Yet FENOC offers no AMP-based remediation, but instead, only observation and investigation. While FENOC and the Staff share the Staff's view (Staff Answer at 20) that "the root cause of the laminar cracking has not changed," what *has* changed is FENOC's position on crack propagation. The July 2014 "apparent cause" revelations are significant inforation because PII provides a new root cause explanation of crack propagation, and its significance (10.8 inches per year of new growth). Also, the FACE contains an explicit admission of micro-cracking, thanks to belated electron scan microscope testing, along with the associated, implicit admission that ice-wedging crack propagation will occur in the micro-cracks as well. This type of crack propagation was predicted by Intervenors in 2012, without the benefit of electron scan microscopes.

The FACE evaluation - the new, improved, "apparent" cause, circulated in July 2014 to the Board and Intervenors, amounts to a set of expert opinions which buttress Intervenors' position that "reasonable assurance" is missing. FENOC's 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, remain inadequate. Significantly more core bores, as well as a broader diversity of complementary testing methods, are prerequisites to a finding of adequate assurance at this late date. 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. .

CONCLUSION

The threshold admissibility requirements of NRC's contention rule should not be turned into a "fortress to deny intervention." *Power Authority of the State of New York, et al.* (James FitzPatrick Nuclear Power Plant; Indian Point Nuclear Generating Unit 3), CLI-00-22, 52 NRC 266, 295 (2000); *Matter of Duke Energy Corp.* (Oconee Nuclear Power Plant), CLI-99-11, 49 NRC 328, 335 (1999) (quoting *Philadelphia Elec. Co.* (Peach Bottom Atomic Power Station, Units 2 and 3), 8 AEC 13, 20-21 (1974), *rev'd in part*, CLI-74-32, 8 AEC 217 (1974), *rev'd in part*, *York Committee for a Safe Environment v. N.R.C.*, 527 F.2d 812 (D.C. Cir. 1975)). There is no requirement that the petitioners' substantive case be made at the contention stage. *Matter of Entergy Nuclear Generation Co., et al.* (Pilgrim Nuclear Power Station), 50-293-LR (ASLB Oct. 16, 2006), 2006 WL 4801142 at (NRC) 85 (quoting *Oconee*, 49 NRC at 342).

The Commission has explained that the requirement at § 2.309(f)(1)(v) "does not call upon the intervenor to make its case at [the contention] stage of the proceeding, but rather to indicate what facts or expert opinions, be it one fact or opinion or many, of which it is aware at that point in time which provide the basis for its contention." *Pilgrim* at 84. Undeniably, a petitioner does not have to provide a complete or final list of its experts or evidence or prove the merits of its contention at the admissibility stage. And, as with a summary disposition motion, the support for a contention may be viewed in a light that is favorable to the petitioner, so long as the admissibility requirements are found to have been met. The admissibility requirement "generally is fulfilled when the sponsor of an otherwise acceptable contention provides a brief recitation of the factors underlying the contention or references to documents and texts that provide such reasons." *Id.*

One final observation: The date of filing of this memorandum, October 10, 2014, marks the Third (3rd) Anniversary of the discovery of Shield Building cracking. FENOC's, the NRC's and ultimately, the public's, understanding of its causes and its remediation continue to marinate in uncertainty. FENOC has not articulated the stuff of "reasonable assurance," and Intervenor urge the ASLB to admit Contention 7 to this proceeding so that they may prove that there is none.

WHEREFORE, Petitioners pray the Atomic Safety and Licensing Board panel allow the amendments and supplementation as explained above, 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 Intervenor

**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	)	October 10, 2014
Davis-Besse Nuclear Power Station, Unit 1)	
)	

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing "INTERVENORS' REPLY IN SUPPORT OF 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 10th day of October, 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

**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	)	December 30, 2014
Davis-Besse Nuclear Power Station, Unit 1)	
)	

**INTERVENORS' SECOND MOTION TO 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 for a second time 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 amended their contention with the filing on September 8, 2014 of "Intervenors' Motion to Amend and Supplement Contention No. 7 on Worsening Shield Building Cracking and Inadequate AMPs in Shield Building Monitoring Program." That amended contention remains the same and reads 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.

Intervenors hereby supplement their Contention No. 7 by bringing to the attention of the Atomic Safety and Licensing Board certain criticisms of FENOC's proposed monitoring of rebar deterioration in the Shield Building, which Intervenors link to the other weaknesses of Aging

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").

Management Plans (AMPs) for that structure.

BACKGROUND

In LBP-12-27 (December 28, 2012), the Atomic Safety and Licensing Board rejected Intervenor's Contention 5 and its associated amending and supplemental filings, by which Intervenor sought consideration of widespread laminar cracking and other concrete cracking and damage in the Shield Building walls to be viewed as aging-related problems falling within the parameters of this license renewal proceeding. The ASLB said in its ruling:

. . . Intervenor 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. ***Intervenor 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, Intervenor's formerly "bare assertions" were clothed with a distinct change of position of FENOC, which had finally conceded that significant mistakes were made in remediation and in understanding the implications of the cracking phenomena which were first noticed in 2011. FENOC's 2014 "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-3. So now, 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. There remain growing, not lessening, questions surrounding the basis for granting a 20-year extension of Davis-Besse's operating life.

