UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of	)	
	)	
Holtec Palisades LLC and Holtec Decommissioning International	)	Docket No. 50-255-LA-4
	)	
	)	
(Steam Generator License Amendment Request)	)	June 16, 2025
	)	

PETITION TO INTERVENE AND REQUEST FOR ADJUDICATORY HEARING BY BEYOND NUCLEAR, DON'T WASTE MICHIGAN, MICHIGAN SAFE ENERGY FUTURE, THREE MILE ISLAND ALERT AND NUCLEAR ENERGY INFORMATION SERVICE

Now come Beyond Nuclear, Don't Waste Michigan, Michigan Safe Energy Future, Three Mile Island Alert and Nuclear Energy Information Service, by and through counsel, and set forth the following as and for their Petition to Intervene in the captioned proceeding.

INTRODUCTION

Holtec Palisades LLC and Holtec Decommissioning International (collectively, "Holtec"), has submitted to the NRC a "License Amendment Request to Revise Selected Permanently Defueled Technical Specifications to Support Repairing of Steam Generator Tubes by Sleeving" (License Amendment Request or LAR) respecting the Palisades Nuclear Plant ("Palisades") located in Covert Township, Michigan.[1] This LAR is one in a series of actions in support of Holtec's proposal to return Palisades from decommissioning status to power operations.

[1] Holtec License Amendment Request, 2/11/2025, https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25043A348

The LAR would revise the Permanently Defueled Technical Specifications (POTS) to allow the use of Framatome Alloy 690 sleeves to repair defective steam generator (SG) tubes as an alternative to removing the tubes from service by plugging or replacing the steam generators.

The steam generators at Palisades have been problematic for many years. Palisades began operation in 1971. The steam generators had to be replaced in 1991.[2] Then on May 10, 2006 Consumers Energy, the owner of Palisades at that time, made a presentation to Michigan regulatory authorities requesting approval to sell Palisades. One of the reasons for the proposed sale was the expected need to replace the steam generators yet again.[3] In the July 2, 2022, funding request to the Department of Energy for support to restart Palisades, Holtec requested $510 million to replace the steam generators.[4] Finally, the issue presented in the LAR involved in this case is an inspection report in September, 2024, confirming that many of the steam generator tubes were degraded.[5]

The license amendment requested by Holtec must comply with the requirements of 10 C.F.R. § 50.92, that granting a license amendment must be based on the considerations which govern the issuance of an initial license. The Atomic Energy Act requires that an initial license for a nuclear plant must ensure that the plant will follow safety standards to protect health and to minimize danger to life or property as the Commission may by rule establish. 42 U.S.C. § 2133(b). Those standards are:

> (a) the processes to be performed, the operating procedures, the facility and equipment, the specifications, or the proposals, in regard to any of the foregoing collectively provide reasonable assurance that the applicant will comply with the

[2] Beck, Charney, & Clark, *Palisades Nuclear Plant Steam Generator Replacement*, 54 Proceedings of the American Power Conference, 1295-1302 (1992).
[3] http://archives.nirs.us/reactorwatch/licensing/kampsconsbrifeinf051806.htm, slide 2.
[4] https://beyondnuclear.org/wp-content/uploads/2023/10/7-5-22-42-page-Holtec-application-to-DOE-for-CNC-funds-to-restart-Palisades.pdf
[5] Holtec License Amendment Request, p. 8/126 of pdf.

> regulations in this chapter . . . and that the health and safety of the public will not be endangered.
>
> (b) the applicant is technically and financially qualified to engage in the proposed activities in accordance with the regulations.
>
> (c) the issuance of a license will not, in the opinion of the Commission, be inimical to the common defense and security or to the health and safety of the public.

10 C.F.R. § 50.40.

Five petitioning organizations, Beyond Nuclear, Michigan Safe Energy Future, Don't Waste Michigan, Three Mile Island Alert and Nuclear Energy Information Service, demonstrate below that they have standing to pursue contentions against Holtec's request for a license amendment. As they detail below, Petitioners contend that the requested license amendment must not be granted because it violates the Atomic Energy Act and NRC regulations.

PETITIONING PARTIES AND THE BASIS FOR LEGAL STANDING

Beyond Nuclear

Beyond Nuclear (BN) is a not-for-profit public policy, research, education organization based in Takoma Park, Maryland that advocates the immediate expansion of renewable energy sources to replace commercial nuclear power generation. Beyond Nuclear has over 12,000 members of whom a number reside, work and recreate near the Palisades Nuclear Plant. Beyond Nuclear herewith provides its declaration setting forth its opposition to the restart of Palisades and to the continued use of the plant's existing steam generators., BN agrees to represent two of its members, W. Dillon Reed and Caroline Ferry, in this proceeding. Both have designated Beyond Nuclear to intervene to oppose the sleeving of the Palisades steam generators and to protect the members' interests in their health and safety and that of their family members, as well as protection of their real property, and the stability of the physical environment proximate to Palisades.

Beyond Nuclear's address is 7304 Carroll Ave., #182, Takoma Park, MD 20912, phone (301) 270-2209, www.beyondnuclear.org.

W. Dillon Reed is an adult Michigan citizen who lives at 80015 Ramblewood Drive, Covert, MI 49043, which is located 0.75 straight-line miles from the Palisades Nuclear Plant ("Palisades"). His home is near Lake Michigan and in the warm season he walks on the beach and wades in the Lake within a few hundred yards of Palisades and goes boating with friends or relatives. He opposes the reopening of Palisades, and particularly opposes the granting of the license amendment request for sleeving steam generator tubes because of concerns over the adequacy of the measures; the deteriorated conditions of the steam generators; potential unsafe performance of the steam generators; the potential for damage to public health and the environment and the well-being of his family; Holtec's lack of nuclear power generation experience; and controversial historical performance of the parent company, Holtec International ("Holtec"), as a corporation.

Mr. Reed has designated Beyond Nuclear to represent his interests in this proceeding and states that they will not be adequately represented unless Beyond Nuclear is allowed to participate as a party on his behalf.

Caroline Ferry is an adult citizen of Michigan who lives at 79964 Fernwood Drive, Covert, MI 49043, which is located 0.75 straight-line miles from the Palisades Nuclear Plant ("Palisades"). Her home is near Lake Michigan and in the warm season she walks on the beach and wades in the Lake within a few hundred yards of Palisades and goes boating with friends or relatives. She opposes the reopening of Palisades, and particularly opposes the granting of the license amendment request for sleeving steam generator tubes because of concerns over the adequacy of the measures; the deteriorated conditions of the steam generators; potential unsafe

performance of the steam generators; the potential for damage to public health and the environment and the well-being of his family; Holtec's lack of nuclear power generation experience; and controversial historical performance of the parent company, Holtec International ("Holtec"), as a corporation.

Ms. Ferry has designated Beyond Nuclear to represent her interests in this proceeding and states that they will not be adequately represented unless Beyond Nuclear is allowed to participate as a party on her behalf.

Michigan Safe Energy Future

Michigan Safe Energy Future (MSEF) is a grassroots association of people in western and southwestern Michigan which since 2013 has advocated for the permanent shutdown of Palisades Nuclear Plant and replacement of nuclear and natural gas power generation with safe and renewable nonnuclear energy technologies. MSEF has a dozen members and does not have a fixed office address.

MSEF herewith provides its declaration, agreeing to represent two of its members, James Scott and Ann Scott in this proceeding. Both Scotts designated MSEF to intervene to raise contentions and adjudicate issues bearing on the legal propriety as well as environmental and safety aspects of the steam generators license amendment request.

James Scott is an adult citizen of Michigan who lives at 80014 Ramblewood Hill, Covert, MI 49043, which is located 1.2 straight-line miles from the Palisades Nuclear Plant. His home is near Lake Michigan and in the warm season he walks on the beach and wades in the Lake within a few hundred yards of Palisades and goes boating with friends or relatives. He opposes the reopening of Palisades, and particularly opposes the granting of the license amendment request for sleeving steam generator tubes because of concerns over the adequacy of the measures; the

deteriorated conditions of the steam generators; potential unsafe performance of the steam generators; the potential for damage to public health and the environment and the well-being of his family; Holtec's lack of nuclear power generation experience; and controversial historical performance of the parent company, Holtec International ("Holtec"), as a corporation.

Mr. Scott has designated Michigan Safe Energy Future to represent his interests in this proceeding and states that they will not be adequately represented unless MSEF is allowed to participate as a party on his behalf.

Ann Scott is an adult citizen of Michigan who lives at 80014 Ramblewood Hill, Covert, MI 49043, which is located 1.2 straight-line miles from the Palisades Nuclear Plant. Her home is near Lake Michigan and in the warm season she walks on the beach and wades in the Lake within a few hundred yards of Palisades and goes boating with friends or relatives. She opposes the reopening of Palisades, and particularly opposes the granting of the license amendment request for sleeving steam generator tubes because of concerns over the adequacy of the measures; the deteriorated conditions of the steam generators; potential unsafe performance of the steam generators; the potential for damage to public health and the environment and the well-being of his family; Holtec's lack of nuclear power generation experience; and controversial historical performance of the parent company, Holtec International ("Holtec"), as a corporation.

Ms. Scott has designated Michigan Safe Energy Future to represent her interests in this proceeding and states that they will not be adequately represented unless MSEF is allowed to participate as a party on her behalf.

