

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

In the Matter of:	)	Docket No. 50-255
Entergy Nuclear Operations, Inc. (Palisades Nuclear Plant)	)	
Operating License Amendment Request	)	December 1, 2014
	)	

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***PETITION TO INTERVENE AND FOR A PUBLIC ADJUDICATION HEARING  
OF ENTERGY LICENSE AMENDMENT REQUEST FOR AUTHORIZATION  
TO IMPLEMENT 10 CFR §50.61a, ‘ALTERNATE FRACTURE TOUGHNESS REQUIREMENTS  
FOR PROTECTION AGAINST PRESSURIZED THERMAL SHOCK EVENTS’***

Now come Beyond Nuclear (“BN”), Don’t Waste Michigan (“DWM”), Michigan Safe Energy Future - Shoreline Chapter (“MSEF”), and the Nuclear Energy Information Service (“NEIS”) (hereafter collectively called “Petitioners”), all of which hereby move to intervene in this proceeding on behalf of their respective members. They request admission of their below-enumerated contention and for the Nuclear Regulatory Commission to convene a public adjudication hearing on the matter of the request of Entergy Nuclear Operations, Inc. (“Entergy”) for a license amendment to the current operating license of the Palisades Nuclear Plant (“PNP”). Specifically, the Entergy amendment requests authorization to implement 10 CFR § 50.61a, “Alternate fracture toughness requirements for protection against pressurized thermal shock events,” *in lieu* of 10 CFR § 50.61, “Fracture toughness requirements for protection against pressurized thermal shock events.”

This Petition is brought pursuant to the Federal Register notice of September 30, 2014, found at Vol. 78, No. 189, p. 58812, entitled “Biweekly Notice; Applications and Amendments to Facility Operating Licenses and Combined Licenses Involving No Significant Hazards Considerations.” In it, Entergy gave notice of its intention to amend the operating license of PNP to allow use of an alternative

method of calculation of the degree of embrittlement of the Palisades nuclear reactor pressure vessel (“RPV”). The 10 CFR § 50.61 screening criteria define a limiting level of embrittlement of the RPV beyond which plant operation cannot continue without further evaluation. Use of 10 CFR § 50.61a would afford Entergy the option of moving the assessment of fracture toughness of the RPV from an analytical approach to a probabilistic risk analysis, or PRA, method of projecting reactor vessel change. Entergy wishes to shift to the § 50.61a method without performing any scientific validation of that approach, as by performing destructive testing of coupons left inside the reactor pressure vessel at Palisades for that very purpose.

Petitioners bring their petition pursuant to 10 CFR § 2.309, and in support thereof, address the component requirements of the regulation below.

## **I. Standing**

### *A. Legal Basis*

Pursuant to 10 CFR § 2.309, a request for hearing or petition for leave to intervene must address (1) the nature of the petitioner’s right under the Atomic Energy Act to be made a party to the proceeding, (2) the nature and extent of the petitioner’s property, financial, or other interest in the proceeding, and (3) the possible effect of any order that may be entered in the proceeding on the petitioner’s interest. In determining whether a petitioner has sufficient interest to intervene in a proceeding, the Commission has traditionally applied judicial concepts of standing. *See Metropolitan Edison Co.* (Three Mile Island Nuclear station, Unit 1), CLI-83-25, 18 NRC 327, 332 (1983) (citing *Portland General Electric Co.* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610 (1976)). Contemporaneous judicial standards for standing require a petitioner to demonstrate that (1) it has suffered or will suffer a distinct and palpable harm that constitutes injury-in-fact within the zone of interests arguably protected by the governing statutes (*e.g.*, the Atomic Energy Act of 1954 (AEA), the National Environmental Policy Act of 1969 (NEPA), *etc.*); (2) the injury can be fairly traced to the challenged action; and (3) the injury is

likely to be redressed by a favorable decision. *See Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plants), LBP-99-25, 50 NRC 25, 29 (1999). An organization that wishes to intervene in a proceeding may do so either in its own right by demonstrating harm to its organizational interests, or in a representational capacity, by demonstrating harm to its members. *See Hydro Resources, Inc.* (2929 Coors Road, Suite 101, Albuquerque, NM 87120), LBP-98-9, 47 NRC 261, 271 (1998).

All of the petitioning organizations here wish to participate in a representational capacity. To intervene in a representational capacity, an organization must show not only that at least one of its members would fulfill the standing requirements, but also that he or she has authorized the organization to represent his or her interests. *See Private Fuel Storage, L.L.C.* (Independent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 168, *aff'd on other grounds*, CLI-98-13, 48 NRC 26 (1998). *Pacific Gas & Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), LBP-02-23, 56 NRC 413, 426 (2002).

Standing to participate in this proceeding is demonstrated by the declarations of the organizations and individuals appended to this Petition. All of the petitioning individuals live within 50 miles of PNP, and each one has designated his or her organizational Petitioners to represent his or her interests in this proceeding. Because they live near the Palisades site, *i.e.*, within 50 miles, the individually-named Petitioners have presumptive standing by virtue of their proximity to the nuclear power plant. *Diablo Canyon, supra*, 56 NRC at 426-427, citing *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-01-6, 53 NRC 138, 146, *aff'd*, CLI-01-17, 54 NRC 3 (2001). In *Diablo Canyon*, the Licensing Board noted that petitioners who live within 50 miles of a proposed nuclear power plant are presumed to have standing in reactor operating license cases, because there is an “obvious potential for offsite consequences” within that distance. *Id.* Here, Entergy seeks an operating license amendment for the Palisades nuclear reactor, near South Haven, Michigan, and the same standing concepts apply.

The Petitioners' members seek to protect their lives, health and property by opposing the license amendment to allow Entergy to apply the alternative embrittlement calculation method. They fear the chronic and increasing risk of serious nuclear reactor accident involving loss of coolant within the severely-embrittled Palisades reactor vessel in the event of a thermal "event," *i.e.*, a serious mishap, called "pressurized thermal shock" ("PTS") could cause or allow the reactor to go out of control. PTS could fracture the reactor pressure vessel. If that happens, a loss-of-coolant accident, or LOCA, ensues. Then meltdown becomes a distinct possibility, if containment fails. What could follow then would be a catastrophic release of hazardous radioactivity to the living environment.

Petitioners oppose the implementation of the alternative calculation method under 10 C.F.R. § 50.61a because there are grave deficiencies in its mathematical and conceptual underpinnings. There has been a dangerously-long passage of time since actual physical testing of the degree of embrittlement was performed at Palisades, while the risks of a severe through-wall fracture have grown to unknown levels. Intervenors assert that the license amendment cannot be allowed by the Nuclear Regulatory Commission because Entergy cannot demonstrate full compliance with the Atomic Energy Act.

*Locus standi* is based on three requirements: injury, causation and redressability. The petitioning organization hereby request to be made parties to the proceeding because (1) continued operation of the PNP poses a tangible and particular harm to the health, well-being and property of members living within 50 miles of the site, (2) the NRC has initiated proceedings for a license amendment, the granting of which would directly affect the named members and other individuals, and (3) the Commission is the sole agency with the power to approve, to deny or to modify an operating license of a commercial nuclear power plant. A license amendment is authorization from the NRC to continue operation of a nuclear power plant at a specific site under altered conditions. Before issuing the license amendment, the NRC staff must complete safety and environmental reviews of the request. The license amendment must comply with provisions of the Atomic Energy Act, federal laws such as the National Environmental

Policy Act, NRC regulations and all other applicable laws.

The Petitioners representationally seek leave to intervene because the interests of their members will not be adequately represented absent this course of action and intervention, and without the opportunity to participate as full parties in this proceeding. This proposed amendment calls for allowing an estimate of the status of the Palisades RPV to substitute for a scientifically-verified assessment. Use of the § 50.61a calculation approach could - and according to Petitioners' evidence, may - cause failure of a critical safety component - the metal reactor pressure vessel which houses the reactor core. The RPV may fail, and with it, safety margins for operation of the nuclear reactor core within it. Without a public adjudication hearing and determination of the propriety of allowing implementation of alternative calculations under 10 C.F.R. § 50.61a, Palisades may operate dangerously and pose an undue and unacceptable risk to the environment, and jeopardize the health, safety and welfare of the Petitioners' members who live, recreate and conduct their business in the vicinity of PNP.

Attached to this Petition are declarations of persons with individual standing to intervene, along with declarations from the four (4) petitioning organizations which are prepared to represent those persons, who are their members. Representational standing of the Petitioners is thus proven via these declarations for Beyond Nuclear, Don't Waste Michigan, Michigan Safe Energy Future - Shoreline, and the Nuclear Energy Information Service, by their respective leaders or officers, who formally wish to protect the interests of those among their members who reside within 50 miles of Palisades.