Intervenors moved to amend Contention 7 via the aforementioned September 8, 2014 motion filing. 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, was the focus.

Intervenors brought to the ASLB's attention in that filing that water is saturating the shield building walls and that FENOC has not adequately considered the sources of it. FENOC's consultant, Performance Improvement International ("PII"), reported in the FACE that there is water saturating the Shield Building concrete at 10 inches of depth. FACE, p. 34/98 of .pdf. PII concluded that coating the outer walls of the Davis-Besse Shield Building has "prevented a finite amount of moisture from leaving the structure," which will contribute to the water accumulation mechanism required for Ice-Wedging for some time to come. *Id.* at 35/98 of .pdf. The FACE also revealed that a Scanning Electron Microscope (SEM) revealed the presence of microcracks in concrete bore samples. FACE at 34/98 of .pdf. 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 maximum microcrack density is near the outermost layer of the concrete (within the first 2 in). *Id.* The presence of excess water was confirmed and is indisputable. *Id.* A high content of salt was identified within the structure's

²NRC ADAMS No. ML14184B184.

walls and credited for having 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 was noted as having 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.

As Intervenors had warned in 2012, the whitewashing of the Shield Building has now locked the water in the walls. Every time it freezes, another 0.4 to 0.7 inches of circumferential ice-wedging crack spreading takes place, which is aging-related and worsens with each winter freeze-thaw cycle. PII concluded in the FACE that “the [exterior Shield Building] coating has. . . locked in moisture or water existing in the structure prior to the coating.” FACE, p. 41/98 of pdf. PII observed that “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, ruefully acknowledging that “the belief was that had the water come from inside of the shield building, the amounts discovered were small

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.”

enough to present no adverse effect to the shield building.” FACE, p. 63/98 of .pdf.

The Intervenor also pointed out in their September 8 Motion that FENOC’s inaction on identifying and ameliorating the cracking is not an effective response. The FACE recommended merely “monitoring the crack propagation condition.” FACE, p. 66/98 of .pdf. This left in place FENOC’s policy of opposing repairs of small exterior cracks in the belief that the October 2012 application of shield building coating would prevent subsequent water intrusion while ignoring the potential for new outer-wall cracks as fissures to continue to foster water intrusion. *Id.*, 40/98 of .pdf. Davis-Besse’s maintenance rule manual states that cracks 1/16" or less do not need to be repaired. *Id.*

In 2012, Intervenor sought 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 that there may be micro-cracking. Two years of concealment of the presence of increased water concentrations in the Shield Building walls from 2012 to 2014, which extended through the uniquely severe winter of 2013-2014, has almost certainly worsened the spread of cracking. PIT’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.

I. NEWLY-DISCOVERED SUPPLEMENTAL FACTS

FENOC’s October 28, 2014 “Reply to Request for Additional Information for the Review of the Davis-Besse Nuclear Power Station, Unit No. 1, License Renewal Application,” which was provided to the ASLB by FENOC on October 29, 2014, is the source of the additional facts with which Intervenor propose to supplement Contention No. 7. The October 28 letter will

hereinafter be called "RAI Responses".

A. Dangerous Denial of Extent of Cracking Propagation

In its "RESPONSE RAI B.2.3-5 (follow-up)," FENOC states "*Crack perimeters were identified to be slowly expanding or propagating* during routine long term monitoring inspections in 2013." (Point #1, Timothy Matthews, Morgan Lewis, on behalf of FENOC, to ASLBP, p. 6/12 on .pdf counter). (Emphasis added). FENOC is suffering from a dangerous denial of the significance of the cracking propagation. Previously, FENOC and NRC staff pointedly denied that cracking propagation was even possible. Intervenor's disputed such optimistic assumptions and wishful thinking in numerous cracking contentions filed throughout 2012. FENOC could no longer deny it, after observing cracking propagation in August-September, 2013. The very belated root cause analysis regarding the cracking propagation, released in July 2014, was the basis for Intervenor's latest previous contention.

It appears now that FENOC has resorted to denying, not the existence of cracking propagation, but rather its significance. FirstEnergy asserts that the "Crack perimeters were identified to be *slowly expanding or propagating...*". But 0.4 to 0.7 inches of cracking propagation each and every time it freezes at Davis-Besse is a remarkably *fast* rate, portending functional and structural failure sooner rather than later.

At p.9/12 of the .pdf, FENOC cites the NRC Staff's own minimization of the significance of the cracking propagation. In its "Question RAI B.2.43-6 (follow-up)...Issue," when it describes the "existing *potentially* propagating laminar cracks..." (emphasis added) As cited by Intervenor's in previous 2014 contention filings, FENOC belatedly admitted in July 2014 that the laminar cracks are not "potentially" propagating, they are *in fact* propagating, 0.4" to 0.7" every

time the Shield Building freezes. This high cracking rate raises deep concern about the functional capability and structural integrity of the Shield Building for the next 22.5 years.