Don't Waste Michigan

Don't Waste Michigan (DWM) is a 40-year-old grassroots association with over 40 members in southern, western and central Michigan. DWM is located at 811 Harrison St.,

Monroe, MI 48161. DWM works to shut down aging, dangerous nuclear power plants in the Great Lakes Basin; to halt or block the construction of new nuclear power plants; to educate the public about the dangers of nuclear power and nuclear waste, its deadly by-product; and to block the practice of landfilling nuclear waste.

DWM opposes the restart of Palisades and herewith provides its declaration, agreeing to represent two of its members, Alice Hirt and Joseph Kirk, in this proceeding. Ms. Hirt and Mr. Kirk both have designated DWM to intervene to protect their interests in physical health and safety, the health and safety of their family members, their real property, and the health and stability of the physical environment proximate to Palisades.

Alice Hirt is an adult citizen of Michigan who lives at 6677 Summit View, Holland, MI 49024, which is located 36.5 straight-line miles from the Palisades Nuclear Plant. Her home is near Lake Michigan and in the warm season she walks on the beach and wades in the Lake and goes boating with friends or relatives. She opposes the reopening of Palisades, and particularly opposes the granting of the license amendment request for sleeving steam generator tubes because of concerns over the adequacy of the measures; the deteriorated conditions of the steam generators; potential unsafe performance of the steam generators; the potential for damage to public health and the environment and the well-being of his family; Holtec's lack of nuclear power generation experience; and controversial historical performance of the parent company, Holtec International ("Holtec"), as a corporation.

Ms. Hirt has designated Don't Waste Michigan to represent her interests in this proceeding and states that they will not be adequately represented unless DWM is allowed to participate as a party on her behalf.

Joseph C. Kirk is an adult citizen of Michigan who lives at 29794 Lake Bluff, Palisades Park, MI 49043, which is 0.8 straight-line miles from the Palisades Nuclear Plant. His home is near Lake Michigan and in the warm season he walks on the beach and wades in the Lake within a few hundred yards of Palisades and goes boating with friends or relatives. He opposes the reopening of Palisades, and particularly opposes the granting of the license amendment request for sleeving steam generator tubes because of concerns over the adequacy of the measures; the deteriorated conditions of the steam generators; potential unsafe performance of the steam generators; the potential for damage to public health and the environment and the well-being of his family; Holtec's lack of nuclear power generation experience; and controversial historical performance of the parent company, Holtec International ("Holtec"), as a corporation.

Mr. Scott has designated Don't Waste Michigan to represent his interests in this proceeding and states that they will not be adequately represented unless DWM is allowed to participate as a party on his behalf.

Three Mile Island Alert

Three Mile Island Alert (TMIA) is a nonprofit grassroots organization with approximately 500 members and supporters. TMIA was founded in central Pennsylvania in 1977 as a grassroots advocacy organization opposed to commercial nuclear power for safety and economic reasons, two years before the accident at Three Mile Island, Unit 2. Three Mile Island, Unit 1, which is presently closed and undergoing decommissioning, is more recently being considered for reopening and restoration of power operations, similarly to Palisades. TMIA opposes a restart for multiple reasons, many relating to the expectations of safe operation of a reactor with some 45 years of operations.

TMIA opposes as a matter of policy the proposed restart of Palisades Nuclear Plant. TMIA opposes the grant of the proposed steam generator license amendment request for Palisades. TMIA herewith provides its declaration and agrees to represent one of its members, David Staiger, in this proceeding. Mr. Staiger has designated TMIA to intervene to protect his interests in physical health and safety, the health and safety of his family members, his real property, and the health and stability of the physical environment proximate to Palisades. He is an adult citizen of Michigan and his residence is located at 1928 Lakeway Ave, Kalamazoo, MI 49001-5195, which is located 39 straight-line miles from Palisades. For years he has spent time on several occasions annually as a tourist along the Lake Michigan shore within fewer than 10 miles from Palisades, and he intends to continue to do so in the future.

Mr. Staiger's opposition to nuclear energy is based in part on his understanding of the 1979 accident at Three Mile Island in Pennsylvania. He opposes the reopening of Palisades, and particularly opposes the granting of the license amendment request for sleeving steam generator tubes because of concerns over the adequacy of the measures; the deteriorated conditions of the steam generators; potential unsafe performance of the steam generators; the potential for damage to public health and the environment and the well-being of his family; Holtec's lack of nuclear power generation experience; and controversial historical performance of the parent company, Holtec International ("Holtec"), as a corporation.

Mr. Staiger has designated Three Mile Island Alert to represent his interests in this proceeding and states that they will not be adequately represented unless TMIA is allowed to participate as a party on his behalf.

Nuclear Energy Information Service

Nuclear Energy Information Service ("NEIS") is located at 3411 W Diversey Avenue,

#13, Chicago, IL 60647. NEIS opposes the potential reauthorization of power operations at Palisades on grounds of public health effects, potential damage to the environment and overall inadequate safety assurances concerning the 55 year old, deteriorated power plant facility.

NEIS is a nonprofit organization committed to ending nuclear power and advocating for sustainable ecologically sound and socially just energy solutions. NEIS educates, activates and organizes the public on energy issues, builds and mobilizes grass roots power and nonviolent opposition to nuclear power, as it advocates for sustainable and ecologically sound energy alternatives. NEIS has over 200 members, one or more of whom lives within 50 miles of Palisades Nuclear Plant. NEIS is concerned that there is deterioration of the steam generators at Palisades and if the NRC authorizes the proposed license amendment for the sleeving, there could be an accident affecting the economics and/or safety of the plant which in turn could adversely affect the public health and safety of its members and the integrity of their physical environment.

NEIS herewith provides its declaration and agrees to represent one of its members, John Brenneman, in this proceeding. John Brenneman is an adult citizen of Indiana whose lives at 2625 Cypress Way, South Bend, IN 46615, located 45 straight-line miles from the Palisades Nuclear Plant. He spends recreational time several times annually along the Lake Michigan shore within fewer than 10 miles from Palisades, and intends to do so in the future.

Mr. Brenneman opposes the reopening of Palisades, and particularly opposes the granting of the license amendment request for sleeving steam generator tubes because of concerns over the adequacy of the measures; the deteriorated conditions of the steam generators; potential unsafe performance of the steam generators; the potential for damage to public health and the environment and the well-being of his family; Holtec's lack of nuclear power generation

experience; and controversial historical performance of the parent company, Holtec International ("Holtec"), as a corporation.

Mr. Brenneman has designated NEIS to represent his interests in this proceeding and states that he will not be adequately represented unless NEIS is allowed to participate as a party on his behalf.

LEGAL BASIS FOR STANDING

Pursuant to the Atomic Energy Act, the Commission must grant a hearing in a licensing proceeding "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). To support the request, a petitioner must provide the Commission with information regarding "(1) the nature of the petitioner's right under the governing statutes to be made a party; (2) the nature of the petitioner's property, financial, or other interest in the proceeding; (3) the possible effect of any decision or order on the petitioner's interest." *Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), 60 NRC 548, 552 (2004) (citing 10 C.F.R. § 2.309(d)(1). "The NRC generally uses judicial concepts of standing in interpreting this regulation." *Entergy Nuclear Vermont Yankee*, 60 NRC at 552. Thus, a petitioner may intervene if it can specify facts showing "that (1) it has suffered or will suffer a distinct and palpable harm constituting injury-in-fact within the zone of interests arguably protected by the governing statutes, (2) the injury is fairly traceable to the action being challenged, and (3) the injury will likely be redressed by a favorable determination." *Id*. at 552-553. In determining whether a petitioner has met the requirements for establishing standing, the Commission "construe[s] the petition in favor of the petitioner." *Id*. at 553.

A petitioner for leave to intervene must, of course, show the potential for injury-in-fact to its interests before intervention can be granted. *Nuclear Eng'g Co., Inc.* (Sheffield, Ill. Low-Level Radioactive Waste Disposal Site), 7 NRC 737, 743 (1978). A petitioner need not establish that injury will inevitably result from the proposed action to show an injury-in-fact, but only that it may be injured in fact by the proposed action. *Gulf States Utils. Co., et al.* (River Bend Station, Unit 1), 40 NRC 43 (1994).

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). Organizations such as the various Petitioners in this case may act as representational entities by demonstrating harm to their members.

An organization seeking representational standing must demonstrate how at least one of its members may be affected by the licensing action (such as by activities on or near the site), must identify that member by name and address, and must show (preferably by affidavit) that the organization is authorized to request a hearing on behalf of that member. *Warth v. Seldin*, 422 U.S. 490, 511, 95 S.Ct. 2197, 45 L.Ed.2d 343 (1975) ("There is no question that an association may have standing in its own right to seek judicial relief from injury to itself and to vindicate whatever rights and immunities the association itself may enjoy. Moreover, in attempting to secure relief from injury to itself the association may assert the rights of its members, at least so long as the challenged infractions adversely affect its members' associational ties. *E.g., NAACP* v. *Alabama, supra*, at 458-460); *Anti-Fascist Committee* v. *McGrath*, 341 U.S. 123, 183-187

(1951) (Jackson, J., concurring). Even in the absence of injury to itself, an association may have standing solely as the representative of its members. *E.g., National Motor Freight Assn*. v. *United States*, 372 U.S. 246 (1963)." *Also, see Sperry Products v. Ass'n ofAm. Railroads*, 132 F.2d 408, 410–11 (2d Cir. 1942) (noting that unincorporated associations can be treated as singular entities for "procedural incidents" such as "service of process" and "venue," but that "for most purposes," including "jurisdiction over [] subject matter," the law "looks at such associations as mere aggregations of individuals").

