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COMMITTEE ON EDUCATION AND THE
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Gregory B. Jaczko
Chairman
Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Chairman Jaczko:

I am writing to ask that the NRC conduct a public hearing in Northern Ohio to reveal the facts surrounding the apparent delamination that has been discovered in the concrete wall of the shield building of the Davis-Besse nuclear power plant, and that this hearing be conducted before FirstEnergy is allowed to power up its reactor. A public hearing is necessary because FirstEnergy has been characterizing the situation at Davis-Besse in ways that I believe are misleading, and because representatives of the NRC seem to have adopted and repeated those characterizations in their statements.

For example, FirstEnergy has characterized the cracks they have discovered as "hairline" and "barely visible." They have characterized the locations of these cracks as being "decorative elements" or "architectural elements" of the building that are separate or distinct from the "structural elements" of the building. And, they have characterized the shield building as something that merely "provides protection from natural phenomena including wind and tornados."

In sharp contrast to these characterizations, the facts reveal that these "barely visible" "hairline" cracks run for approximately 30 feet along the line of the steel reinforcing rods in the wall. A photo of the wall posted on the NRC website appears to show cracks that are not "hairline" and are clearly "visible." FirstEnergy's diagram of a cross section of the wall shows that the "elements" in which the cracks have been found are "structural" and are part of that wall, not separate "decorative" elements.[1] And, First Energy has described the purpose of the shield building quite differently in its recent "License Renewal Application."

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

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

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

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

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

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

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

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

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

In 2006, Oak Ridge National Laboratory performed a study for the NRC "to support the NRC's efforts to understand containment degradation...and how changes in concrete material properties may affect the performance of [nuclear power plant] concrete structures." The resulting Report [5] contains a number of findings that are very worrisome when applied to the Davis-Besse situation.

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

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

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

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

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

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

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

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

Sincerely,

Dennis J. Kucinich
Member of Congress

cc. Cynthia Pederson, Regional Administrator (Acting)
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