B. Air and Water Infiltration of the Shield Building Wall

However, the NRC Staff's main point is apt. Staff warns "The presence of water and air trapped within the existing potentially [*sic*] propagating laminar cracks of the coated shield building wall increases the potential for corrosion of the adjacent rebar layers." The Staff "also noted in LRA Section 3.5.2.2.1.1 that the groundwater chemistry at the Davis-Besse site is considered to be aggressive (*i.e.*, chlorides = 2,870 ppm (max) and sulfates = 1,700 ppm (max)) which may also be indicative that the shield building is or has been exposed to potentially aggressive (high chloride content) air-outdoor environment that favors potential for rebar corrosion." RAI Responses, p. 9/12 of .pdf. The Staff requested "additional technical justification and basis regarding the AMP's justification of opportunistic inspections to monitor aging effects in the rebar located near the laminar cracking." *Id.*

NRC Staff expressly requested as follows:

Considering the plant-specific conditions of the shield building wall associated with existing laminar cracking that may propagate; presence of trapped water and air in the laminar cracks; and potentially aggressive environmental conditions; explain, with sufficient technical details and basis, the following:

1) How opportunistic inspection of rebar when exposed will adequately manage potential aging effects of rebar corrosion for rebar layers located near laminar cracking, or

2) Any modifications or enhancements that will be made to the Shield Building Monitoring Program or any other applicable AMP to address the staff's concern regarding the implementation of opportunistic inspection of rebar when exposed to manage potential aging effects of rebar corrosion for rebar layers located near laminar cracking.

Id. at 9-10/12 of .pdf. In response, FENOC asserted that no modifications or enhancements to Davis-Besse License Renewal Aging Management Programs are necessary, claiming that

opportunistic inspection will be adequate; that there will be no interaction between chemically aggressive groundwater and laminar cracking; that there is minimal corrosion of rebar due to the weather sealant precluding any additional moisture or oxygen; and that the water in the walls has high pH and thus is not "conducive to generate corrosion in the rebar." RAI Response p. 10/12 of .pdf. FENOC further stated:

Corrosion of rebar would result in visual indications such as staining, cracking and spalling on the exterior of the structure or in core bores that are located near rebar. These indications are aspects that are monitored under the Structures Monitoring Program to adequately manage aging of the structure, inclusive of potential rebar corrosion.

Id. at p. 11/12 of .pdf.

FENOC's responses to the NRC Staff's requests are severely wanting. The inadequacy of opportunistic visual inspection is clear from Davis-Besse's own recent operating experience: sub-surface laminar cracking of the Shield Building went undetected from 1978 to 2011 (33 years); the air void or wall gap in the Shield Building wall went undetected, despite extending 24 of 30 inches (80% of the way) through the Shield Building wall, from early December, 2011 to early 2014 (for over two years of full power operations).

FENOC's only opportunity to visually inspect rebar was during the October-November 2011 construction opening (after more than 30 years of operation). Reality dictates that only a very small fraction of the entire rebar skeleton of the Shield Building walls will be available, on an irregular and unpredictable basis, for opportunistic inspection.

Further, FENOC's conclusion of impossibility of water transporting from the ground into the Shield Building walls⁴ is not credible, if the Shield Building cracking extends down to the

⁴ "[P]ostulated scenarios of interaction between groundwater and the laminar cracking condition are not considered credible." RAI Responses at p. 10/12 of .pdf.

ground, creating a capillary action, or wicking mechanism, that creates a direct pathway for chemically aggressive groundwater to move up the shield building to corrode rebar. Besides, the only evidence FENOC has which indicates the cracking does not reach to the ground are impulse response tests from 2011 which are no longer credible.

Intervenors have previously in this proceeding identified other pathways for water (and hence air) infiltration into the Shield Building walls: a pathway from the ground up, via wicking or capillary action; cracks less than a certain size (1/16" in width) on the Shield Building exterior not being required to be sealed; a top-down pathway, via atmospheric precipitation deposition (rain, melting snow and ice) and infiltration; also, moisture can enter the Shield Building walls via the Inner Face, inside the SB, from the annulus, because that wall is not sealed. This last point begs the question, if the Inner Face is not sealed, how is air infiltration precluded?

At RAI Responses p.11/12 of .pdf, FENOC states "It was concluded that the water constituents were 'typical of water that was in contact with the concrete for a period of time.'" More specific information on the age of the water in the walls is needed to preclude the possible conclusion that the Outer Face weather sealant is not working, as well as to determine if other pathways (such as those mentioned immediately above) might be the source, either recently or on an ongoing basis.

On the same page, FENOC states "Water samples collected exhibited high pH values (average greater than 10). It is therefore documented that the "...water itself with salt and high pH is not conducive to generate corrosion in the rebar." Such optimistic assumptions by FENOC about high alkalinity protecting the rebar are suspect. *The Shield Building is not intact, but rather is severely cracked*, with propagating cracking that grows 0.4" to 0.7" every single time it

freezes. The more cracking that occurs, the more infiltration of moisture and oxygen which follows, all the way to the structural rebar. This is part of a vicious cycle of degradation that will ultimately lead to loss of safety function, and perhaps even collapse of Shield Building walls.