An organization seeking representational standing must demonstrate how at least one of its members may be affected by the licensing action (such as by activities on or near the site), must identify that member by name and address, and must show (preferably by affidavit) that the organization is authorized to request a hearing on behalf of that member. *See, e.g., Georgia Institute of Technology* (Georgia Tech Research Reactor, Atlanta, Georgia), CLI-95-12, 42 NRC 111, 115 (1995); *Houston Lighting and Power Co*. (South Texas Project, Units 1 and 2), ALAB-549, 9 NRC 644, 646-48 (1979); *Houston Lighting and Power Co*. (Allens Creek Nuclear Generating Station, Unit 1), ALAB-535, 9 NRC 377, 390-97 (1979); *Shieldalloy Metallurgical Corp.* (Cambridge, Ohio Facility), CLI-99-12, 49 NRC 347, 354 & n.4 (1999); *Northeast Nuclear Energy Co.* (Millstone Nuclear Power Station, Unit 1), LBP-96-1, 43 NRC 19, 23 (1996).

In this case, five organizations – Beyond Nuclear, Don't Waste Michigan, Michigan Safe Energy Future, Three Mile Island Alert, and Nuclear Energy Information Service – are each petitioning on behalf of one or more members, and have submitted declarations from them. Five of the 8 members are residents of Palisades Park, Michigan, all of whom live within two miles or less from the Palisades plant. The remaining three live within 50 miles. The petitioning

organizations base their claims to standing on the facts that the restoration of Palisades to power generation is analogous to licensing a new nuclear power plant, and that the longstanding NRC policy is to readily recognize the legal standing of persons who live, work and/or recreate within 50 miles of a power plant in the present generation of light water reactors based on the inherent dangerousness of commercial nuclear power. *Amergen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), LBP-06-7, 63 NRC 188, 195 (2006). *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 an analogous operating license proceeding, a petitioner can base his or her standing upon a combination of residence or visits near the plant and a showing that the proposed action entails an increased potential for offsite consequences. *Commonwealth Edison Co*. (Zion Nuclear Power Station, Units 1 & 2), CLI-99-4, 49 NRC 185, 191 (1999); *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), LBP-08-18, 68 NRC 533, 541 (2008).

Petitioners' members may be accorded standing if they reside close enough to a planned project so that there is reasonable apprehension of injury. *Hydro Resources, Inc., supra.* As each of the member declarants explains, they will suffer (or will be under threat of suffering) concrete and particularized injuries from the restored operations of Palisades if the exemption sought by Holtec is granted. If the exemption is denied, the potential threats or actual harms from Palisades will not occur. Palisades may not resume operations without a license from the Commission, which by statute also has the power to order mitigation arrangements. 42 U.S.C. § 2133(a). In addition, the member-declarants have expressed bases for standing that fall within the zone of interests protected by the Atomic Energy Act and the National Environmental Policy Act and their respective implementing regulations, which are pertinent to this proceeding, even if the

Commission decides to grant the requested categorical exclusion. *See, e.g., Ouachita Watch League v. Jacobs*, 463 F.3d 1163, 1173 (11th Cir. 2006) ("[S]ince the injury alleged is environmental, it falls within the zone of interests protected by NEPA . . . ."); *Sabine River Auth. v. U.S. Dep't ofInterior*, 951 F.2d 669, 675 (5th Cir. 1992) (plaintiffs' concerns about impacts on water quality and quantity fell within NEPA's zone of interests).

The member-declarants have standing to intervene in their own right, having met the requirements for injury-in-fact, causation, and redressability. *See Lujan v. Defenders of Wildlife*, 504 U.S. 555, 572 n.7 (1992) ("[P]rocedural rights are special: The person who has been accorded a procedural right to protect his concrete interests can assert that right without meeting all the normal standards for redressability and immediacy.") (internal quotations omitted); *see also Duke Energy Corp.* (McGuire, Units 1 and 2; Catawba, Units 1 and 2) CLI-02-17, 56 NRC 1, 10 (2002) (emphasizing NEPA's goal to "ensure that the agency does not act upon incomplete information, only to regret its decision after it is too late to correct.").

STANDARD FOR ADMISSIBILITY OF CONTENTIONS

Section 189(a) of the Atomic Energy Act, 42 U.S.C. § 2239, provides:

> In any proceeding under this Act, for the granting, suspending, revoking, or amending of any license or construction permit, or application to transfer control, and in any proceeding for the issuance or modification of rules and regulations dealing with the activities of licensees, and in any proceeding for the payment of compensation, an award, or royalties under section 153, 157, 186c., or 188, the Commission shall grant a hearing upon the request of any person whose interest may be affected by the proceeding,

To carry out the provisions of that statute, the NRC has adopted a regulation, 10 C.F.R. § 2.309, regarding hearing requests and petitions to intervene. The regulation authorizes any person whose interest may be affected by a proceeding to intervene in the proceeding. Additionally, the petitioner must submit and have admitted at least one contention.

Pursuant to 10 C.F.R. § 2.309(f), a petitioner's contentions must: (1) provide a specific statement of the issue of law or fact to be raised or controverted; (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 action that is involved in the proceeding; (5) provide a concise statement of the alleged facts or expert opinions which support the petitioner's position on the issue and on which the petitioner intends to rely at hearing, together with reference to specific sources and documents on which the petitioner intends to rely; (6) provide sufficient information to show that a genuine dispute exists with the licensee on a material issue of law or fact.

The NRC has made clear that the burden on a petitioner in stating its contentions is not heavy. In *Dominion Nuclear Conn., Inc*. (Millstone Nuclear Power Station, Units 2 & 3), 54 NRC 349 (2001), the NRC described the contention admissibility standards as "insist[ing] upon some 'reasonably specific factual and legal basis' for the contention." *Id*., 54 NRC at 359. The NRC further explained in *Millstone* that the standards for contention admissibility were meant to prevent contentions based on "little more than speculation" and intervenors who had "negligible knowledge of nuclear power issues and, in fact, no direct case to present." *Id*. at 358. Rather, petitioners are required only to 'articulate at the outset the specific issues they wish to litigate." *Id*. at 359.

The NRC and the courts have also made clear that the burden of persuasion is on the licensee, not the petitioner. The petitioner only needs to "com[e] forward with factual issues, not merely conclusory statements and vague allegations." *Northeast Nuclear Energy Company* (Millstone Nuclear Power Station, Unit 3), 53 NRC 22, 27 (2001). The NRC described the

threshold burden in stating a contention as requiring a petitioner to "raise any specific, germane, substantial, and material factual issues that are relevant to the. . . request for a license. . . and that create a basis for calling on the [licensee] to satisfy the ultimate burden of proof." *Id*.

Courts have found, however, that this threshold burden may not be appropriate where the information was in the hands of the licensee or NRC staff and was not made available to the petitioner. See, e.g., *York Comm. for a Safe Env't. v. NRC*, 527 F.2d 812, 815 n. 12 (D.C. Cir. 1975) (where the information necessary to make the relevant assessment is "readily accessible and comprehensible to the license applicant and the Commission staff but not to petitioners, placing the burden of going forward on petitioners appears inappropriate.").

Also, in *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 554 (1978), the U.S. Supreme Court affirmed the NRC in finding that the proper standard to apply required intervenors to simply make a "showing sufficient to require reasonable minds to inquire further," a burden the NRC found to be significantly less than that of making a *prima facie* case.

The pleading requirements of 10 C.F.R. 2.309(f)(1) do not present the overly burdensome standards asserted by NRC Staff and Holtec. The standards are not meant to be insurmountable. *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), 49 NRC 328, 335 (1999) (explaining that the rule should not be used as a "fortress to deny intervention") (internal quotation marks and citation omitted); *see Entergy Nuclear Operations, Inc.* (Palisades Nuclear Plant and Big Rock Point Site), 96 NRC 1, 104-05 (2022) (admitting for hearing portions of a contention that raised a genuine material dispute with the application). The rule serves to assess the scope, materiality, and support provided for a proposed contention, to ensure that the hearing process is "properly reserve[d] . . . for genuine, material controversies between knowledgeable

litigants." *FirstEnergy Nuclear Operating Co.* (Davis-Besse Nuclear Power Station, Unit 1), 75 NRC 393, 396 (2012) (internal quotation marks omitted).

Another way to contextualize this point is to compare contention admissibility to the way a motion to dismiss is addressed in federal court. Pursuant to Federal Rules of Civil Procedure 12(b), a motion to dismiss is evaluated by accepting all factual allegations in the complaint as true and drawing all reasonable inferences in favor of the plaintiff. *Ashcroft v. Iqbal*, 556 U.S. 662 (2009). If, by doing so, the complaint fails to plausibly state a claim, then dismissal is warranted. Beyond the motion to dismiss, if facts are developed, a party can file with the court a motion for summary judgment, where the judge reviews the facts to determine if there is a genuine factual dispute. That would be analogous to the motion for summary disposition provided in 10 C.F.R. § 2.710, which is available only after a contention is admitted for hearing.