*B. The Named Intervenors*

Beyond Nuclear ("BN") is a not-for-profit organization located at 6930 Carroll Avenue, Suite 400, Takoma Park, Maryland, 20912, Tel. (301) 270-2209, [www.beyondnuclear.org](http://www.beyondnuclear.org). BN has over 20,000 members, of whom a number reside, work and recreate within the fifty (50) mile Emergency Planning Zone for Palisades. Beyond Nuclear provides the declaration of Bette Pierman, a member, who lives in Benton Harbor, Michigan, within about a 15-mile radius of Palisades. Beyond Nuclear seeks to intervene

to protect the interests of Pierman, who has safety and environmental concerns about Palisades' operations surrounding its severely-embrittled RPV. Pierman worries that the possibility of through-wall cracking of the Palisades RPV is greater than Entergy predicts; that the request for license amendment is inadequate as written; and that her interests will not be adequately represented absent participation in this action by BN to intervene and participate as a full party in this proceeding on her behalf. Kevin Kamps, radioactive waste specialist at Beyond Nuclear, represents BN in this proceeding and has submitted a declaration in support of BN's representation of Pierman as its member.

Don't Waste Michigan ("DWM") is a federation of environmental organizations with a board of directors and a membership of some 50 researchers, educators, concerned citizens, and others. DWM was founded in 1987 to oppose the designation of the State of Michigan as a repository for what was misleadingly called "low-level" radioactive waste from eight states. Don't Waste Michigan's work was ultimately successful; Michigan was eliminated from consideration as a repository for the wastes. DWM also resisted, unsuccessfully, the 1993 plan at Palisades to load high-level nuclear waste in casks on the shore of Lake Michigan at the plant site. DWM has several members who reside, work, and/or recreate within fifty (50) miles of Palisades and maintains a website, <http://dwmi.homestead.com>. DWM seeks to intervene on behalf of its member, Alice Hirt, who lives about 35 miles from Palisades in Holland, Michigan. According to her declaration, Hirt has safety and environmental concerns about Palisades' operations with a severely-embrittled RPV. She worries that the possibility of through-wall cracking of the Palisades nuclear reactor vessel is greater than Entergy predicts; that the request for license amendment is inadequate as written; and her interests will not be adequately represented absent participation in this action by DWM to intervene and participate as a full party in this proceeding on her behalf. Michael Keegan, co-convenor of DWM, represents the group in this proceeding and has submitted a declaration to assure DWM's responsibility to act to protect its members.

Michigan Safe Energy Future - Shoreline Chapter ("MSEF") is a group of sustainable energy

advocates, nearly all of whom live, work or recreate within 50 miles of PNP. Maynard Kaufman, a member, lives about 10 miles from Palisades. Kaufman has safety and environmental concerns about Palisades' operations with a severely-embrittled RPV. He worries that the possibility of through-wall cracking of the Palisades nuclear reactor vessel is greater than Entergy predicts; that the request for license amendment is inadequate as written; and that his interests will not be adequately represented absent participation in this action by MSEF to intervene and participate as a full party in this proceeding on his behalf. Vikke Andersen, co-convenor of MSEF, represents the group in this proceeding and has submitted a declaration assuming MSEF's responsibility to act to protect its members.

Nuclear Energy Information Service, 3411 W Diversey Avenue, #16, Chicago IL 60647 ("NEIS") is a nonprofit organization which has opposed continued operation of Illinois' and Great Lakes region nuclear power plants for over 30 years, while supporting greater reliance on sustainable energy technologies. NEIS opposes Entergy's request to allow a change to the Palisades Operating License for purposes of implementation of 10 CFR § 50.61a. Gail Snyder, a member of NEIS, owns vacation property within 15 miles of Palisades, where she and her family occasionally travel to camp and picnic. Snyder has safety and environmental concerns about Palisades' operations with a severely-embrittled RPV. She worries that the possibility of through-wall cracking of the Palisades nuclear reactor vessel is greater than Entergy predicts; that the request for license amendment is inadequate as written; and that her interests will not be adequately represented absent participation in this action by NEIS to intervene and participate as a full party in this proceeding on her behalf. David Kraft, executive director of NEIS, represents the group in this proceeding and has submitted a declaration in support of NEIS' commitment to act to protect its members.

## **II. Background**

On September 30, 2014, notice was published in the Federal Register<sup>1</sup> of Entergy's intentions of

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<sup>1</sup>79 Fed. Reg. 58812 (September 30, 2014)

seeking amendment of the operating license of PNP to allow implementation of an alternative method of calculation of the degree of embrittlement of the Palisades nuclear reactor pressure vessel. The 10 CFR § 50.61 screening criteria, to which Palisades currently adheres, define a limiting level of embrittlement beyond which plant operation cannot continue without further evaluation. The switch to the use of 10 CFR § 50.61a will change how fracture toughness of the reactor vessel is determined, moving from an analytical to a probabilistic risk assessment method. According to Entergy, the NRC publication NUREG-1806, “Technical Basis for Revision of the Pressurized Thermal Shock (PTS) Screening Limit in the PTS Rule (10 CFR 50.61),”<sup>2</sup> (August 2007) supports a conclusion that the screening criteria in the PTS rule are overly conservative and further, that the risk of through-wall cracking due to a PTS event is much lower than previously estimated. *See 79 Fed. Reg. 58814.*

Entergy’s proposed “no significant hazards” determination, required here by 10 C.F.R. § 50.91(a), concludes that the proposed change will not involve a significant increase in the probability or consequences of an accident previously evaluated:

Application of 10 CFR 50.61a *in lieu* of 10 CFR 50.61 would not result in physical alteration of a plant structure, system or component, or installation of new or different types of equipment. Further, application of 10 CFR 50.61a would not significantly affect the probability of accidents previously evaluated in the Updated Final Safety Analysis Report (UFSAR) or cause a change to any of the dose analyses associated with the UFSAR accidents because accident mitigation functions would remain unchanged. Use of 10 CFR 50.61a would change how fracture toughness of the reactor vessel is assessed and does not affect reactor vessel neutron radiation fluence. As such, implementation of 10 CFR 50.61a *in lieu* of 10 CFR 50.61 would not increase the likelihood of a malfunction.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

*Id.* at 58815. Entergy further concludes that the proposed change does not create the possibility of a new or different type of accident from any accident previously evaluated:

The amendment request would allow implementation of the 10 CFR 50.61a alternate PTS rule in lieu of 10 CFR 50.61. No new accident scenarios, failure mechanisms, or limiting single failures are introduced as a result of the proposed change. No physical plant alterations are

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<sup>2</sup>ADAMS No. ML072830074.

made as a result of the proposed change. The proposed change does not challenge the performance or integrity of any safety-related system. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

*Id.* The utility maintains, also, that the proposed change would not involve a significant reduction in a margin of safety:

The amendment request would authorize implementation of 10 CFR 50.61a in lieu of 10 CFR 50.61. Regulation 10 CFR 50.61a would maintain the same functional requirements for the facility as 10 CFR 50.61. It establishes screening criteria that limit levels of embrittlement beyond which operation cannot continue without further plant-specific evaluation or modifications. Sufficient safety margins are maintained to ensure that any potential increases in core damage frequency and large early release frequency resulting from implementation of 10 CFR 50.61a are negligible. As such, there would be no significant reduction in the margin of safety as a result of use of the alternate PTS rule. The margin of safety associated with the acceptance criteria of accidents previously evaluated in the UFSAR is unchanged. The proposed change would have no effect on the availability, operability, or performance of the safety-related systems and components.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

*Id.*

In light of Entergy's analysis, the NRC Staff has concluded that "the three standards of 10 CFR 50.92(c) are satisfied. Therefore, the NRC staff proposes to determine that the amendment request involves no significant hazards consideration." *Id.*

Petitioners detail below their position that the analysis provided to the NRC by Entergy is inadequate and relies upon unsupported assumptions. Petitioners urge that there is a consequential possibility that significant hazards associated with implementation of the alternative calculation method under 10 C.F.R. § 50.61a may occur, in the form of a material underestimate of the prospects of a severe PTS incident which could lead to a LOCA involving the Palisades RPV. As a result, Petitioners submit that the standards of 10 CFR § 50.92 have not been satisfied.

### **III. Legal Standards Governing License Amendments**

Nuclear Regulatory Commission regulations at 10 CFR §§ 50.90 to 50.92 provide the applicable process when a licensee wishes to request a license amendment. Specifically, § 50.90 authorizes applications to amend existing operating licenses; § 50.91 provides for notice and comment regarding

license amendment applications, as well as consultation with the State in which the facility is located; and § 50.92 provides the standard considered by the NRC when determining whether to issue an amendment.