Intervenors have previously pointed out that there are ongoing water problems around the Shield Building foundation. In one of their 2012 filings on cracking, they stated:

Moreover, Davis-Besse has other water problems inside the shield building. 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." 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.

www.beyondnuclear.org/storage/June%204%202012%20Motn%20to%20Amend%20Supp%20Contn%205%20COMPLETE-1.pdf, p.12/16 of .pdf.

In another 2012 cracking filing, Intervenors asserted:

At its base, in the sand bed region, it has been exposed to standing water, "aggressive" groundwater containing dissolved chemicals that make it a high risk for corrosion, which in fact has been observed in that portion of the steel containment. But other areas of the steel containment have also exhibited corrosion, as towards the top, due to a corrosive boric acid leak from the refueling channel associated with the reactor cavity. A leak from the refueling channel would also likely contain tritium, itself highly corrosive to steel. This steel containment documented degradation makes its failure during an accident more likely.

<http://www.beyondnuclear.org/storage/FOIA%20Appendix%20B%20contention%20suppliment%208%2016%202012.pdf>, p.67/101 of .pdf.

FENOC denies the possibility of water infiltration upward through the Shield Building wall structures, and the potential for chloride-laden water vapor being found in concentrations

around the base of the building. Trivialization of the possibilities, without adequate investigation, is an unfortunate hallmark of the company's aging management of the Shield Building.

3. Disputed Corrosion-Inhibiting Alkalinity

As a result of the hydration reactions of cement, the pore solution of concrete tends to be alkaline, with pH values typically in the range 12.5-13.6. Under such alkaline conditions, reinforcing steel tends to passivate and display negligible corrosion rates. However, due to the porous nature of concrete, corrosive species and chemical species supporting corrosion reactions can enter the concrete and lead to corrosion problems. Furthermore, corrosive species can enter the mix if 'contaminated' mix ingredients are used (water, aggregates, additives). See Corrosion-Club.com (<http://www.corrosion-club.com/concretecorrosion.htm>), which states. "Corrosion damage to the reinforcing steel results in the build-up of voluminous corrosion products, generating internal stresses and subsequent cracking and spalling of the concrete...." *Id.* The fact is, reinforcing steel is more vulnerable to further corrosion damage after the protective concrete cover has been compromised.

Two important rebar corrosion mechanisms are chloride induced rebar corrosion and carbonation. *Id.* FENOC asserts that bore hole water with "average greater than 10" pH values are high enough to preclude significant rebar corrosion. However, the above Corrosion-Club citation indicates that a pH value of at least 12.5, or even higher, is needed to preclude rebar corrosion. Thus, it appears that FENOC's confidence level with the current situation is misplaced. Davis-Besse's Shield Building rebar appears to be quite vulnerable to worsening corrosion.

Regarding "chloride induced rebar corrosion," FENOC's admission that "the groundwater

chemistry at the Davis-Besse site is considered to be aggressive (*i.e.*, chlorides = 2,870 ppm (max)...) which may also be indicative that the shield building is or has been exposed to potentially aggressive (high chloride content) air-outdoor environment that favors potential for rebar corrosion,” the low pH value of somewhat more than 10 raises concern that the Davis-Besse Shield Building rebar is in fact very vulnerable to airborne or waterborne chloride-induced corrosion, despite FENOC’s assurances to the contrary.

Regarding the carbonation rebar corrosion mechanism, U.S. Representative Dennis Kucinich, citing an Oak Ridge National Laboratory report, pointed out the significance of carbonation vis-a-vis Davis-Besse’s Shield Building cracking in 2011. Intervenors cited Congressman Kucinich’s revelations in their first cracking contention on January 10, 2012. See, for example, ¶ 26,⁵ on pages 26-29 of 61 on PDF counter of Intervenors’ January 10, 2012 Contention No. 5 motion.⁶

⁵“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.”

⁶<http://www.beyondnuclear.org/storage/FINAL%20Contention%205%20Cracking%20January%2010%202012.pdf>.

Congressman Kucinich's allegations about the carbonation rebar corrosion mechanism were compelling enough that it prompted NRC staff to echo it, in a Request for Additional Information dated December 12, 2011, as documented by Intervenor's in their initial, January 10, 2012 cracking contention motion. (*Id.*, ¶ 45, beginning at p. 42/61 of .pdf counter).

"Corrosion of embedded metal components, especially reinforcing bars, is a principal cause of deterioration and failure in concrete structures. Corrosion expands the diameter of the rebar, which puts pressure on the surrounding concrete and leads to cracks, delamination, and spalls." Kenneth E. Hooker, "Rebar Without Corrosion: Alternative reinforcing materials can improve concrete performance in harsh conditions and critical applications" (June 2013), at http://www.concreteconstruction.net/reinforcement/rebar-without-corrosion_1.aspx.