The current contention admissibility standards were adopted in 1989 because there was concern that the previously existing standards allowed intervention for petitioners who had no real basis for their contentions.[6] The Federal Register discussion states that the rule, now codified at 10 C.F.R. § 2.309(f)(1), does not require the petitioner to make its case at the contention admissibility stage, but merely to indicate what facts or expert opinions provide the basis for the contention. The Federal Register discussion goes on to say that a petitioner need only include some alleged facts in support of its position sufficient to indicate that a genuine issue of material fact or law exists. This prevents admission of a contention where the petitioner has no facts to support its position and where the intervenor wants to use discovery or cross-examination as a fishing expedition. Most importantly, the Federal Register analogizes to the Federal Rules of Civil Procedure:

> The rule was intended to parallel the standard for dismissing a claim under Rule

[6] 54 Fed. Reg. 33168 (1989).

> 12(b)(6) of the Federal Rules of Civil Procedure. The intent of Rule 12(b)(6) is to permit dismissal of a claim where the plaintiff would be entitled to no relief under any set of facts which could be proved in support of his claim.[7]
>
> Finally, the Federal Register makes the following statement:
>
> > [A]t the contention filing stage the factual support necessary to show that a genuine dispute exists need not be in affidavit or formal evidentiary form and need not be of the quality necessary to withstand a summary disposition motion.[8]

It appears that since the current contention admissibility rules were adopted in 1989, NRC Staff and permit applicants have presented arguments that mischaracterize and misapply the intended scope and purpose of the admissibility standards so as to require petitioners to essentially prove their case on the merits. By taking phrases from certain NRC decisions, such as that the admissibility standards are "strict by design," out of context, NRC Staff and permit applicants have developed a narrative that effectively requires petitioners to prove their case at the contention admissibility stage. That narrative is clearly at odds with the actual history and purpose of the contention admissibility standards. Petitioners respectfully ask this Board to evaluate the admissibility of this contention as originally intended.

PETITIONERS' CONTENTION AND SUPPORTING INFORMATION

CONTENTION 1

The steam generators at Palisades are defective and damaged because the tubes are corroded or otherwise defective and damaged. Holtec proposes to repair the defective and damaged tubes by installing metal sleeves, instead of plugging the tubes or replacing the generators entirely. Installing sleeves will make the tubes more likely to crack, than installing plugs. However, due to Holtec not properly maintaining the steam generators for the past 2-3 years, the only solution to the defective and damaged steam generators is to replace the generators. Therefore, the LAR to allow sleeving should not be granted and Holtec should be required to replace the steam generators.

Basis for the Contention

[7] 54 Fed. Reg. 33168, 33171.
[8] *Id.* at 33171.

A license amendment is to be issued only if the amendment complies with the considerations that govern the issuance of initial licenses. 10 C.F.R. § 50.92(a). Those considerations include whether the license amendment adversely affects the health and safety of the public, and whether the performance of each safety feature of the proposed activity has been demonstrated through either analysis, appropriate test programs, experience, or a combination thereof. 10 C.F.R. §§ 50.40 and 50.43(e)(1)(i).

The attached declaration of Arnold Gundersen, a qualified nuclear engineer, establishes that installing metal sleeves upon the steam generator tubes at Palisades will increase the stress on the tubes and the tube sheet. Increasing the stress on the tubes and the tube sheet will cause further cracking of the tubes. If steam generator tubes develop cracks, radioactive water can leak into non-radioactive steam, which will be released into the environment. If cracking is severe, a nuclear meltdown can occur.

Furthermore, the steam generators are so degraded that sleeving is insufficient to protect public health and safety and the generators must be replaced.

Therefore, Holtec's LAR to install metal sleeves must not be approved.

<u>This Contention Is Within the Scope of This Proceeding</u>

The scope of this proceeding is the consideration of Holtec's LAR and whether the amendment should be granted to install metal sleeves on the tubes of the steam generators at Palisades. In support of the LAR, Holtec has submitted documentation from Framatome, the manufacturer of the sleeves, with the assertion that the sleeves will provide adequate safeguards for the tubes and the generator. Petitioners' contention challenges those assertions in Holtec's documentation, so it is within the scope of this proceeding.

In addition, Holtec has cited the experience with sleeving at the Watts Bar 2 reactor as precedent for the LAR in this case. Mr. Gundersen explains in detail why the Watts Bar experience does not support the LAR and shows that the steam generators at Palisades must be replaced, as were the steam generators at Watts Bar 2. Because Holtec is using the Watts Bar experience as precedent, and because the Watts Bar steam generators had to be replaced, the Petitioners' conclusion that the Palisades steam generators must be replaced is within the scope of this proceeding.

"The scope of a proceeding , and, as a consequence, the scope of contentions that may be admitted, is limited by the nature of the application and pertinent Commission regulations."[9] As explained above, Holtec's LAR claims that sleeving the steam generator tubes will make the steam generators safe and that the steam generators will not have to be replaced. Commission regulations, specifically 10 C.F.R. § 50.92, requires that license amendments comply with the requirements of a new license, as set forth in 10 C.F.R. §§ 50.40 and 50.43(3)(1)(i). Those sections require that the NRC make a finding that the license amendment will not adversely impact public health and safety. Mr. Gundersen's report makes clear that the only way to protect public health and safety is to replace the steam generators at Palisades.

This Contention Is Material to the Findings the NRC Must Make in Considering the LAR

Pursuant to 10 C.F.R. §§ 50.40 and 50.43(3)(1)(i), the NRC must determine whether the proposal by Holtec to install metal sleeves on the Palisades steam generator tubes adversely impacts the health and safety of the public, and whether the performance of each safety feature of installing the sleeves has been demonstrated through either analysis, appropriate test programs, experience, or a combination thereof. The Petitioners' contention directly addresses

[9] 63 Fed. Reg. 41872, 41874 (1998).

those issues and is therefore material to the findings the NRC must make in considering the LAR.

Facts Upon Which Petitioners Intend to Rely In Support of the Contention

Petitioners rely on the attached declaration of Arnold Gundersen. Mr. Gundersen's CV is attached and his declaration at p. 1-4 discusses his special expertise and experience regarding steam generators.

Mr. Gundersen describes the history of steam generator damage at Palisades.[10] The initial steam generators at Palisades lasted only 19 years before being replaced in 1991. And, as noted in the Introduction above, in 2006, Consumers Energy wanted to sell Palisades because of a number of problems, including problems with the steam generators. And we also know that Holtec knew when it acquired Palisades in 2022 that the steam generators would have to be replaced. Replacement of the steam generators was one of the items asserted as a basis for the funding request from the Department of Energy.[11]

The current technical specifications for Palisades allow for plugging the steam generator tubes.[12] The LAR requests approval to install metal sleeves on the tubes. As Mr. Gundersen explains, however, the history of the steam generator problems at Palisades have been ongoing for years and have been exacerbated since Holtec acquired Palisades. Since Holtec acquired Palisades in 2022, the steam generators have not been properly maintained to allow them to be returned to service.[13] They have not been placed in what is termed wet layup. This allowed corrosive chemicals to attack the steam generators' internal structures. That, in turn, leads to a

[10] Gundersen Report, p. 4-8
[11] *Holtec International Application for Federal and State Support to Enable the Resurrection of the Palisades Nuclear Generation Station,* submitted July 5, 2022, p. 7/42 of pdf. https://beyondnuclear.org/wp-content/uploads/2023/10/7-5-22-42-page-Holtec-application-to-DOE-for-CNC-funds-to-restart-Palisades.pdf
[12] Holtec License Amendment Request, p. 1/126 of pdf.
[13] Gundersen Report, p. 13-14, 16

probable release of radioactive material. In fact, as Mr. Gundersen explains, sleeving the generator tubes will actually increase stress cracking, leading to a probable release of radioactive material.[14]

Another factor in the problematic attempt by Holtec to repair the steam generators is the concept of hideout.[15] Hideout involves the presence of corrosive chemicals between the tubes and the tube sheets in the steam generator. As Mr. Gundersen explains, Holtec's focus on repairing the tubes by sleeving ignores the more significant issue of hideout. Mr. Gundersen also explains that Holtec's MSLB testing does not accurately model the actual conditions that now exist inside the damaged Palisades steam generators.[16] Not only the tubes that Holtec proposes to sleeve, but all tubes inside the steam generators, will be under continuing chemical attack and will be further weakened if the NRC allows these old steam generators to be restarted. The MSLB tests performed by Holtec do not include any further degradation of all the tubes caused by hideout under hot operating conditions, but instead represents the cold-water condition of only the damaged tubes identified in the September 2024 inspection report.

Even if plugging the tubes on the Palisades steam generators would be preferable to installing sleeves, Mr. Gundersen concludes that the Palisades generators are so degraded that they must be replaced. Holtec's reliance on the experience at Watts Bar 2, although being an incorrect comparison to the situation at Palisades in many respects, is relevant in the fact that the steam generators at Watts Bar had to be replaced in 18 months.[17] And unlike the experience at Watts Bar, the Palisades steam generators are more seriously degraded because of Holtec's failure to place Palisades in wet layup for two years.