NRC regulations at 10 C.F.R. §50.61 provide fracture toughness requirements for protection against pressurized thermal shock (“PTS”) events at pressurized water reactors such as Palisades. A PTS can occur when water considerably cooler than the water normally used in operation of a nuclear power reactor is injected into the reactor pressure vessel; severe cracking of the metal RPV can follow, which in turn can cause a serious nuclear power accident. By 10 C.F.R. § 50.61a, the NRC affords operating license holders for a pressurized water nuclear power reactor whose construction permit was issued before February 3, 2010 and whose reactor vessel was designed and fabricated to the ASME Boiler and Pressure Vessel Code, 1998 Edition or earlier - Palisades - a chance to invoke “an alternative to the requirements of 10 CFR 50.61.” Basically, 10 C.F.R. § 50.61a allows Entergy to substitute various estimates of the status of the RPV for actual data investigation and analysis. The § 50.61a projections are attained among other means by averaging data on reactor vessels from other nuclear power plants, to arrive at a projection of the current status of the Palisades RPV.

Petitioners’ position is that Palisades has an acknowledged problem of worsening reactor vessel embrittlement commencing from the start of operations in the early 1970's. Palisades’ owners have repeatedly - a half dozen times or more - invoked 10 C.F.R. § 50.61 or predecessor procedures to push back the metallurgical toughness parameters which would otherwise have caused a shutdown of Palisades and forced expensive reactor vessel annealing to try to fix the embrittlement problem.

Petitioners herein challenge whether there is apples-to-apples validity of data drawn from other power reactors en route to questioning the implementation of 10 C.F.R. § 50.61a. They further raise the question of whether Entergy should be allowed to resort to § 50.61a at all. There is a scientifically-verifiable means of assessing the current status of embrittlement of the Palisades RPV involving

examination of metal samples, called “capsules” or “coupons.” These are pieces of metal which are alike in composition and age to the RPV metal and/or its welds, which have been aging inside the RPV throughout the period of Palisades’ operations. For inexplicable reasons, Entergy has not removed or examined any coupons since a 2003 refueling outage, and does not intend to study a coupon until at least 2019. Entergy plans to substitute the estimate procedure of 10 C.F.R. § 50.61a for the scientific rigor implicated by 10 C.F.R. §50.61, despite the availability of scientifically-measurable coupons. The fact that sixteen (16) years will have passed between coupon examinations to gain an accurate view of the RPV calls into question Entergy’s motivation for switching to § 50.61a. Resort to § 50.61a would obviate the need for actual physical data from coupon examination. Petitioners believe that such a course is potentially dangerous, and absurdly impractical.

#### **IV. Petitioners’ Contention and Supporting Information**

##### *A. Statement of Contention*

The licensing framework that the NRC is applying to allow Palisades to continue to operate until August 2017 includes both non-conservative analytical changes and mathematically dubious comparisons to allegedly similar “sister” reactor vessels. Palisades' neutron embrittlement dilemma continues to worsen as the plant ages, and Palisades has repeatedly requested life extensions which have ignored and deferred worsening embrittlement characteristics of the RPV for decades. Presently, Entergy plans to deviate from the regulatory requirements of 10 C.F.R. § 50.61 to §50.61a (Alternate Fracture Toughness Requirements). This new amendment request introduces further non-conservative analytical assumptions into the troubled forty-three (43) year operational history of Palisades. Entergy’s License Amendment Request (LAR) contains an equivalent margins evaluation, which is an untried methodological approach to measure neutron bombardment-induced reactor vessel embrittlement. Allowing Palisades to continue operations under such relaxed measurement conditions exposes the public to increased danger and is not acceptable. The license amendment to switch to 10 C.F.R. § 50.61a must be denied.

*B. Brief Explanation of the Bases for the Contention*

Arnold Gundersen, a nuclear engineer of more than 40 years' standing, provides his expert report in support of this Petition. After reviewing public domain evidence of Palisades' history of embrittlement events, Gundersen concludes that Entergy's planned shift to rely upon 10 C.F.R. § 50.61a for the determination of RPV embrittlement is flawed and could subject the public to unnecessary danger. The comparisons Entergy makes with other, "sister" nuclear plants are largely inapropos and the decision not to use available coupons for scientific analysis is improper.

Mr. Gundersen states (Declaration of Arnold Gundersen, hereafter "Gundersen Declaration" attached, along with Gundersen's *curriculum vitae*) that "Almost half of the initial capsules [coupon samples] installed 43 years ago still remain inside the embrittled nuclear reactor" and that if the NRC allows Entergy to postpone the next Palisades coupon sampling until 2019, "then no accurate current assessment of Palisades' severe embrittlement condition exists." *Id.* p. 8, ¶ 21. Gundersen notes that § 50.61 is analytical in nature, while § 50.61a authorizes probabilistic risk assessment, and that the discretionary availability of § 50.61a under the circumstances cannot be used as a substitute for scientific investigation. Gundersen Declaration p. 9, ¶ 24.3. Gundersen observes (*id.* at p. 3, ¶ 8) that "Continued operation of the Palisades nuclear power plant without analyzing the coupon designated to be sampled more than seven years ago means that Entergy may be operating Palisades as a *test* according to 10 C.F.R. § 50.59." (Emphasis in original).

*C. Concise Statement of Alleged Facts and Expert Opinion  
Upon Which Petitioners Intend to Rely*

Palisades has been the subject of a surprising number of changes to the RPV pressurized thermal shock screening criteria in 43 years of operations. Arnold Gundersen cites only a few in his report; there is a rich context of PTS-related events dating back to the 1970's. Attached to this Petition as "Exhibit A" is a comprehensive, detailed listing of what Petitioners call "rollbacks" for the period 1976 through 2011 - regulatory or management changes at Palisades which fostered the illusion of regulation, while in fact

supporting the weakening of PTS criteria and increasing the risks of a serious RPV accident. Petitioners incorporate Exhibit A wholly herein by reference as though rewritten, as evidentiary support for their position that more than four decades of regulatory retreat is seriously endangering the public in southwest Michigan and the larger Great Lakes region.

The chronic question for Palisades is, at what temperature (referred to as RT-ndt, Reference Temperature-nil ductility transition) is the RPV at risk of fracturing due to brittleness? The RT-ndt is also referred to as the PTS screening criteria.

PTS concerns arise when a nuclear reactor vessel is weakened by neutron flux. The nuclear chain reaction inside the reactor that is created to generate energy from high-energy electrons also creates neutrons that impinge upon the inner side of the steel reactor vessel, damaging the metal at a nano-level. That process leads to metal embrittlement of reactor vessels. The neutron bombardment weakens all the metal in the vessel, and especially the welds that are made from softer metals. Also, metallic impurities in the welds lead to rapid degradation of the welds from the neutrons' bombardment creating the "neutron embrittlement" phenomenon which leaves a brittle nuclear vessel at great risk of cracking under certain circumstances. Gundersen Declaration at p. 4, ¶ 12.

When the Palisades RPV was brand new, its reference temperature-nil ductility transition (RT-ndt) was at 40 degrees F. By the early 1980s, NRC had weakened Palisades' screening criteria - and the rest of the U.S. pressurized water reactors - to 200 F. So water as cold as 40 degrees could be quickly forced into the reactor vessel in the event of a loss of control of the nuclear reaction with overheating. And 200 degrees F. is closer to the operating temperature of Palisades, which is around 550 F. Thus if the Emergency Core Cooling System ("ECCS") pumps too-cold water into the 550 F. RPV, and over-cools it quickly down to 200 F. (or, later, 270 or 300 degrees), there instantaneously arises an overwhelming likelihood of a fracture of the RPV, which is a very serious reactor accident. When the PWR safety system repressurizes the RPV, the metal can't take it any more, and fractures. It breaks,

either by major cracking or actual fragmentation, presumably at the point of a flaw in the RPV.

Noably, 200 degrees F. was merely an earlier stage of the retreat from regulation. The criteria were later relaxed to 270 degrees F. for axial/vertical welds, and to 300 F. for welds of a circumferential/horizontal orientation. And through it all, Palisades and/or the NRC have projected, over and over, that without a regulatory “break,” the PTS screening criteria will be exceeded at an explicit date. Some of those dates have been 1995; 1999; September 2001; 2004; 2007; 2014; April 2017; and August 2017. On or near those dates, Palisades or the NRC has said, the allowable boundary beyond which lies the risk of disaster will be crossed. And then, magically, so it seems, the date of heightened vulnerability to this type of disaster has routinely been pushed and postponed further into the future.

This is where the availability of analyzable physical samples of reactor metal - the capsule coupons inside the Palisades RPV - is extremely important. Less than a decade after Palisades commenced operations, the first capsule samples began indicating severe embrittlement. These metallic samples had been placed inside the reactor during construction in order to determine whether or not neutron bombardment within the nuclear reactor was damaging and embrittling the steel vessel and its welds. At refueling outages, they were to be removed, one at a time, and destructively tested to ascertain with some precision the status of metallurgical embrittlement. In the ensuing 33 years since the early indicators, Palisades has gained notoriety at the NRC for being one of the nation’s most-embrittled reactors. Gundersen Report at p. 6, ¶ 15. In its May 19, 1995 NRC Generic Letter 1992-001, Supplement 1,<sup>3</sup> the NRC Staff permitted Palisades to operate until late 1999, observing that it had “reviewed the other PWR vessels and, based upon currently available information, believes that the Palisades vessel will reach the PTS screening criteria by late 1999, *before any other PWR.*” (Emphasis added). *Id.*

There were 8 coupons installed originally in the Palisades RPV, and 2 supplements added later.