And, as stated at ConcreteConstruction.net <http://www.concreteconstruction.net/zinc/galvanized-rebar.aspx>), "Depending on the oxidation state, *the corrosion products of steel can occupy more than 6 times the volume of the original steel.*" (Emphasis added). The voluminous expansion of corroding rebar in the Davis-Besse Shield Building walls could be among the additional "even... small loads" that NRC staff warned about in late 2011, as all that would be needed to cause a failure of the outer 27 inches of the 30 inch thick Shield Building wall. (NRC FOIA response Appendix B, Document B/26, 11/22/11 Email from A. Sheikh, NRR to E. Sanchez Santiago, RIII on Questions for the Conference Call, 1 page; and pages 23-24 of 43, "Intervenor's Fourth Motion to Amend and/or Supplement Proposed Contention No. 5 (Shield Building Cracking) July 23, 2012. (<http://www.beyondnuclear.org/storage/4th%20Motion%20PII%20COMPLET.pdf>).

FENOC's conclusion that, "Corrosion of rebar would result in visual indications such as

staining, cracking and spalling on the exterior of the structure or in core bores that are located near rebar,” is alarming and unacceptable as an aspect of aging management monitoring. Long before such severe degradation of the structural rebar becomes visible, and undeniable, on the exterior surface of the Shield Building, its capability to fulfill design and safety functions will have long since ceased. Such undeniable rebar corrosion, as indicated by “staining, cracking and spalling on the exterior of the structure” will in fact raise concerns about the structural integrity of the Shield Building itself, such as the risk of it collapsing under its own immense weight.

D. Shield Building Cracking Links to Rebar Degradation

From the very beginning, the Shield Building cracking, since it has been closely associated with the outer rebar mat, is inextricably interlinked with rebar degradation. For example, as cited by Intervenor in their February 27, 2012 cracking contention supplement (at p.2/102 of .pdf),⁷ Congressman Kucinich had stated on February 8, 2012:

...The NRC allowed my staff to review those documents. The reports showed conclusively that the cracking was not in ‘architectural’ or ‘decorative’ elements of the wall, as FirstEnergy publicly claimed, but *ran throughout the line of the main outer rebar. In fact, the cracking is so extensive that the NRC required FirstEnergy to assume, in its calculations of the strength of the wall, that the vertical outer rebar mat did not even exist.*” (Emphasis added).

In the same February 27, 2012 contention filing, Intervenor also cited an NRC inspection report dated January 31, 2012 (Davis-Besse Nuclear Power Station Integrated Inspection Report 05000346/2011005). At pp. 26-27/102 on .pdf counter, the NRC inspection report states that defective rebar would have been installed by FENOC in the Davis-Besse Shield Building construction opening patch, if NRC staff had not intervened. Such defective rebar, in violation of

⁷<http://www.beyondnuclear.org/storage/Coalition%20filing%20contention%20amdt%202%2027%202012.pdf>

NRC regulations, could have made Davis-Besse's Shield Building vulnerable to failure of its design and safety function, NRC staff warned.

Citing a Japanese study, Intervenor warned in their June 4, 2012 motion to supplement⁸ that the drama of FENOC's purported Blizzard of 1978 root cause theory for Shield Building cracking was not necessary, but rather that corrosive water could be "supplied to the rebar with few minutes' scattered showers." (*Id.*, p.6/16 on .pdf counter, quoting "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, posted online at http://www.degas.nuac.nagoya-u.ac.jp/ippei/paper_e/200811_ACF_Kanematsu.pdf).

This warning is all the more relevant, given FENOC's refusal to repair exterior surface cracking less than 1/16" inch in width. Such cracks will allow water – and hence air -- infiltration into the Shield Building wall, another matter which can enable rebar corrosion.

In the June 4, 2012 filing, Intervenor also cited FENOC's own Root Cause Analysis (FENOC's February 27, 2012 "Root Cause Analysis Report" ("Root Cause Analysis" or "RCA") at p. 96). which contains the admission that: "Rebar was installed too densely in areas opened for maintenance over the plant's history and a spacing sensitivity study established that a higher density of rebar could propagate laminar cracking beyond the architectural flute region with a given stress condition." (<http://www.beyondnuclear.org/storage/June%204%202012%20Motn%20to%20Amend%20Supp%20Contn%205%20COMPLETE-1.pdf>, p.8/16 of .pdf).

⁸<http://www.beyondnuclear.org/storage/June%204%202012%20Motn%20to%20Amend%20Supp%20Contn%205%20COMPLETE-1.pdf>.

Intervenors further noted that "Rebar was also installed too densely at the main steam line penetration blackouts. This was done as an earthquake protection for the shield building structure, because the concrete was more vulnerable there due to the 'discontinuities.' But ironically, it facilitated crack propagation."

At p. 10/16 of the June 4 filing, Intervenors expressed concern about "swollen and bursting rebar" associated with the Shield Building cracking. At p. 13/16, they warned, "What is missing is an analysis which considers and if warranted, refutes, any connection between the cracking, and spalling or the placement of too-dense rebar or the potential for moisture-caused damage to the interior of the shield building from moisture which even now may be wicking into interior concrete. The potential for concrete damage emanating outward from inside the shield building has not been addressed at all by FENOC." Such analysis has still not been done and the risks have still not been addressed, two a half years later.