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[14] Gundersen Report, p. 18-20
[15] Gundersen Report, p. 30-31, 33
[16] Gundersen Report, p. 31-32
[17] Gundersen Report, p. 21-24

Petitioners hereby incorporate as if set out verbatim herein the attached declaration of Arnold Gundersen in support of this Petition.[18]

This Contention Raises a Genuine Dispute With Holtec's Application

Holtec's application requests a license amendment to allow the installation of metal sleeves on the steam generator tubes. Holtec claims that the sleeves will make the steam generators safe and allow Palisades to be restarted. The declaration of Arnold Gundersen and the history of the steam generator problems at Palisades clearly dispute the assertions in Holtec's application.

CONCLUSION

Petitioners have established standing and that their contention should be admitted for hearing. Holtec is trying to get by with a Band-Aid fix to a long-standing problem with the Palisades steam generators which has only been exacerbated by Holtec's failure to properly place the generators in wet layup. Not only will sleeving the generator tubes not fix the problem, it will make it worse by increasing the likelihood of stress cracking.

Based on the facts and the requirements of NRC regulations, Petitioners' Contention 1 must be admitted for hearing.

Dated June 16, 2025

/ s/ Terry J. Lodge
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CO-COUNSEL FOR PETITIONING ORGANIZATIONS

[18] 10 C.F.R. 2.309(f)(1)(v) (A contention must provide a concise statement of the alleged facts or expert opinion which supports the petitioners' position).

BEFORE THE UNITED STATES
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	Docket No. 50-255-LA-4
Holtec Palisades LLC and Holtec	)	
Decommissioning International	)	CERTIFICATE OF SERVICE
	)	
(Palisades Nuclear Plant Request for	)	June 16, 2025
Exemption and License Amendments	)	

Pursuant to 10 C.F.R. § 3.305, I certify that, on this date, copies of this Petition to Intervene and Request for Adjudicatory Hearing were served upon the Electronic Information Exchange (the NRC's E-Filing System) in the above captioned proceeding.

/s/ Wallace L. Tylor
WALLACE L. TAYLOR
ATTORNEY FOR PETITIONERS

Exhibit A: Standing Declarations

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Palisades LLC and Holtec Decommissioning International	)	June 16, 2025
(Palisades Nuclear Plant Request for License Amendment)	)	
	)	

* * * * *

DECLARATION OF AUTHORIZED OFFICER OF BEYOND NUCLEAR IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR PLANT LICENSE AMENDMENT REQUEST PROCEEDING

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

1. I am the Radioactive Waste Specialist of Beyond Nuclear (BN), located at 7304 Carroll Avenue, #182, Takoma Park, MD 20912, Tel. (301) 270-2209, www.beyondnuclear.org. I am authorized to sign this Declaration on behalf of Beyond Nuclear.

2. Beyond Nuclear has over 12,000 members, one or more of whom lives within 50 miles of Palisades Nuclear Plant (PNP). Beyond Nuclear is concerned that if the NRC authorizes the proposed l icense amendment request to change the technical specifications for the PNP steam generators, the subsequent restart of Palisades could adversely affect the public health and safety of its members and the integrity of the physical environment in which its members live.

3. Beyond Nuclear and its members oppose the Nuclear Regulatory Commission's (NRC) prospective issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP) and noticed in the *Federal Register* on April 15, 2025. The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4. Beyond Nuclear intends to intervene on behalf of its members, William D. Reed and Carolyn Ferry, in opposition to the granting of the proposed license amendment. Mr. Reed and Ms. Ferry have provided declarations in support of BN's intervention. BN and its members believe that granting the change of technical specifications for repair of the steam generators would not adequately address damage and deterioration present in the steam generators, and that they must be completely replaced with new steam generators. BN and its members further

believe that the proposed technical specification changes would not alleviate risks that the planned Palisades restart could adversely affect the health and safety of its members and the integrity of the physical environment.

5. BN intends to seek to intervene and establish standing on behalf of its members before the Nuclear Regulatory Commission and to raise contentions and adjudicate issues bearing on the legal propriety as well as safety and environmental aspects of the license amendment request.

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.

Beyond Nuclear

June 14 , 2025 Signed (electronically) by /s/ Kevin Kamps

Kevin Kamps, Radioactive Waste Specialist, BN
7304 Carroll Ave, #182, Takoma Park, MD 20912
kevin@beyondnuclear.org
Executed in Accord with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Decommissioning International LLC and Holtec Palisades LLC	)	June 16, 2025
(Palisades Nuclear Plant License Amendment Request)	)	

* * * * *

DECLARATION OF WILLIAM D. REED IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR POWER PLANT LICENSE AMENDMENT PROCEEDING

Now comes William D. Reed and makes the following statements under penalty of perjury:

1) My name is William D. Reed. I am an adult citizen of the State of Michigan. I also am a member of Beyond Nuclear, hereafter referred to as "Petitioner."

2) My residence is located at 80015 Ramblewood Drive, Covert, MI 49043, which is located 0.75 straight-line mile from the Palisades Nuclear Plant ("Palisades"). My home is near Lake Michigan and in the warm season I walk on the beach and wade in the Lake within a few hundred yards of Palisades Nuclear Plant ("PNP"). Occasionally I go boating with friends or relatives.

3) I understand that according to a *Federal Register* notice dated April 15, 2025, the Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP). The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4) I have familiarized myself with documents, including expert opinions and have carefully formulated my own opinions about the restoration of power generation at Palisades. I have concerns about safety of PNP operations, the potential for significant damage to public health and the environment, and the lack of nuclear power generation experience and controversial history of the parent company, Holtec International (Holtec).

5) I am aware that after the shutdown of PNP in May 2022, for about two years Holtec

apparently did not put the two steam generators at PNP into wet layup status and stabilize them. I know that according to nuclear power engineers, steam generators are critical components that can rapidly degrade when not correctly put in a wet layup. I am aware that in a September 3, 2024 phone conference between the NRC and Holtec, an August 2024 inspection was discussed and that the inspection identified significant damage in the two PNP steam generators. I also know possible accident scenarios involving steam generators such as those at PNP could involve a major loss of coolant which could cause a very serious accident up to a core meltdown. I know that our expert, Arnold Gundersen, has identified significant stress corrosion cracking in the steam generator tubes and that an unexpectedly high number, 700, had to be plugged due to corrosion. I oppose the continued use of these steam generators, they must be replaced.

6) I am concerned that if Palisades is allowed to restart, there could be catastrophic accidents resulting in radiation releases. I am further concerned about the prospect of ongoing routine releases of radiation from an operating Palisades and that my family and I might suffer irreparable damage to our health and real and personal property located at my residence.

7) I request leave to intervene in this regulatory exemption proceeding and to have my interests advanced and represented by Beyond Nuclear, a nonprofit grassroots organization that advocates against continued use of commercial nuclear power and in favor of alternative, renewable, nonnuclear energy technologies. I am a member of Beyond Nuclear. My interests will not be adequately represented absent my legal intervention and without the opportunity of Beyond Nuclear to participate as a full party in this license amendment proceeding on my behalf.

8) Further Declarant saith naught.

June 6, 2025 Signed (electronically) by /s/ William D. Reed

William D. Reed
80015 Ramblewood Drive, Covert, MI 49043
dillonreed@gmail.com
Executed in Accord with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Decommissioning International LLC and Holtec Palisades LLC	)	June 16, 2025
(Palisades Nuclear Plant) Steam Generator License Amendment Request)	)	

* * * * *

DECLARATION OF CAROLYN FERRY IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR PLANT LICENSE AMENDMENT PROCEEDING

Now comes Carolyn Ferry, declarant herein and makes the following statements under penalty of perjury:

1) My name is Carolyn Ferry. I am an adult citizen of the State of Michigan. I also am a member of Beyond Nuclear, hereafter referred to as "Petitioner."

2) My residence is located at 79964 Fernwood Drive, Covert, MI 49043, which is located 0.75 straight-line mile from the Palisades Nuclear Plant (“Palisades”). My home is near Lake Michigan and in the warm season I walk on the beach and wade in the Lake within a few hundred yards of Palisades Nuclear Plant (“PNP”). Occasionally I go boating with friends or relatives.

3) I understand that according to a *Federal Register* notice dated April 15, 2025, the Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP). The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4) I have familiarized myself with documents, including expert opinions and have carefully formulated my own opinions about the restoration of power generation at Palisades. I have concerns about safety of PNP operations, the potential for significant damage to public health and the environment, and the lack of nuclear power generation experience and controversial history of the parent company, Holtec International (Holtec).

5) I am aware that after the shutdown of PNP in May 2022, for about two years Holtec

apparently did not put the two steam generators at PNP into wet layup status and stabilize them. I know that according to nuclear power engineers, steam generators are critical components that can rapidly degrade when not correctly put in a wet layup. I am aware that in a September 3, 2024 phone conference between the NRC and Holtec, an August 2024 inspection was discussed and that the inspection identified significant damage in the two PNP steam generators. I also know possible accident scenarios involving steam generators such as those at PNP could involve a major loss of coolant which could cause a very serious accident up to a core meltdown. I know that our expert, Arnold Gundersen, has identified significant stress corrosion cracking in the steam generator tubes and that an unexpectedly high number, 700, had to be plugged due to corrosion. I oppose continued use of the steam generators at Palisades, they must be replaced.

6) I am concerned that if Palisades is allowed to restart, there could be catastrophic accidents resulting in radiation releases. I am further concerned about the prospect of ongoing routine releases of radiation from an operating Palisades and that my family and I might suffer irreparable damage to our health and real and personal property located at my residence.