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<sup>3</sup>ADAMS No. ML031070449.

Of the 8 original coupons, 4 have been removed and tested, the 2 supplements have also been removed and tested, and four capsules remain available for testing. Gundersen Declaration at pp. 6-7, ¶ 17. There remain four coupons in the vessel. The last test was performed in 2003. The next proposed removal and testing of a coupon is slated for 2019, so fully 16 years will have passed without development or analysis of new physical evidence of embrittlement - easily the longest period without physical analysis in Palisades' existence. *Id.*

When NRC Commission Chairman Macfarlane was asked in 2014 by Michael Keegan of Don't Waste Michigan why Palisades has imposed a moratorium on testing of the coupons in the RPV, she deferred to an NRC Staff representative, who stated that if coupons were removed for testing, there would soon be no more coupons to test - a troubling tautology. *See* the "Declaration of Pierman, Kamps and Keegan Concerning Coupon Availability for PTS Testing" filed along with this Petition.

#### 1. Analytical vs. Experimental

In the Gundersen Declaration, which is fully incorporated by reference into this Petition as though rewritten, Arnold Gundersen sets forth the facts and opinions which will comprise the heart of Petitioners' case at trial. Gundersen expresses concern that "Rather than confirming the [10 C.F.R. §50.61a] estimates with physical testing of actual samples that have been continuously irradiated during the last 43 years of operation, the NRC prefers to defer to the calculational predictions created by Palisades." *Id.* at p. 8, ¶ 22 Gundersen contrasts the sheer anomaly of substituting probabilistic risk assessment under 10 C.F.R. § 50.61a for the required physical sampling analysis under § 50.61:

. . . [T]he NRC first claimed it was "very nervous" about vessel embrittlement more than 30 years ago. In spite of these legitimate concerns, the NRC continues to allow Entergy to operate its Palisades Nuclear Power Plant in a compromised and *test condition*. This old and compromised reactor vessel continues to operate well outside the bounds of its design and fabrication without any modifications to the severely embrittled reactor pressure vessel. Instead of maintaining safety parameters during the last three decades, even in the aftermath of five nuclear meltdowns, the NRC has allowed Palisades to make unrealistic, unsupported and imprudent safety calculations based on little more than probabilistic risk, rather than real scientific analysis of hard data that is available inside the Palisades reactor.

*Id.* at ¶ 23.

While noting that Palisades had, to its credit, reworked the fuel configuration in the reactor core to minimize neutron impingement on the vessel walls, Gundersen also finds that the failure of the licensee to install a thermal shield before the reactor became operational would have avoided the problem altogether. *Id.* at p. 9, ¶ 24.1.

## 2. The Comparable Plants Are Not Apples-to-Apples Comparisons

Gundersen objects to the identified comparable nuclear reactor vessels cited by Entergy to comply with § 50.61a. He observes that “The NRC has allowed Palisades to compare itself to reactors of disparate designs from other vendors, built in different years and operating at diverse power levels.” *Id.* at ¶ 24.2. These plants, which he says “thus far have not exhibited significant signs of reactor metal embrittlement,” are poor comparables because

. . . the dramatically different nuclear core design and operational power characteristics make an accurate comparison impossible. The difference between the Westinghouse nuclear cores and the Combustion Engineering nuclear core impacts the neutron flux on each reactor vessel, thus making an accurate comparison of neutron bombardment and embrittlement impossible.

*Id.* at p. 10, ¶ 27.

A good example of a false comparison is found in Structural Integrity Associates, Inc.’s Report No. 0901132.401, Revision 0, “Evaluation of Surveillance Data for Weld Heat No. W5214 for Application to Palisades PTS Analysis,” ADAMS No. ML110060693. This document served as part of the technical basis for the PTS safety risk regulatory rollback of PTS screening criteria, from January 2014 to April 2017 at Limiting Beltline Weld W5214. “Similar Sister Plant” proxies were used which involved the inappropriate averaging of 11 sample surveillance capsules/coupons from very dissimilar RPVs.

Such false comparisons, Gundersen says, “significantly dilute Palisades’ embrittlement calculations.” Gundersen Declaration, p. 11 at ¶ 28. He adds: “This rogue comparative data is not sound

scientific methodology and clearly places the operations of the Palisades NPP in the experimental test venue, possibly as delineated in 10 CFR 50.59.” *Id.* at p. 11, ¶ 29.

Section 50.59 of 10 C.F.R. Part 50 establishes standards for a licensee to request a license amendment before it may make “changes in the facility as described in the final safety analysis report, make changes in the procedures as described in the FSAR, and conduct tests or experiments not described in the FSAR.” 10 CFR § 50.59(c)(1). The section 50.59(c)(2) criteria require a licensee to seek a license amendment if the proposed change, test, or experiment would:

- (I) Result in more than a minimal increase in the frequency of occurrence of any accident previously evaluated in the [UFSAR];
- (ii) Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the [UFSAR];
- (iii) Result in more than a minimal increase in the consequences of an accident previously evaluated in the [UFSAR];
- (iv) Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the [UFSAR];
- (v) Create a possibility for an accident of a different type than any previously evaluated in the [UFSAR];
- (vi) Create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the [UFSAR];
- (vii) Result in a design basis limit for a fission product barrier as described in the [UFSAR] being exceeded or altered; or
- (viii) Result in a departure from a method of evaluation described in the [UFSAR] used in establishing the design bases or in the safety analyses.

*Id.* § 50.59(c)(2); *Southern California Edison Co.*, (San Onofre Nuclear Generating Station, Units 2 and 3), LBP-13-07, pp. 18-20 (May 13, 2013).

Petitioners wholly anticipate that Entergy and the NRC Staff will cite 10 C.F.R. § 50.59( c)(4)<sup>4</sup> as a bar to the applicability of § 50.59 to require formal classification of the fluid PTS standards as an “experiment” or “test.” But the facts here prompt the conclusion that off-the-charts historical PTS problems at Palisades will continue into the uncharted future as a very dangerous experiment, whether or

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<sup>4</sup>“(4) The provisions in this section do not apply to changes to the facility or procedures when the applicable regulations establish more specific criteria for accomplishing such changes.”

not NRC regulations call it that, or not.

Palisades nuclear plant, Gundersen says, “has become the symbol of a regulator-endorsed national test attempting to determine how long a damaged vessel can continue to operate without failing and having a major radiation release to the highly populated areas surrounding the plant.” Gundersen Declaration, p. 6, ¶ 16.

### 3. Cross-Comparisons And Standard Deviations Don’t Match Up

Gundersen also asserts that the most serious analytical problem in the use of sister plants “is the extraordinary difficulty comparing data from four separate plants while still maintaining one standard deviation ( $1\sigma$ ) or 20% between all the data. According to the *Palisades Reactor Pressure Vessel Fluence Evaluation*, one standard deviation is required, however there has never been a discussion of how this was achieved between the four sister units.” Gundersen Declaration at p. 11, ¶ 30. While “[a]  $1\sigma$  analysis appears to be binding within the Palisades data, . . . the NRC lowers the bar when comparing data from similar sister plants that are included in Entergy’s analysis of the Palisades reactor vessel without requiring the same  $1\sigma$  variance with Palisades.” *Id.* at p. 12, ¶ 32. Gundersen adds: “There can be no assurance that the 20% error band at Palisades encompasses the 20% error band at the Robinson or Indian Point plants. To compare this different data without assurance that the  $1\sigma$  variance from each plant overlaps the other plants lacks scientific validity.” *Id.* at p. 12, ¶ 33.

Gundersen further found that there is “extraordinary variability between the neutron flux across the nuclear core in this Combustion Engineering reactor” because of a “flux variation of as much as 300% between the 45-degree segment and the 75-degree segment,” calling it “mathematically implausible that a 20% deviation is possible when the neutron flux itself varies by 300%.” *Id.* at p. 12, ¶ 34. Gundersen’s final opinion on this point is:

The Westinghouse Analysis delineates that a 20% variation is mandatory, yet the effective fluence variability can be as high as 300%, therefore, *the analytical data does not support relicensure without destructive testing and complete embrittlement analysis of additional capsule samples.*

Gundersen Report at p. 16, ¶ 39. He also discovered In the 1980's, Palisades was allowed to ignore the scientifically acceptable  $1\sigma$  variation identified by Westinghouse, when on February 28, 1984, the NRC authorized deletion of sample SA-60-1 from consideration because its measured neutron value exceeded this  $1\sigma$  variation:

As of October 31, 1982, the licensee indicates that Capsule A-60 had accumulated approximately  $8.7 \times 10^{18}$  n/cm<sup>2</sup> ( $E > 1\text{MeV}$ ) neutron fluence. Since the neutron fluence accumulated by the Capsule is significantly greater than the predicted EOL fluence for the Palisades reactor vessel and Capsule A-240 has provided material properties that can be utilized to predict the EOL material properties of the Palisades reactor vessel, Capsule A-60 will provide no useful fracture toughness data and may be deleted from the surveillance program.