In their July 16, 2012 filing, Intervenors warned (at p. 9, "Ettringite Penetration Beyond Outer Rebar Layer"):

The root cause report did not document the depth of the core samples at which ettringite was present in samples that contained ettringite deposits. Ettringite is a hydrous calcium aluminium sulfate mineral. FENOC asserted in its February 2012 RCA 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.

Information added to the Revised RCA states (RRCA at 25) that:

Core F2-792.3-4.5 was approximately 4-3/4 inches long and the secondary deposits [of ettringite] thinly lined virtually all of the air voids throughout the concrete. Core F4-791.0-2.5 was approximately 4 inches long with both ends saw cut. The air voids in core F4-791.0-2.5 contained secondary deposit linings in the same abundance and pattern as those of core F2-792.3-4.5.

Ettringite 4-3/4 inches deep indicates "long-term exposure to moisture migrating through the

concrete,” then, in FENOC’s own words. Intervenor’s pointed out in the July 16 filing that:

The outer rebar mat is only 3 inches beneath the concrete surface. Finding ettringite at 4 3/4" would seem to indicate potential for rebar corrosion, which would seriously worsen cracking and loss of bond strength between concrete and rebar. FENOC’s conclusion that there is no problem with rebar corrosion whatsoever is not consistent with the conclusion to be drawn from the utility’s core-bore samples.

(<http://www.beyondnuclear.org/storage/3rd%20%20Motion%20COMPLET%20supp%20cracked%20concrete%20containment%20contention%20July%2016%202012.pdf>, pp. 10-11 of .pdf).

Intervenor’s July 23, 2012 contention filing contains around 65 references to the word “rebar” in its 56 pages. This document analyzed 27 areas of questioning posed by NRC staff to FENOC, in the form of Requests for Additional Information regarding the utility’s Shield Building cracking root cause analysis. (<http://www.beyondnuclear.org/storage/4th%20Motion%20PII%20COMPLET.pdf>).

Another 54 instances of the word “rebar” appear in Intervenor’s 101-page-long August 16, 2012 contention filing. (<http://www.beyondnuclear.org/storage/FOIA%20Appendix%20B%20contention%20supplement%208%2016%202012.pdf>). “Rebar” appears 67 times in Intervenor’s 39-page-long April 21, 2014 contention filing [<http://www.beyondnuclear.org/storage/kk-links/4%2021%2014%20Motion%20to%20admit%20new%20contentio%20FINAL-2.pdf>]. “Rebar” appears 21 times in Intervenor’s September 2, 2014 first filing of Contention 7. (<http://www.beyondnuclear.org/storage/kk-links/9%202%2014%20Final%20Contn%207%20COMPLET%20FINAL.pdf>). And “rebar” turns up three (3) times in their second, September 8, 2014 filing. <http://www.beyondnuclear.org/storage/kk-links/9%208%2014%20Contn%207%20Motn%20Amd%20or%20Supp%20FINAL-1.pdf>).

II. LEGAL STANDARDS

A. Timeliness of This Supplementation

Intervenors admit that by filing their petition on December 30, 2014, they are one (1) day outside of the deadline for amendment of contentions specified in the ASLB's June 15, 2011 Initial Scheduling Order ("ISO"). The deadline would have been December 26, 2014, which was extended to December 29 by President Obama's issuance a few weeks before Christmas of an order declaring December 26 to be a federal holiday. The 60-day period commenced with FENOC's October 29, 2014 deposit of the RAI Responses into the docket. The ISO requires that 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).⁹

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 supplementation of Contention 7, filed one day beyond the ISO deadline, should be admitted. Applying the pre-2012 factors of 10 C.F.R. § 2.309(c) in effect at the time the ISO was entered, the determination of whether a petition is "nontimely" filed must be based on a balancing of those factors, the most important of which is "good cause, if any, for the failure to file on time." *Crow Butte Res., Inc.* (North Trend

⁹ Licensing Board Order (Initial Scheduling Order) at 12 (June 15, 2011) (unpublished) [hereinafter ISO].

Expansion Project), LBP-08-6, 67 NRC 241 (2008). 10 C.F.R. § 2.309(c) (formerly § 2.714(a)) provides that nontimely petitions to intervene or requests for hearing will not be considered absent a determination that the petition or request should be granted based upon a balancing of the following factors:

- (1) good cause, if any, for failure to file on time;
- (2) the nature of the petitioner's right under the Act to be made a party to the proceeding;
- (3) the nature and extent of the petitioner's property, financial or other interest in the proceeding;
- (4) the possible effect of any order that may be entered in the proceeding on the petitioner's interest;
- (5) the availability of other means for protecting the petitioner's interests;
- (6) the extent to which the petitioner's interest will be represented by existing parties;
- (7) the extent to which petitioner's participation will broaden the issues or delay the proceeding; and
- (8) the extent to which petitioner's participation might reasonably assist in developing a sound record.