7) I request leave to intervene in this regulatory exemption proceeding and to have my interests advanced and represented by Beyond Nuclear, a nonprofit grassroots organization that advocates against continued use of commercial nuclear power and in favor of alternative, renewable, nonnuclear energy technologies. I am a member of Beyond Nuclear. My interests will not be adequately represented absent my legal intervention and without the opportunity of Beyond Nuclear to participate as a full party in this license amendment proceeding on my behalf.

8) Further the Declarant saith naught.

June 6, 2025 Signed (electronically) by /s/ Carolyn Ferry

Carolyn Ferry, Declarant
79964 Fernwood Drive, Covert, MI 49043
carolynferry@sbcglobal.net
Executed in Accord with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255
Holtec Palisades LLC and Holtec Decommissioning International	)	June 16, 2025
(Palisades Nuclear Plant Request for License Amendment)	)	
	)	

* * * * *

DECLARATION OF AUTHORIZED OFFICER OF DON'T WASTE MICHIGAN IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR PLANT LICENSE AMENDMENT REQUEST PROCEEDING

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

1. I am the Convenor of Don't Waste Michigan (DWM), a Michigan nonprofit corporation headquartered in Monroe, Michigan, the purposes of which are to oppose continued use of commercial nuclear power and to promote the spread of renewable energy technologies and energy conservation. I am authorized to sign this Declaration.

2. Don't Waste Michigan has over 40 members, one or more of whom lives within 50 miles of Palisades Nuclear Plant. (PNP).

3. DWM and its members oppose the Nuclear Regulatory Commission's (NRC) prospective issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP) and noticed in the *Federal Register* on April 15, 2025. The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4. DWM intends to intervene on behalf of its members, Charles Kirk and Alice Hirt, in opposition to the granting of the proposed license amendment. Mr. Kirk and Ms. Hirt have provided declarations in support of DWM's intervention. DWM and its members oppose the restart of Palisades. They believe that granting the change of technical specifications for repair of the steam generators would not adequately address damage and deterioration present in the steam generators, and that they must be completely replaced with new steam generators. DWM and its members further believe that the proposed technical specification changes would not alleviate risks that the planned Palisades restart could adversely affect the health and safety of its members and the integrity of the physical environment.

5. DWM intends to seek to intervene and establish standing on behalf of its members before an NRC licensing board and to raise contentions and adjudicate issues bearing on the legal propriety as well as safety and environmental aspects of the license amendment request.

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. Further declarant saith naught.

Don't Waste Michigan

June 15, 2025 Signed (electronically) by /s/ Michael Keegan
Date

Michael Keegan, Convenor, DWM
811 Harrison St., Monroe, MI 48161
mkeeganj@comcast.com
Executed in Accord with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Decommissioning International LLC and Holtec Palisades LLC	)	June 16, 2025
(Palisades Nuclear Plant Steam Generator License Amendment Request)	)	

* * * * *

DECLARATION OF ALICE HIRT IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR POWER PLANT LICENSE AMENDMENT PROCEEDING

Now comes Alice Hirt and makes the following statements under penalty of perjury:

1) My name is Alice Hirt. I am an adult citizen of the State of Michigan. I also am a member of Don't Waste Michigan, hereafter referred to as "Petitioner."

2) My residence is located at 6677 Summit View, Holland, MI 49024, which is located 37 straight-line miles from the Palisades Nuclear Plant ("Palisades"). My home overlooks Lake Michigan and in the warm season I frequently walk on the beach and wade in the Lake with my dog, and often go boating with friends or relatives.

3) I understand that according to a *Federal Register* notice dated April 15, 2025, the Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP). The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4) I have familiarized myself with documents, including expert opinions and have carefully formulated my own opinions about the restoration of power generation at Palisades. I have concerns about safety of PNP operations, the potential for significant damage to public health and the environment, and the lack of nuclear power generation experience and controversial history of the parent company, Holtec International (Holtec).

5) I am aware that after the shutdown of PNP in May 2022, for about two years Holtec apparently did not put the two steam generators at PNP into wet layup status and stabilize them. I know that according to nuclear power engineers, steam generators are critical components that

can rapidly degrade when not correctly put in a wet layup. I am aware that in a September 3, 2024 phone conference between the NRC and Holtec, an August 2024 inspection was discussed and that the inspection identified significant damage in the two PNP steam generators. I also know possible accident scenarios involving steam generators such as those at PNP could involve a major loss of coolant which could cause a very serious accident up to a core meltdown. I know that our expert, Arnold Gundersen, has identified significant stress corrosion cracking in the steam generator tubes and that an unexpectedly high number, 700, had to be plugged due to corrosion. I am opposed to continued use of the steam generators, they must be replaced.

6) I am concerned that if Palisades is allowed to restart, there could be catastrophic accidents resulting in radiation releases. I am further concerned about the prospect of ongoing routine releases of radiation from an operating Palisades and that my family and I might suffer irreparable damage to our health and real and personal property located at my residence.

7) I request leave to intervene in this license transfer and amendment proceeding and to have my interests advanced and represented by by Don't Waste Michigan (DWM), a 30-year-old grassroots Michigan nonprofit corporation that works to end various incarnations of commercial nuclear power generation and radioactive waste on grounds of public health and safety, and engages in public education and legal and administrative advocacy in licensing proceedings. I am a member of DWM. My interests will not be adequately represented absent my legal intervention and without the opportunity of DWM to participate as a full party in this license amendment proceeding proceeding on my behalf.

8) Further the Declarant saith naught.

June 13, 2025 Signed (electronically) by */s/ Alice Hirt*

Alice Hirt
6677 Summit View, Holland, MI 49024
alicehirt@gmail.com
Executed in Accord with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Decommissioning International LLC and Holtec Palisades LLC	)	June 16, 2025
(Palisades Nuclear Plant License Amendment Request)	)	

* * * * *

DECLARATION OF JOSEPH C. KIRK IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR POWER LICENSE AMENDMENT PROCEEDING

Now comes Joseph C. Kirk and makes the following statements under penalty of perjury:

1) My name is Joseph C. Kirk. I am an adult citizen of the State of Michigan. I also am a member of Don't Waste Michigan, hereafter referred to as "Petitioner."

2) My residence is located at 29794 Lake Bluff, Palisades Park, MI 49043, which is located .8 straight-line mile from the Palisades Nuclear Plant ("Palisades"). My home is near Lake Michigan and in the warm season I walk on the beach and wade in the Lake within a few hundred yards of Palisades Nuclear Plant ("PNP"). Occasionally I go boating with friends or relatives.

3) I understand that according to a *Federal Register* notice dated April 15, 2025, the Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP). The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4) I have familiarized myself with documents, including expert opinions and have carefully formulated my own opinions about the restoration of power generation at Palisades. I have concerns about safety of PNP operations, the potential for significant damage to public health and the environment, and the lack of nuclear power generation experience and controversial history of the parent company, Holtec International (Holtec).

5) I am aware that after the shutdown of PNP in May 2022, for about two years Holtec apparently did not put the two steam generators at PNP into wet layup status and stabilize them. I

know that according to nuclear power engineers, steam generators are critical components that can rapidly degrade when not correctly put in a wet layup. I am aware that in a September 3, 2024 phone conference between the NRC and Holtec, an August 2024 inspection was discussed and that the inspection identified significant damage in the two PNP steam generators. I also know possible accident scenarios involving steam generators such as those at PNP could involve a major loss of coolant which could cause a very serious accident up to a core meltdown. I know that our expert, Arnold Gundersen, has identified significant stress corrosion cracking in the steam generator tubes and that an unexpectedly high number, 700, had to be plugged due to corrosion. I am opposed to continued use of these steam generators, they must be replaced.

6) I am concerned that if Palisades is allowed to restart, there could be catastrophic accidents resulting in radiation releases. I am further concerned about the prospect of ongoing routine releases of radiation from an operating Palisades and that my family and I might suffer irreparable damage to our health and real and personal property located at my residence.

7) I request leave to intervene in this license transfer and amendment proceeding and to have my interests advanced and represented by by Don't Waste Michigan ("DWM"), a 30-year-old grassroots Michigan nonprofit corporation that works to end various incarnations of commercial nuclear power generation and radioactive waste on grounds of public health and safety, and engages in public education and legal and administrative advocacy in licensing proceedings. I am a member of DWM. My interests will not be adequately represented absent my legal intervention and without the opportunity of DWM to participate as a full party in this license amendment proceeding on my behalf.

8) Further the Declarant saith naught.

June 9, 2025 Signed (electronically) by /s/ Joseph C. Kirk

Joseph C. Kirk, Declarant\
29794 Lake Bluff, Palisades Park, MI 49043
joekirk1932@gmail.com
Executed in accordance with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Palisades LLC and Holtec Decommissioning International	)	June 16, 2025
(Palisades Nuclear Plant License Amendment Request)	)	
	)	

* * * * *

DECLARATION OF AUTHORIZED OFFICER OF MICHIGAN SAFE ENERGY FUTURE IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR PLANT LICENSE AMENDMENT PROCEEDING

Under penalty of perjury, I, Bette Pierman ("Declarant"), declare as follows:

1. I am the spokesperson of Michigan Safe Energy Future ("MSEF"), a Michigan grassroots association. I am authorized to sign this Declaration.