*Id.* at p. 16, ¶ 41. From this evidence, Gundersen deduced that “this particular sample was discarded precisely because it gave an answer that would have required Palisades to be shut down.” “It follows,” he opined, “that the analytical basis for continuing operation is distorted, and since specific sample data has been disregarded, Entergy may be putting the public at risk by operating Palisades under unsafe conditions.” *Id.* at p. 16, ¶ 42.

#### 4. An ‘Equivalent Margins Evaluation’ Which Does Not Rely On Equivalence

Arnold Gundersen further accuses Entergy of “seeking NRC approval for another untried methodological approach to measure the neutron bombardment induced reactor vessel embrittlement in such a manner, that the Palisades NPP could continue to operate under additional relaxed measurement conditions.” Gundersen Declaration at p. 19, ¶ 45.5. From the evidence Gundersen reviewed,

. . . it appears that this specific LAR is required because prior evaluations suggest that three portions of the nuclear reactor vessel will not meet the NRC required 50 ft-lb ductility stress limit. It also appears, from the five documents attached to the LAR, that Westinghouse has reanalyzed and manipulated the Palisades data so that the final calculations keep the reactor vessel within the regulatory acceptable range above the minimum 50 ft-lb ductility stress limit.

*Id.* at ¶ 46. “Entergy,” Gundersen says, “may have chosen not to apply the Westinghouse re-analysis because that analysis would not allow Entergy to operate the Palisades NPP in the manner it wished.” Consequently, Gundersen states, “Entergy submitted what it calls an equivalent margin analysis to show

that even in the portions of the nuclear reactor that did not meet the NRC minimum required 50 ft-lb ductility stress limit, the reactor will still provide sufficient safety margins for continued operation of the Palisades Nuclear Power Plant.” *Id.* at p. 20, ¶ 47. Gundersen considers this to be “red flag” evidence that “Entergy is proposing to operate its Palisades NPP well outside the norm by proposing to reanalyze the deteriorating metallurgical conditions without using the readily available physical samples that are designed specifically for this purpose.” *Id.* at ¶ 48.

“The problems identified by the need for an equivalent margins analysis in conjunction with Palisades’ long history of metallurgical concerns,” Gundersen concluded, “proves that continued operation in the future will be on an experimental basis. Clearly the ‘special’ condition of the Palisades reactor and its ranking as one of the most embrittled reactors in the United States qualify its continued operation as a test.” *Id.* at pp. 20-21, ¶ 50.

And Gundersen also advises that “extrapolation beyond 2014 is problematic and potentially dangerous” because of the 16 year period that will have passed between 2003 and 2019 since an actual sample was removed from inside the RPV, “so there is no physical data to benchmark the analysis described in 10 CFR 50.61 and in 10 CFR 50.61(a).” Gundersen Declaration at p. 21. “Even the NRC,” he notes, “has acknowledged that its 50.61(a) models require validation in order to provide assurance of safe operation at Palisades.” *Id.* Because “abundant capsule coupon samples remain inside the reactor,” he counsels, they “should be removed and tested rather than the Entergy proposal of a license change based only upon an extrapolated analysis.” *Id.* at ¶ 51.

Even the Advisory Committee on Reactor Safety (“ACRS”) of the NRC recommended little more than one month ago that the use of all possible physical samples is important to an accurate outcome, that “the vehicle for doing that is doing a statistical comparison of a particular reactor’s *plant specific surveillance data* with the general trends.” (Emphasis in original). Gundersen Declaration at p. 22, ¶ 53.

Gundersen's bottom-line professional opinion is that "the NRC should not approve any change to Palisades' operating license without such validation and verification."

## V. Conclusion

The evidence articulated in support of this Petition is considerable, and warrants a hearing before the Atomic Safety and Licensing Board. Section 182a of the Atomic Energy Act states that a reactor operating license must include "technical specifications" that include, *inter alia*, "the specific characteristics of the facility, and such other information as the Commission may, by rule or regulation, deem necessary in order to enable it to find that the utilization . . . of special nuclear material . . . will provide adequate protection to the health and safety of the public." 42 U.S.C. § 2232(a).

The Commission is empowered to issue an order amending any license as it deems necessary to "effectuate the provisions of [the AEA]" (42 U.S.C. § 2233) - that is, to "promote the common defense and security or to protect health or to minimize danger to life or property." *Id.* § 2201; *see also id.* § 2237. Additionally, the Commission "may at any time . . . before the expiration of the license, require further written statements [from the licensee] to determine whether . . . a license should be modified." *Id.* § 2232(a).

Finally, section 189a of the AEA states that "[i]n any proceeding under [the AEA], for the . . . amending of any license . . . , the Commission shall grant a hearing upon the request of any person whose interest may be affected by the proceeding, and shall admit any such person as a party to such proceeding." 42 U.S.C. § 2239(a)(1)(A).

Petitioners have demonstrated their particularized interest in the outcome of Entergy's license amendment request, and further, have provided factual details along with regulatory and legal authority as anticipated by 10 CFR § 2.309. For all these reasons, Petitioners pray the Nuclear Regulatory Commission grant them leave to intervene in the license amendment proceeding, and to schedule discovery and an adjudicatory hearing.

/s/ Terry J. Lodge

Terry J. Lodge (OH #0029271)  
316 N. Michigan St., Ste. 520  
Toledo, OH 43604-5627  
(419) 255-7552  
Fax (419) 255-7552  
Tjlodge50@yahoo.com  
Counsel for Petitioners

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

In the Matter of: ) Docket No. 50-255  
Entergy Nuclear Operations, Inc. )  
(Palisades Nuclear Plant) )  
Operating License Amendment Request ) December 1, 2014  
)

\* \* \* \* \*

**DECLARATION OF AUTHORIZED OFFICER OF BEYOND NUCLEAR IN  
SUPPORT OF PETITION TO INTERVENE IN DOCKET NO. 50-255**

Under penalty of perjury, I, Kevin Kamps, declare as follows:

1. I am authorized by Beyond Nuclear, 6930 Carroll Ave, #400, Takoma Park, MD 20912 to sign this Declaration. Beyond Nuclear is formally and officially opposed to Entergy Nuclear Operations, Inc.'s request to the Nuclear Regulatory Commission to allow a change to the Palisades Operating License to allow implementation of 10 CFR § 50.61a, "Alternate fracture toughness requirements for protection against pressurized thermal shock events," *in lieu* of 10 CFR § 50.61.
2. Beyond Nuclear has 20,000 active members, several of whom live within 50 miles of the Palisades nuclear power plant site, including Bette Pierman of Benton Harbor, Michigan. Beyond Nuclear is concerned that if the NRC grants the Entergy license amendment request, the operation of Palisades could adversely affect the health and safety of Beyond Nuclear members, and the integrity of the environment in which they live.
3. In order to ensure that the operating license amendment decision for Palisades protects the interests of Beyond Nuclear members in a safe and healthy environment, the group formally seeks to intervene on behalf of its member, Bette Pierman, who has provided a declaration of her standing to pursue the pending Pressurized Thermal Shock license amendment proceeding. Beyond Nuclear intends, on behalf of its members, to take any legal actions necessary to ensure the license amendment proceeding is conducted fairly, effectively, efficiently and in a manner that provides the full consideration of all issues that could affect the safety and health of Beyond Nuclear members and their living environment.

I hereby declare under penalty of perjury that the foregoing facts are true and correct and that any expressions of opinion are based on my judgment.

December 1, 2014  
[date]

For Beyond Nuclear  
By Kevin John Kamps  
Kevin Kamps, Nuclear Waste Specialist

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

In the Matter of: ) Docket No. 50-255  
Entergy Nuclear Operations, Inc. )  
(Palisades Nuclear Plant) )  
 ) December 1, 2014  
Operating License Amendment Request )  
 )  
 ;  
\* \* \* \* \*

**DECLARATION OF BETTE PIERMAN IN SUPPORT OF  
PETITION TO REQUEST A PUBLIC HEARING AND LEAVE  
TO INTERVENE IN OPPOSITION TO OPERATING LICENSE  
AMENDMENT FOR PALISADES NUCLEAR PLANT**

The following statements are true under the penalty of perjury:

1) My name is Bette Pierman. I am a member of Beyond Nuclear, a grassroots coalition located at 6930 Carroll Ave, Takoma Park, MD 20912, hereinafter referred to as "Petitioner," which opposes continued reliance on commercial nuclear power generation and advocates immediate conversion to a renewable energy economy.