At this late date in this four-year-long proceeding, there can be little question but that Intervenor's have participated meritoriously and that factors 2 through 8 should be resolved in their favor. The remaining, first, factor - good cause for failure to file on time - likewise should be. Intervenor's have patiently waited for the determination by the ASLB on their pending Contention 7. The ASLB stated at the November 2014 hearing on Contention 7 admissibility that its ruling would be forthcoming in 45 days, a period which ended on December 26, 2014

(extended to December 29, 2014 when President Obama declared December 26 to be a federal holiday shortly before Christmas). Intervenors decided to prepare this filing for submission when there was no ruling by the close of business on December 29. They realized, belatedly, that they had not undertaken the requisite 10 C.F.R. §2.323 consultation with opposing counsel, and so requested that consultation via email sent late in the evening of December 29. Intervenors' counsel and lead lay representative have been occupied with both work and celebratory events during the December 2014 holidays, and represent that there is no prejudice which the NRC Staff or FENOC can show as a result of this filing being tendered into the docket one day late.

Intervenors have managed to meet the perceived timeliness requirements in multiple filings earlier in this case, and have displayed no pattern of habitually late filings. They respectfully submit that the circumstances surrounding the present filing should augur in favor of allowing it into the record for consideration with other evidence.

1) 10 C.F.R. § 2.309 (f)(2) Factors: Information not previously available

Applying the factors of the former 10 C.F.R. § 2.309(f)(2)(i-iii), 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 October 29, 2014.

Intervenors could not file this contention regarding rebar problems and interpretations concerning Davis-Besse's Shield Building until the RAI Responses from FENOC were placed in the public domain on October 29, 2014.

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 respecting rebar problems in the Shield Building prior to October 29, 2014. In particular, FENOC’s considerable stretch to make “opportunistic monitoring” of rebar corrosion a serious method of Shield Building cracking investigation is counters common sense and ignores the technical literature which explains rebar corrosion’s effects upon concrete. It further confounds PII’s “Full Apparent Cause Evaluation” discussion of the factors present which could be promoting accelerated rebar corrosion.

3) *Timeliness of the amended or new contention*

This new contention has been submitted in a practical, timely fashion, one day outside the sixty (60) day period allowed (since the 60th day after October 29, 2014 fell on a weekend, and December 26, 2014 was designated a federal holiday a couple of weeks before Christmas, December 29 became the deadline day).

B. Admissibility Criteria

Contentions and amendments 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 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, 2014,¹⁰ 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 that aging-related cracking is spreading through the Shield Building walls, which buttresses Intervenors' September 2, 2014 Contention 7 filing and ensures that this issue falls within the scope of this License Renewal Application proceeding. FENOC's proposed

¹⁰See "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. The inadequacy also includes a misunderstanding of the possible-probable enhancement of laminar cracking which is happening from rebar corrosion. The cracking phenomena - including damage from expanding corroded rebar in and near existing cracks - 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. The presence of unresolved and continuing cracking of the Shield Building, including underestimation or denial by FENOC of the role of corroding rebar, is not being managed in such a way as to provide "adequate assurance" per 10 C.F.R. § 54.29.¹¹

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), Intervenors 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

¹¹"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);"

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 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,¹² as well as a biological shield, and a tornado-driven missile shield,¹³ and thus to public health, safety, and environmental protection, and in consideration of the already severe, and worsening, cracking of the Shield Building, these

¹² 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>.

¹³ 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 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>.

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-Besse, the compromised Shield Building requires that “reasonable consideration of alternatives” should mean that an accurate economic costing of the replacement of the Shield Building 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).

Intervenors' contention, as supplemented by factual allegations concerning rebar corrosion and FENOC's suspect management of it, fall 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 tornado-driven 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, especially when better understood as to rebar corrosion, 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 will remain structurally sound enough to fulfill its vital safety functions, as required by applicable laws and regulations.

The NEPA document here 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 the rebar facts mentioned *infra* as if written herein, as well as "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.'" They also incorporate herein by reference and re-allege as if written herein "Intervenors' Motion to Amend and Supplement Contention No. 7 on Worsening Shield Building Cracking and Inadequate AMPs in Shield Building Monitoring Program," and specifically the section entitled "Facts Which Require Expanded NEPA Consideration and/or Undercut a Finding of 'Reasonable Assurance.'" This evidence comprises the base on which Intervenors will rely at hearing.

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. Addition of rebar corrosion - meaningfully understood - adds to the disputes of fact.

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 and the ongoing and increasing damage to rebar, which loops back into causation of expanded cracking, is being underestimated and trivialized by FENOC's approach.

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 rebar corrosion as

a contributing but underestimated cause and promoter of expanded cracking.

WHEREFORE, Petitioners pray the Atomic Safety and Licensing Board panel allow the supplementation which they have detailed 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 by sending an email requesting consultation on December 29, 2014.

Counsel for the NRC Staff stated by email response that the Staff “does not oppose the filing of your motion, but based on the information contained in your e-mail message, the Staff does not have enough information at this time to take a position on the proposed supplement to your earlier filings or the timeliness of the supplement. The Staff will respond to the contention in accordance with 10 C.F.R. 2.309, when filed.”

FENOC participated in a telephone conference consultation and objects to the filing one day after the ISO period to be untimely, and will oppose the basis for supplementation.