2. MSEF is a grassroots association with 10 members in southern, central and western Michigan. MSEF is headquartered at 2033 Paw Paw Avenue, Benton Harbor, MI 49022. MSEF is working to end the use of commercial nuclear power generation and engages in public education and legal and administrative advocacy in licensing proceedings. MSEF also advocates for measures to protect the health and safety of its members and the southwestern Michigan public from radiological injury.

3. MSEF and its members oppose the Nuclear Regulatory Commission's (NRC) prospective issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP) and noticed in the *Federal Register* on April 15, 2025. The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4. MSEF intends to intervene on behalf of its members, Ann Scott and James Scott, in opposition to the granting of the proposed license amendment. Mr. and Ms. Scott have provided declarations in support of MSEF's intervention. MSEF and its members believe that granting the change of technical specifications for repair of the steam generators would not adequately address damage and deterioration present in the steam generators, and that they must be

completely replaced with new steam generators. MSEF and its members further believe that the proposed technical specification changes would not alleviate risks that the planned Palisades restart could adversely affect the health and safety of its members and the integrity of the physical environment.

5. MSEF intends to seek to intervene and establish standing on behalf of its members before the Nuclear Regulatory Commission and to raise contentions and adjudicate issues bearing on the legal propriety as well as safety and environmental aspects of the license amendment request.

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. Further Declarant saith naught.

Michigan Safe Energy Future

June 15, 2025 Signed (electronically) by /s/ Bette Pierman

Bette Pierman, Spokesperson, MSEF
2033 Paw Paw Avenue, Benton Harbor, MI 49022
bette49022@yahoo.com
Executed in accord with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Decommissioning International LLC and Holtec Palisades LLC	)	
(License Amendment Request)	)	

* * * * *

DECLARATION OF ANN SCOTT IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR PLANT LICENSE AMENDMENT PROCEEDING

Now comes Ann Scott and makes the following statements under penalty of perjury:

1) My name is Ann Scott. I am an adult citizen of the State of Michigan. I also am a member of Michigan Safe Energy Future, hereafter referred to as "Petitioner."

2) My residence is located at 80014 Ramblewood Hill, Covert, MI 49043, which is located 1.2 straight-line miles from the Palisades Nuclear Plant ("Palisades"). My home is near Lake Michigan and in the warm season I walk on the beach and wade in the Lake within a few hundred yards of Palisades Nuclear Plant ("PNP"). Occasionally I go boating with friends or relatives.

3) I understand that according to a *Federal Register* notice dated April 15, 2025, the Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP). The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4) I have familiarized myself with documents, including expert opinions and have carefully formulated my own opinions about the restoration of power generation at Palisades. I have concerns about safety of PNP operations, the potential for significant damage to public health and the environment, and the lack of nuclear power generation experience and controversial history of the parent company, Holtec International (Holtec).

5) I am aware that after the shutdown of PNP in May 2022, for about two years Holtec apparently did not put the two steam generators at PNP into wet layup status and stabilize them. I

know that according to nuclear power engineers, steam generators are critical components that can rapidly degrade when not correctly put in a wet layup. I am aware that in a September 3, 2024 phone conference between the NRC and Holtec, an August 2024 inspection was discussed and that the inspection identified significant damage in the two PNP steam generators. I also know possible accident scenarios involving steam generators such as those at PNP could involve a major loss of coolant which could cause a very serious accident up to a core meltdown. I know that our expert, Arnold Gundersen, has identified significant stress corrosion cracking in the steam generator tubes and that an unexpectedly high number, 700, had to be plugged due to corrosion. I oppose any continued use of the steam generators at Palisades; they must be replaced.

6) I am concerned that if Palisades is allowed to restart, there could be catastrophic accidents resulting in radiation releases. I am further concerned about the prospect of ongoing routine releases of radiation from an operating Palisades and that my family and I might suffer irreparable damage to our health and real and personal property located at my residence.

7) I request leave to intervene in this license transfer and amendment proceeding and to have my interests advanced and represented by Michigan Safe Energy Future ("MSEF"), a grassroots association of people in western and southwestern Michigan which since 2013 has advocated for the permanent shutdown of Palisades Nuclear Plant and replacement of nuclear and natural gas power generation with safe and renewable nonnuclear energy technologies. I am a member of MSEF. My interests will not be adequately represented absent my legal intervention and without the opportunity of MSEF to participate as a full party in this license amendment proceeding proceeding on my behalf.

8) Further the Declarant saith naught.

June 15 , 2025 Signed (electronically) by /s/ Ann Scott

Ann Scott, Declarant
80014 Ramblewood Hill, Covert, MI 49043
anngoldenscott@gmail.com
Executed in accordance with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Decommissioning International LLC and Holtec Palisades LLC	)	June 16, 2025
(Palisades Nuclear Plant Steam Generator License Amendment Request)	)	

* * * * *

DECLARATION OF JAMES SCOTT IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR PLANT LICENSE AMENDMENT PROCEEDING

Now comes James Scott and makes the following statements under penalty of perjury:

1) My name is James Scott. I am an adult citizen of the State of Michigan. I also am a member of Michigan Safe Energy Future, hereafter referred to as "Petitioner."

2) My residence is located at 80014 Ramblewood Hill, Covert, MI 49043, which is located 1.2 straight-line miles from the Palisades Nuclear Plant ("Palisades"). My home is near Lake Michigan and in the warm season I walk on the beach and wade in the Lake within a few hundred yards of Palisades Nuclear Plant ("PNP"), and I go boating with friends or relatives.

3) I understand that according to a *Federal Register* notice dated April 15, 2025, the Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP). The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4) I have familiarized myself with documents, including expert opinions and have carefully formulated my own opinions about the restoration of power generation at Palisades. I have concerns about safety of PNP operations, the potential for significant damage to public health and the environment, and the lack of nuclear power generation experience and controversial history of the parent company, Holtec International (Holtec).

5) I am aware that after the shutdown of PNP in May 2022, for about two years Holtec apparently did not put the two steam generators at PNP into wet layup status and stabilize them. I know that according to nuclear power engineers, steam generators are critical components that

can rapidly degrade when not correctly put in a wet layup. I am aware that in a September 3, 2024 phone conference between the NRC and Holtec, an August 2024 NRC inspection was discussed and that the inspection identified significant damage in the two PNP steam generators. I also know possible accident scenarios involving steam generators such as those at PNP could involve a major loss of coolant which could cause a very serious accident up to a core meltdown. I know that our expert, Arnold Gundersen, has identified significant stress corrosion cracking in the steam generator tubes and that an unexpectedly high number, 700, had to be plugged due to corrosion. I oppose the continued use of these steam generators at Palisades, they must be replaced.

6) I am concerned that if Palisades is allowed to restart, there could be catastrophic accidents resulting in radiation releases. I am further concerned about the prospect of ongoing routine releases of radiation from an operating Palisades and that my family and I might suffer irreparable damage to our health and real and personal property located at my residence.

7) I request leave to intervene in this license transfer and amendment proceeding and to have my interests advanced and represented by Michigan Safe Energy Future ("MSEF"), a grassroots association of people in western and southwestern Michigan which since 2013 has advocated for the permanent shutdown of Palisades Nuclear Plant and replacement of nuclear and natural gas power generation with safe and renewable nonnuclear energy technologies. I am a member of MSEF. My interests will not be adequately represented absent my legal intervention and without the opportunity of MSEF to participate as a full party in this license amendment proceeding on my behalf.

8) Further the Declarant saith naught.

June 16, 2025 Signed (electronically) by /s/ R. James Scott

R. James Scott, Declarant
80014 Ramblewood Hill, Covert, MI 49043
rjamesscott@gmail.com
Executed in accordance with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Palisades LLC and Holtec Decommissioning International	)	
	)	June 16, 2025
(Palisades Nuclear Plant License Amendment Request)	)	
	)	

* * * * *

DECLARATION OF AUTHORIZED OFFICER OF NUCLEAR ENERGY INFORMATION SERVICE IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR PLANT LICENSE AMENDMENT REQUEST PROCEEDING

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

1. I am the Executive Director of Nuclear Energy Information Service ("NEIS"), located at 3411 W Diversey Avenue, #13, Chicago, IL 60647. I am authorized to sign this Declaration.

2. Nuclear Energy Information Service is a nonprofit organization committed to ending nuclear power and advocating for sustainable ecologically sound and socially just energy solutions. To accomplish these ends, NEIS educates, activates and organizes the public on energy issues, builds and mobilizes grass roots power and nonviolent opposition to nuclear power, advocates for sustainable and ecologically sound energy alternatives. NEIS has over 200 members, one or more of whom lives within 50 miles of Palisades Nuclear Plant. NEIS is concerned that if the NRC authorizes the proposed exemption from NRC regulations, the reopening and restart of Palisades could adversely affect the public health and safety of its members and the integrity of the physical environment in which its members live.

3. NEIS opposes the Nuclear Regulatory Commission's (NRC) prospective issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP) and noticed in the *Federal Register* on April 15, 2025. The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4. NEIS intends to intervene on behalf of its member John Brenneman of South Bend, Indiana in opposition to the granting of the proposed license amendments. John has provided a declaration in support of NEIS's intervention. NEIS and its member believe that granting the

change of technical specifications for repair of the steam generators would not adequately address damage and deterioration present in the steam generators, and that they must be completely replaced with new steam generators. NEIS and its member further believe that the proposed technical specification changes would not alleviate risks that the planned Palisades restart could adversely affect the health and safety of its members and the integrity of the physical environment.