2) I reside at 2033 Paw Paw Ave., Benton Harbor, MI 49022-2651. My home is located approximately 13 miles from Palisades Nuclear Plant ("Palisades"), operated by Entergy Nuclear Operations, Inc. ("Entergy"), which has formally requested the United States Nuclear Regulatory Commission to allow a change to the Palisades Operating License to allow implementation of 10 CFR § 50.61a, "Alternate fracture toughness requirements for protection against pressurized thermal shock events," *in lieu* of 10 CFR § 50.61.

3) I believe that the possibility of through-wall cracking of the Palisades nuclear reactor vessel is greater than Entergy predicts; that the request for license amendment is inadequate as written; and my interests will not be adequately represented absent participation in this action by Don't Waste Michigan to intervene and participate as a full party in this proceeding on my behalf. I further believe that if Palisades is allowed to continue operations based upon the information Entergy has provided in its request without resolving Don't Waste Michigan's safety and environmental concerns, Palisades may operate unsafely and pose an unacceptable risk to the environment and to my health and safety, as a member who lives, recreates and conducts business within the affected vicinity of the nuclear power reactor. I am concerned that if an accident were to occur at Palisades, I might be killed, injured or sickened by radioactive releases.

November 25, 2014  
Date

Bette Pierman  
Bette Pierman

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

In the Matter of: ) Docket No. 50-255  
Entergy Nuclear Operations, Inc. )  
(Palisades Nuclear Plant) )  
Operating License Amendment Request ) December 1, 2014  
)

\* \* \* \* \*

**DECLARATION OF AUTHORIZED OFFICER OF DON'T WASTE MICHIGAN IN  
SUPPORT OF PETITION TO INTERVENE IN DOCKET NO. 50-255**

Under penalty of perjury, I, Michael J. Keegan, declare as follows:

1. I am authorized by Don't Waste Michigan, 2213 Riverside DR NE, Grand Rapids MI 48505 and P.O. Box 463, Monroe, MI 48161, to sign this Declaration. Don't Waste Michigan is formally and officially opposed to Entergy Nuclear Operations, Inc.'s request to the Nuclear Regulatory Commission to allow a change to the Palisades Operating License to allow implementation of 10 CFR § 50.61a, "Alternate fracture toughness requirements for protection against pressurized thermal shock events," *in lieu* of 10 CFR § 50.61.

2. Don't Waste Michigan has 40 active members, several of whom live within 50 miles of the Palisades nuclear plant site, including Alice Hirt of Holland, Michigan. Don't Waste Michigan is concerned that if the NRC grants the Entergy license amendment request, the operation of Palisades could adversely affect the health and safety and the integrity of the environment in which Don't Waste Michigan's members live.

3. In order to ensure that the operating license amendment decision for Palisades protects the interests of Don't Waste Michigan members in a safe and healthy environment, the group formally seeks to intervene on behalf of its member, Alice Hirt, who has attached a declaration, in the pending Pressurized Thermal Shock license amendment proceeding. Don't Waste Michigan intends, on behalf of its members, to take any legal actions necessary to ensure the license amendment proceeding is conducted fairly, efficiently and in a manner that provides the full consideration of all issues that could affect the safety and health of Don't Waste Michigan members and their living environment.

For Don't Waste Michigan

12/1/2014  
[date]

By Michael J. Keegan  
Michael J. Keegan, Co-Chair

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

In the Matter of: ) Docket No. 50-255  
Entergy Nuclear Operations, Inc. )  
(Palisades Nuclear Plant) )  
Operating License Amendment Request ) December 1, 2014  
 )  
 ;  
 \* \* \* \* \*

**DECLARATION OF ALICE HIRT IN SUPPORT OF  
PETITION TO REQUEST A PUBLIC HEARING AND LEAVE  
TO INTERVENE IN OPPOSITION TO OPERATING LICENSE  
AMENDMENT FOR PALISADES NUCLEAR PLANT**

The following statements are true under the penalty of perjury:

1) My name is Alice Hirt. I am a member of Don't Waste Michigan, a grassroots coalition within the State of Michigan, hereinafter referred to as the "Petitioner," which opposes continued reliance on commercial nuclear power generation and advocates immediate conversion to a renewable energy economy.

2) I reside at 6677 Summit View Concourse, Holland, MI 49423. My home is located approximately 35 miles from Palisades Nuclear Plant ("Palisades"), operated by Entergy Nuclear Operations, Inc. ("Entergy"), which has formally requested the United States Nuclear Regulatory Commission to allow a change to the Palisades Operating License to allow implementation of 10 CFR § 50.61a, "Alternate fracture toughness requirements for protection against pressurized thermal shock events," in lieu of 10 CFR § 50.61.

3) I believe that the possibility of through-wall cracking of the Palisades nuclear reactor vessel is greater than Entergy predicts; that the request for license amendment is inadequate as written; and my interests will not be adequately represented absent participation in this action by Don't Waste Michigan to intervene and participate as a full party in this proceeding on my behalf. I further believe that if Palisades is allowed to continue operations based upon the information Entergy has provided in its request without resolving Don't Waste Michigan's safety and environmental concerns, Palisades may operate unsafely and pose an unacceptable risk to the environment and to my health and safety, as a member who lives, recreates and conducts business within the affected vicinity of the nuclear power reactor. I am gravely concerned that if an accident were to occur at Palisades, my children or grandchildren, or I might be killed, injured or sickened by radioactive releases.

11/25/14 \_\_\_\_\_  
Date Alice Hirt

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

In the Matter of: ) Docket No. 50-255  
Entergy Nuclear Operations, Inc. )  
(Palisades Nuclear Plant) )  
Operating License Amendment Request ) December 1, 2014  
)

\* \* \* \* \*

**DECLARATION OF AUTHORIZED OFFICER OF NUCLEAR ENERGY INFORMATION  
SERVICE IN SUPPORT OF PETITION TO INTERVENE IN DOCKET NO. 50-255**

Under penalty of perjury, I, David Kraft, declare as follows:

1. I am authorized by Nuclear Energy Information Service, 3411 W Diversey Avenue, #16, Chicago IL 60647 ("NEIS") to sign this Declaration. NEIS is formally and officially opposed to Entergy Nuclear Operations, Inc.'s request to the Nuclear Regulatory Commission to allow a change to the Palisades Operating License to allow implementation of 10 CFR § 50.61a, "Alternate fracture toughness requirements for protection against pressurized thermal shock events," *in lieu* of 10 CFR § 50.61.

2. NEIS has 902 active members, several of whom live, recreate or conduct business within 50 miles of the Palisades nuclear power plant site, including Gail Snyder. NEIS is concerned that if the NRC grants the Entergy license amendment request, the operation of Palisades could adversely affect the health and safety of NEIS members and the Chicago metropolitan area (even though Chicago itself is outside a 50-mile radius from Palisades, Lake Michigan lies between the plant and Chicago), and the integrity of the environment in which they live.

3. In order to ensure that the operating license amendment decision for Palisades protects the interests of NEIS members in a safe and healthy environment, the group formally seeks to intervene on behalf of its member, Gail Snyder, who has provided a declaration of her standing to pursue the pending Pressurized Thermal Shock license amendment proceeding. NEIS intends, on behalf of its members, to take any legal actions necessary to ensure the license amendment proceeding is conducted fairly, effectively, efficiently and in a manner that provides the full consideration of all issues that could affect the safety and health of NEIS members and their living environment and property.

I hereby declare under penalty of perjury that the foregoing facts are true and correct and that any expressions of opinion are based on my judgment.

For Nuclear Energy Information Service

Nov. 30, 2014  
[date]

By David C. Kraft  
David Kraft, Executive Director

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

In the Matter of: ) Docket No. 50-255  
Entergy Nuclear Operations, Inc. )  
(Palisades Nuclear Plant) )  
 ) December 1, 2014  
Operating License Amendment Request )

\* \* \* \* \*

**DECLARATION OF GAIL SNYDER IN SUPPORT OF  
PETITION TO REQUEST A PUBLIC HEARING AND LEAVE  
TO INTERVENE IN OPPOSITION TO OPERATING LICENSE  
AMENDMENT FOR PALISADES NUCLEAR PLANT**

The following statements are true under the penalty of perjury:

1) My name is Gail Snyder. I am a member of Nuclear Energy Information Service, 3411 W Diversey Avenue, #16, Chicago IL 60647 ("NEIS"), a grassroots coalition, hereinafter referred to as "Petitioner," which opposes continued reliance on commercial nuclear power generation and advocates immediate conversion to a renewable energy economy.