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	)	December 30, 2014
Davis-Besse Nuclear Power Station, Unit 1)	
)	

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing "INTERVENORS' SECOND MOTION TO 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 30th day of December, 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

Genesky, Donielle

From: Karena Kilcoin <kkred4@hotmail.com>
Sent: Monday, January 26, 2015 5:30 PM
To: Puco Docketing
Cc: James Skalsky; Karena Kilcoin; Leslie Arbogast
Subject: docketing case # 14-1297-EL-SSO

January 26, 2015

Greetings Ohio Public Utilities Commission Representative,

I'm writing today in regards to case # 14-1297-EL-SSO. I oppose the case, AEP's request to bail out its old dirty coal plants. Dirty coal plants make Ohioans sick and I don't want to pay to keep them running.

Thank you very much,
Karena Kilcoin
Athens, OH 45701

Genesky, Donielle

From: CYNthia Bailey <cb11circle@gmail.com>
Sent: Monday, January 26, 2015 4:03 PM
To: Puco Docketing
Subject: Please file comment under case 14-1297-el-sso
Attachments: puco ltr.doc

To whom it may concern,

Thank you for the opportunity to testify in this matter.

Regards,
Cynthia Bailey

Cynthia Bailey
110 Winchester Rd.
Akron, Ohio 44333

Letter of Testimony against First Energy proposal to PUCO

Dear Commissioners;

I appreciate the opportunity you have given the public to speak out in favor or against First Energy's request.

Although First Energy has been a leader in the industry and in our community for years, I am opposed to First Energy passing on the cost to their own customers to keep failed, outdated, polluting facilities operational. Many utilities, companies, and institutions across the country, for that matter, the world are diversifying their energy mix with wind, hydro, and solar. Unfortunately, there are some utilities that have dug their heels into the old mantra of "business as usual". This is illogical thinking. Many industries throughout the world have embraced new technologies and innovation to improve and enhance their individual business models.

It is appalling and insulting to me and other Ohio consumers that First Energy is trying to saddle us and future generations with a BAD INVESTMENT. While I do not want to encourage the continued operation of any coal plants, First Energy should absorb the financial loss themselves or convince their shareholders to absorb the cost. The residents of Ohio deserve to make and be offered a GOOD INVESTMENT.

There are many numbers and facts being thrown around depending on your view of this request (First Energy has not supplied all the facts and will not be transparent on this issue). First Energy supposedly claims this "investment will cost each customer \$71 over three years. It appears to be a minimal amount-but please do not disregard the cost to our environment and our children's future financial burden. I would be more than happy to write a check to First Energy for \$71-under one condition...

First Energy must embrace the opportunity to invest in renewable energy (wind and solar) and diversify their energy portfolio. This is the only way First Energy will be able to maintain their leadership status. Unfortunately, they have recently pressured Ohio state politicians to freeze the Renewable Energy Standards (RES). Ohio again is the state that moved backward on a public policy. THE ONLY STATE IN THE COUNTRY TO FREEZE THEIR RES. Both of these entities demonstrated how out of touch they are with Ohio citizens and the RE industry. This industry has brought a bounty of jobs to the state. Ohio is #1 in manufacturing wind components. In addition, while the RES was in effect, it allowed millions of investment dollars to flow into the state. As a matter of fact, one of the reasons First Energy is asking for the bail-out is because these plants have become less competitive against WIND POWER!

The commission has a very important decision to make. With all due respect, please do not take it lightly. We Do have an energy choice. We, the citizens of Ohio deserve to make good and fiscally sound investments- and our children deserve to be able to say thank you for the decisions YOU make today.

Warm regards,

Cynthia Bailey

Genesky, Donielle

From: Allen Strous <a.strous@hotmail.com>
Sent: Monday, January 26, 2015 5:31 PM
To: Puco Docketing
Subject: OPPOSITION COMMENT UNDER CASE #:14-1297-EL-SSO

I do not want ratepayers' electric rates to be raised to subsidize the Davis-Besse atomic reactor or FirstEnergy's coal power plants. These plants are environmental threats that should be closed, not subsidized.

Thank you,

Allen Strous
11339 Spangler Road
Circleville, Ohio 43113

a.strous@hotmail.com

From: webmaster@puc.state.oh.us
To: PUCO ContactThePUCO
Subject: 85918
Received: 1/23/2015 9:19:51 AM
Message:
WEB ID: 85918 AT:01-23-2015 at 09:21 AM

Related Case Number:

TYPE: comment

NAME: Mr. joseph olivo

CONTACT SENDER ? Yes

MAILING ADDRESS:

- 19457 laurel ave
- rocky river , Ohio 44116
- USA

PHONE INFORMATION:

- Home: (440) 356-3167
- Alternative: (216) 789-1635
- Fax: *(no fax number provided?)*

E-MAIL: josdoliv@gmail.com

INDUSTRY:Electric

ACCOUNT INFORMATION:

- Company: first energy
- Name on account: joseph olivo
- Service address: multiple
- Service phone: 440-356-3167
- *(no account number provided?)*

COMMENT DESCRIPTION:

Please DO NOT bail out first energy for there bad investment decisions. The public was not consulted upon these investments, did not give input on their security plan. There bad judgement it not our responsibility. They must cover their own mistakes. jo