2) I reside in Homer Glen, Illinois. I also am fee owner of five (5) acres of land located in Columbia Township, Van Buren County, Michigan. The property is located approximately 15 miles from Palisades Nuclear Plant ("Palisades"), operated by Entergy Nuclear Operations, Inc. ("Entergy"), which has formally requested the United States Nuclear Regulatory Commission to allow a change to the Palisades Operating License to allow implementation of 10 CFR § 50.61a, "Alternate fracture toughness requirements for protection against pressurized thermal shock events," *in lieu* of 10 CFR § 50.61. My family members have camped on the land, and go there during the warm season on day trips from our home. We had intentions of constructing a house there until we learned about the dangers of being downwind of Palisades.

3) I believe that the possibility of through-wall cracking of the Palisades nuclear reactor vessel is greater than Entergy predicts; that the request for license amendment is inadequate as written; and my interests will not be adequately represented absent participation in this action by NEIS to intervene and participate as a full party in this proceeding on my behalf. I further believe that if Palisades is allowed to continue operations based upon the information Entergy has provided in its request without resolving NEIS' safety and environmental concerns, Palisades may operate unsafely and pose an unacceptable risk to the environment and to my health and safety, as a member who lives, recreates and conducts business within the affected vicinity of the nuclear power reactor. I am concerned that if an accident were to occur at Palisades, my family members or I might be killed, injured or sickened by radioactive releases, and that if we are not personally present during a radiological accident, the land I own would become permanently uninhabitable.

11/30/14  
Date

Gail Snyder  
Gail Snyder

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

In the Matter of: ) Docket No. 50-255  
Entergy Nuclear Operations, Inc. )  
(Palisades Nuclear Plant) )  
 ) December 1, 2014  
Operating License Amendment Request )

\* \* \* \* \*

**DECLARATION OF AUTHORIZED OFFICER OF MICHIGAN SAFE  
ENERGY FUTURE IN SUPPORT OF PETITION TO INTERVENE  
IN DOCKET NO. 50-255**

Under penalty of perjury, I, Vikke Andersen, declare as follows:

1. I am authorized by Michigan Safe Energy Future - Shoreline ("MSEF") located at MSEF P.O. Box 221 South Haven, MI 49090 to sign this Declaration. MSEF is formally and officially opposed to Entergy Nuclear Operations, Inc.'s request to the Nuclear Regulatory Commission to allow a change to the Palisades nuclear plant Operating License to allow implementation of 10 CFR § 50.61a, "Alternate fracture toughness requirements for protection against pressurized thermal shock events," *in lieu* of 10 CFR § 50.61.
2. MSEF has 6 active members, several of whom live within 50 miles of the Fermi 2 nuclear power plant site, including me. MSEF is concerned that if the NRC grants the Entergy license amendment request, the operation of Palisades could adversely affect the health and safety and the integrity of the environment in which Beyond Nuclear members live.
3. In order to ensure that the operating license amendment decision for Palisades protects the interests of MSEF members in a safe and healthy environment, the group formally seeks to intervene on behalf of its member, Maynard Kaufman, who has attached a declaration, in the pending Pressurized Thermal Shock license amendment proceeding. MSEF intends, on behalf of its members, to take any legal actions necessary to ensure the license amendment proceeding is conducted fairly, efficiently and in a manner that provides the full consideration of all issues that could affect the safety and health of MSEF members and their living environment.

For Michigan Safe Energy Future - Shoreline

December 1 2014  
[date]

By Vikke Andersen, Co-Chair  
Vikke Andersen, Co-Chair



Roll Backs from 1976 to 2011 – Sampled from ADAMS on search for term “Palisades PTS Evaluation” of 108 documents identified. The following documents are germane and represent only some of the Roll Backs on Pressurized Thermal Shock. Provided by Michael J. Keegan, December 1, 2014.

Roll Back of April 29, 1976. Palisades License Amendment No. 21 to Provisional Operating License No. DPR-20 for the Palisades Plant. The amendment consists of changes to the Technical Specifications, and is in response to your requests dated July 9, 1975, and January **30** and April 5, 1976, as supplemented and amended. Fuel Assemblies Replacement / Substitution.

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML020790203> This amendment (1)-revises provisions in the Technical Specifications related to the replacement of fuel assemblies in the Palisades core with fuel assemblies of a different design, constituting refueling of the core for operation with Cycle 2 at power levels up to 2200 NIWt (**100%** power), (2) incorporates operating limits in the Technical Specifications based on an evaluation of ECCS performance calculated in accordance with an acceptable evaluation model that conforms to the requirements of the Commission's regulations in **10** CFR Section 50.46, (**3**) modifies various limits established in accordance with the Commission's Interim Acceptance Criteria, and (4) terminates the further restrictions imposed by the Commission's December 27, 1974 Order for Modification of License, and imposes instead limitations established in accordance with the Commission's Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors, **10 CFR** Section 50.46.

Roll Back – Power Uprate 15% November 1, 1977. Palisades Amendment No. 31, to Provisional Operating License No. DPR-20 for the Palisades Plant. The amendment consists of changes to the Technical Specifications and is in response to your request dated August 12, 1977, as supplemented September 26, 1977.

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML020790442> This amendment authorizes operation of the Palisades Plant at power levels up to 2530 megawatts thermal.

Roll Back June 7, 1984. Palisades Issued License Amendment 82 - Thermal Margin TECHNICAL SPECIFICATION CHANGES TO THE BASIS FOR THE THERMAL MARGIN/LOW PRESSURE TRIP SETTING

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML020800178> This amendment modifies the basis for the thermal margin/low pressure trip setting based on the results of a reanalysis of the control rod withdrawal transient and also modifies the basis for the limit on linear heat rate.

Roll Back July 12, 1988. SUBJECT: NRC POSITION ON RADIATION EMBRITTLEMENT OF REACTOR VESSEL MATERIALS AND ITS IMPACT ON PLANT OPERATIONS Information Notice – Generic Letter

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML031150471> ...Revision 2 to Regulatory Guide 1.99, "Radiation Embrittlement of Reactor

Vessel Materials," which became effective May 1988. It will be used by the NRC in reviewing submittals regarding pressure-temperature (P-T) limits and for analyses other than pressurized thermal shock (PTS) that require an estimate of the embrittlement of reactor vessel beltline materials.

Licensees and permittees should use... the methods described as required by Paragraph V.A. of 10 CFR Part 50 Appendix G, unless they can justify the use of different methods. The use of the Revision 2 methodology may result in a modification of the pressure-temperature limits contained in Technical Specifications in order to continue to satisfy the requirements of Sec. V of 10 CFR Part 50, Appendix G. Within 180 days of the effective date of Revision 2, licensees should submit the results of their technical analysis and a proposed schedule for whatever actions they propose to take. In the event that such actions are necessary, their schedule is negotiable.

Roll Back April 26, 1990. Palisades AMENDMENT NO.131 TO PROVISIONAL OPERATING LICENSE NO. DPR-20: PRESSURE-TEMPERATURE LIMITS AND LOW-TEMPERATURE OVERPRESSURE PROTECTION (TAC NOS. 72889 AND 71526)

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML020810447> This amendment revises the Appendix A TS relating to Primary Coolant System (PCS) operable components, **PCS** heatup and cooldown rates, **PCS** pressure temperature limits, **PCS** overpressure protection system set points and operating requirements, and Emergency Core Cooling System (ECCS) operability requirements. The amendment also revises certain related surveillance requirements. Specifically, the amendment modifies TS Sections 3.1, 3.3, 4.1, and 4.6, and Fig. 3-1, 3-2, 3-3, and 3-4.

These changes permit the use of a variable set point control-system for low-temperature overpressure protection, account for the use of Regulatory Guide 1.99, Rev. 2, for the determination of PCS heatup and cooldown limits, and allow extending the range of ECCS operation. Note\* Capsules T-330 and W-290 removed in 1983, reported.

Roll Back Request October 17, 1992. NUCLEAR MANAGEMENT COMPANY, LLC PALISADES NUCLEAR PLANT, DOCKET 50-255, LICENSE DPR-20 LICENSE AMENDMENT REQUEST: THERMAL MARGIN/LOW PRESSURE TRIP

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML023020583> Pursuant to 10 CFR 50.90, Nuclear Management Company, LLC (NMC) requests Nuclear Regulatory Commission (NRC) review and approval of a license amendment for the Palisades Nuclear Plant. NMC proposes to revise Table 3.3.1-2 of Appendix A, Technical Specifications (TS), by modifying a constant in the variable Thermal Margin/Low Pressure (TM/LP) trip equation. The proposed change would reduce calculated values for the variable TM/LP trip equation.

Roll Back March 2, 1995. Palisades Issued License Amendment 163 - The amendment consists of changes to the Technical Specifications (TS) to Accommodate Reactor

Vessel Fluence 4 more years.

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML020840184> The amendment revises primary coolant system (PCS) pressure-temperature limits, power-operated relief valve setting limits, and primary coolant pump starting limits to accommodate reactor vessel fluence for an additional 4 effective full power years. The amendment also revises the emergency core cooling system TS to render two high-pressure safety injection pumps incapable of injecting into the PCS when the PCS is below 300°F rather than rendering both inoperable below 260 °F. In addition, it revises the pressurizer heat up to achieve consistency between design assumptions and TS limits.

Roll Back December 27, 1999. -PALISADES PLANT TRANSMITTAL OF CALCULATION NOTEBOOKS SUPPORTING DEVELOPMENT OF RELAP DECK FOR REEVALUATING PRESSURIZED THERMAL SHOCK SCREENING CRITERIA

<http://pbadupws.nrc.gov/docs/ML0036/ML003670974.pdf>

The NRC has asked that the Palisades Plant forward Palisades specific thermal/hydraulic data which could be used by the NRC for their research effort in reevaluating 10CFR50.61 Pressurized Thermal Shock (PTS). A reevaluated 10CFR50.61 can potentially result in extending the date that Palisades reaches the PTS screening criteria. In order for the NRC to run calculations using RELAP5 for Palisades, Consumers Energy requested that Siemens Power Corporation (SPC) provide an input deck for ANF-RELAP, with accompanying calculation information, that the NRC can use as a starting point for this reevaluation effort. SPC has provided that information to Consumers Energy and has requested the information be controlled as proprietary.

ATTACHMENT I: AFFIDAVIT TO SUPPORT WITHHOLDING OF SIEMENS POWER COMPANY CALCULATION NOTEBOOKS SUPPORTING DEVELOPMENT OF RELAP DECK FOR REEVALUATING PRESSURIZED THERMAL SHOCK SCREENING CRITERIA. December 27, 1999.

Roll Back November 14, 2000. Revised Schedule for PTS Screening, 2007 to 2011.

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML003768802> The NRC staff also concludes that the properties of the Palisades Plant reactor vessel beltline materials will comply with the requirements of 10 CFR Part 50.61 for continued operation of the facility through both the end of the facility's current operating license (March 14, 2007) through the proposed period of operation (March 24, 2011).

Roll Back December 14, 2000. Palisades Amendment 192 Revision to Operating License Expiration from 2007 to 2011.

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML003777442> This amendment changes the expiration date of the Operating License to 40 years from the date of issuance of the license rather than the date of the construction permit. Specifically, the amendment changes the expiration date of the Operating License from

"midnight on March 14, 2007" to "midnight on March 24, 2011."

Roll Back September 30, 2004. NUREG CR-6858 RELAP5 Thermal Hydraulic Analysis to Support PTS Evaluations for the Oconee-1, Beaver Valley-1, and Palisades Nuclear Power Plants

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML043570>

385 ABSTRACT: As part of the Pressurized Thermal Shock Rebaseline Program, thermal hydraulic calculations were performed for the Oconee-1, Beaver Valley-1, and Palisades Nuclear Power Plants using the RELAP5/MOD3.2.2gamma computer program. Transient sequences that are important to the risk due to a PTS event were defined as part of a risk assessment by Sandia National Laboratories. These sequences include loss of coolant accidents (LOCA) of various sizes with and without secondary side failures and also non-break transients with primary and secondary side failure. Operator actions are considered in many of the sequences analyzed. The results of these thermal hydraulic calculations are used as boundary conditions to the fracture mechanics analysis performed by Oak Ridge National Laboratory.

Roll Back September 4, 2007. PALISADES NUCLEAR PLANT - REQUEST FOR AUTHORIZATION TO EXTEND THE THIRD INSERVICE INSPECTION INTERVAL FOR REACTOR VESSEL WELD EXAMINATION (TAC NO. MD3059)

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML07177>

0387 The Nuclear Regulatory Commission (NRC) staff has completed its review of the subject request for authorization of an alternative. As documented in the enclosed Safety Evaluation, the NRC staff concludes that the proposed alternative is justified on the basis that it would provide an acceptable level of quality and safety. Therefore, the NRC staff authorizes the proposed alternative pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year ISI interval at PNP. The proposed alternative is authorized until the end of spring 2009 refueling outage.

Roll Back July 21, 2008. Request for Authorization to Extend the Third 10-Year Inservice Inspection Reactor Interval for Vessel Weld Examination

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML082040>

342 The third inspection interval for PNP started on May 12, 1995, and considering the ASME Code-allowed extensions, was originally scheduled to end on December 12, 2006. The examination of the reactor vessel (RV) welds (Category B-A), the nozzle-to-vessel welds and inner radius sections (Category B-D), for the third interval would need to be completed by the end of the spring 2009 refueling outage, as allowed by two previously approved relief requests (References 1, 2, and 3).

NRC approval is requested to extend the third inspection interval, for RV pressure retaining welds, examination category B-A and B-D until December 12, 2015, for the subject examinations. The technical justification for this request is consistent with the

guidance provided in Regulatory Guide 1.174, dated November 2002 (Reference 4). Additionally, NRC-approved topical report WCAP-16168-NP-A, Revision 2 (Reference 5) includes an evaluation of risk based on PNP site-specific information. The extension of the inspection interval for these examinations would result in an acceptable level of quality and safety, as described in the enclosed request.

*The two documents below served as the technical basis to Roll Back from January 2014 to April 2017 at Limiting Beltline W5214 (Sister Proxies Averaging of 11 Capsules)*

Roll Back April 20, 2010. EVALUATION OF SURVEILLANCE DATA FOR WELD HEAT NO. W5214 FOR APPLICATION TO PALISADES PTS ANALYSIS Structural Integrity Associates Capsule Discussion of W5214 - Sister Plant -

[https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML110060](https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML110060693)

693 Executive Summary: This evaluation was performed as part of a review of the Palisades Pressurized Thermal Shock (PTS) re-evaluation. A previous analysis performed for the Palisades vessel in 2000 determined that the PTS screening criteria limit of 270°F for weld heat No. W5214 would not be reached until January 2014. That evaluation was based on the fluence projections and weld material chemistry for weld heat No. W5214 available at that time; no credit was given for surveillance data to improve the RTPTS projection. In the fall of 2009 it became apparent to Entergy that new information was available that could affect the RTNDT of the limiting Palisades vessel beltline material. The new data included revised fluence calculations and a total of eleven irradiated surveillance capsules that contain Charpy V-notch data for weld heat No. W5214. This report examines the updated fluence calculations performed by Westinghouse and all the available surveillance data relevant to the Palisades reactor pressure vessel weld heat No. W5214. Using the revised fluences and chemistry factors based on the refitted surveillance data for this weld heat, this re-evaluation shows that the projected date to reach the PTS screening criteria limit using the surveillance weld data would be approximately April 2017 or later.

Roll Back - November 12, 2010. REVISED PRESSURIZED THERMAL SHOCK EVALUATION FOR THE PALISADES REACTOR PRESSURE VESSEL Structural Integrity Associates Capsule Discussion of C-1279

[https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML110060](https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML110060694)

694 Executive Summary: This updated analysis was performed to review the previous Pressurized Thermal Shock (PTS) evaluation for Palisades and incorporate new data and information that could affect the date to reach the PTS screening limit in 10CFR50.61. A previous analysis performed for the Palisades vessel in 2000 determined that the PTS screening criteria limit of 270°F for weld heat No. W5214 would not be reached until January 2014. That evaluation was based on the fluence projections and weld material chemistry for weld heat No. W5214 available at that time; no credit was given for surveillance data to improve the RTpTs projection. In the fall of 2009 it became apparent to Entergy that new information was available that could affect the RTNDT of the limiting Palisades vessel beltline material. The new data included revised fluence calculations and additional surveillance capsules containing weld data matching the Palisades vessel beltline materials.

This report examines the updated fluence calculations performed by Westinghouse and all known surveillance data relevant to the Palisades reactor pressure vessel weld heat numbers W5214 and 27204. The scope of this new evaluation includes all of the materials located in the Palisades reactor vessel beltline region. This report is an extension of the earlier Structural Integrity Associates Report that only evaluated weld heat No. W5214 [5]. Using the revised fluences and chemistry factors based on the refitted surveillance data for limiting weld heat No. W5214, this re-evaluation shows that the projected date to reach the PTS screening criteria limit using the surveillance weld data would be approximately April 2017 or later. Revised chemistry factors based on surveillance capsule results were also calculated for weld heat No. 27204 and plate heat No. C-1279. This further evaluation of PTS confirms that the limiting vessel beltline material in the Palisades reactor vessel for evaluation of PTS remains the axial weld heat No. W5214.

Roll Back April 25, 2011. Report to NRC of Changes to Technical Specifications Bases Palisades Nuclear Plant. <http://pbadupws.nrc.gov/docs/ML1111/ML111160597.pdf>  
PNP 2011-032 Related to technical specifications of PORVs to PTS pp 56-58.

Changes reported after the fact. This report is submitted in accordance with Palisades Technical Specification 5.5.12.d, which requires that changes to the Technical Specifications Bases, implemented without prior Nuclear Regulatory Commission (NRC) approval, be provided to the NRC on a frequency consistent with 10 CFR 50.71(e).