5. NEIS will seek to have the NRC to recognize its legal standing and admit its contentions and to adjudicate all issues bearing on the safety and health of its member as well issues pertaining to effects on the natural and physical 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. Further declarant saith naught.

Nuclear Energy Information Service

June 9, 2025 Signed (electronically) by /s/ David Kraft

David Kraft, Executive Director, NEIS
3411 W Diversey Ave. #13, Chicago, IL 60647
neis@neis.org
Executed in accordance with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Decommissioning International LLC and Holtec Palisades LLC	)	June 16, 2025
Steam Generator License Amendment Request)	)	

* * * * *

DECLARATION OF JOHN BRENNEMAN IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR PLANT LICENSE AMENDMENT PROCEEDING

Now comes John Brenneman and makes the following statements under penalty of perjury:

1) My name is John Brenneman. I am an adult citizen of the State of Indiana. I also am a member of Nuclear Energy Information Service, hereafter referred to as "Petitioner."

2) My residence is located at 2625 Cypress Way, South Bend, IN 46615, which is located 45 straight-line miles from the Palisades Nuclear Plant ("Palisades"). Over the years I have spent time as a tourist several times annually along the Lake Michigan shore in the State of Michigan within fewer than 10 miles from Palisades, and I intend to do so in the future.

3) I understand that according to a *Federal Register* notice dated April 15, 2025, the Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP). The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4) I have familiarized myself with documents, including expert opinions and have carefully formulated my own opinions about the restoration of power generation at Palisades. I have concerns about safety of PNP operations, the potential for significant damage to public health and the environment, and the lack of nuclear power generation experience and controversial history of the parent company, Holtec International (Holtec).

5) I am aware that after the shutdown of PNP in May 2022, for about two years Holtec apparently did not put the two steam generators at PNP into wet layup status and stabilize them. I

know that according to nuclear power engineers, steam generators are critical components that can rapidly degrade when not correctly put in a wet layup. I am aware that in a September 3, 2024 phone conference between the NRC and Holtec, an August 2024 inspection was discussed and that the inspection identified significant damage in the two PNP steam generators. I also know possible accident scenarios involving steam generators such as those at PNP could involve a major loss of coolant which could cause a very serious accident up to a core meltdown. I know that our expert, Arnold Gundersen, has identified significant stress corrosion cracking in the steam generator tubes and that an unexpectedly high number, 700, had to be plugged due to corrosion. I oppose the continued use of the steam generators at Palisades, they must be replaced.

6) I am concerned that if Palisades is allowed to restart, there could be catastrophic accidents resulting in radiation releases. I am further concerned about the prospect of ongoing routine releases of radiation from an operating Palisades and that my family and I might suffer irreparable damage to our health and real and personal property located at my residence.

7) I request leave to intervene in this license transfer and amendment proceeding and to have my interests advanced and represented by Nuclear Energy Information Service ("NEIS"), a Chicago-based grassroots association of people which for over a decade has advocated for the permanent shutdown of Palisades Nuclear Plant and replacement of nuclear and natural gas power generation with safe and renewable nonnuclear energy technologies. I am a member of NEIS. My interests will not be adequately represented absent my legal intervention and without the opportunity of NEIS to participate as a full party in this license amendment proceeding on my behalf.

8) Further the Declarant saith naught.

June ,9 2025 Signed (electronically) by /s/ John Brenneman

John Brenneman
2625 Cypress Way, South Bend, IN 46615
thebrenneman@yahoo.com
Executed in accordance with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Palisades LLC and Holtec Decommissioning International	)	June 16, 2025
(Palisades Nuclear Plant Request for License Amendment)	)	
	)	

* * * * *

DECLARATION OF AUTHORIZED OFFICER OF THREE MILE ISLAND ALERT IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR PLANT LICENSE AMENDMENT PROCEEDING

Under penalty of perjury, I, Eric Epstein, declare as follows:

1. I am the Chair of Three Mile Island Alert ("TMIA"), 4100 Hillsdale Rd., Harrisburg, PA 17112. I am authorized to sign this Declaration.

2. TMIA is a nonprofit grassroots organization with approximately 500 members and supporters. TMIA was founded in central Pennsylvania in 1977 as a grassroots advocacy organization opposed to commercial nuclear power for safety and economic reasons, two years before the accident at Three Mile Island, Unit 2. Three Mile Island, Unit 1, which is presently closed and undergoing decommissioning, is more recently being considered for reopening and restoration of power operations. TMIA opposes a restart for multiple reasons, many relating to the safety of a reactor with some 40 years of operations. TMIA similarly opposes as a matter of policy the proposed restart of rhe Palisades Nuclear Plant (PNP) on grounds of safety and environmental effects. TMIA opposes the Nuclear Regulatory Commission's (NRC) prospective issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for PNP and noticed in the *Federal Register* on April 15, 2025. The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

3. One TMIA member, David Staiger, lives and recreates within 50 miles of Palisades Nuclear Plant. TMIA and its member oppose the restart of Palisades. TMIA and its member believe that granting the change of technical specifications for repair of the steam generators would not adequately address damage and deterioration present in the steam generators, and that they must be completely replaced with new steam generators. TMIA and its member further believe that the proposed technical specification changes would not alleviate risks that the

planned Palisades restart could adversely affect the health and safety of its members and the integrity of the physical environment.

4. TMIA seeks to intervene in this proceeding on behalf of Mr. Staiger to oppose the license amendment to the technical specifications. Mr. Staiger has provided a declaration in support of TMIA's intervention.

5. TMIA intends, on behalf of its member, for the NRC to admit its contentions and to adjudicate all issues bearing on the safety and health of its member as well issues pertaining to effects on the natural and physical 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. Further declarant saith naught.

Three Mile Island Alert

June 11. 2025 Signed (electronically) by /s/ Eric Epstein

Eric Epstein, Chair, TMIA
4100 Hillsdale Rd., Harrisburg, PA 17112
epstein@emfr.org
Executed in accordance with 10 CFR 2.304(d)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 50-255-LA-4
Holtec Decommissioning International LLC and Holtec Palisades LLC	)	June 16. 2025
(Palisades Nuclear Plant)	)	

* * * * *

DECLARATION OF DAVID STAIGER IN SUPPORT OF PETITION FOR LEAVE TO INTERVENE IN PALISADES NUCLEAR PLANT LICENSE AMENDMENT PROCEEDING

Now comes David Staiger and makes the following statements under penalty of perjury:

1) My name is David Staiger. I am an adult citizen of the State of Michigan. I also am a member of Three Mile Island Alert, hereafter referred to as "Petitioner."

2) My residence is located at 1928 Lakeway Ave, Kalamazoo, MI 49001-5195, which is located 39 straight-line miles from the Palisades Nuclear Plant ("Palisades"). Over the years I have spent time on several occasions annually as a tourist along the Lake Michigan shore within 10 miles from Palisades, and I intend to do so at least that frequently in the future.

3) I understand that according to a *Federal Register* notice dated April 15, 2025, the Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Renewed Facility Operating License (RFOL) No. DPR-20 that was requested by Holtec Palisades, LLC for the Palisades Nuclear Plant (PNP). The proposed license amendment would revise the technical specifications to allow for the use of Framatome Alloy 690 sleeves to repair the defective steam generator tubes as an alternative to removing the tubes from service by plugging, purportedly to support the return to service of the steam generators as part of the potential resumption of power operations at PNP.

4) I have familiarized myself with documents, including expert opinions and have carefully formulated my own opinions about the restoration of power generation at Palisades. I have concerns about safety of PNP operations, the potential for significant damage to public health and the environment, and the lack of nuclear power generation experience and controversial history of the parent company, Holtec International (Holtec).

5) I am aware that after the shutdown of PNP in May 2022, for about two years Holtec apparently did not put the two steam generators at PNP into wet layup status and stabilize them. I know that according to nuclear power engineers, steam generators are critical components that

can rapidly degrade when not correctly put in a wet layup. I am aware that in a September 3, 2024 phone conference between the NRC and Holtec, an August 2024 inspection was discussed and that the inspection identified significant damage in the two PNP steam generators. I also know possible accident scenarios involving steam generators such as those at PNP could involve a major loss of coolant which could cause a very serious accident up to a core meltdown. I know that our expert, Arnold Gundersen, has identified significant stress corrosion cracking in the steam generator tubes and that an unexpectedly high number, 700, had to be plugged due to corrosion. I oppose the continued use of these steam generators, they must be replaced.

6) I am concerned that if Palisades is allowed to restart, there could be catastrophic accidents resulting in radiation releases. I am further concerned about the prospect of ongoing routine releases of radiation from an operating Palisades and that my family and I might suffer irreparable damage to our health and real and personal property located at my residence.

7) I request leave to intervene in this license transfer and amendment proceeding and to have my interests advanced and represented by Three Mile Island Alert ("TMIA"), a Pennsylvania-based grassroots association of people which for nearly 50 years has opposed the use of nuclear power as a means of energy production. I am a member of TMIA. My interests will not be adequately represented absent my legal intervention and without the opportunity of TMIA to participate as a full party in this license amendment proceeding on my behalf.

8) Further the Declarant saith naught.

June 16 , 2025 Signed (electronically) by /s/ David Staiger

David Staiger, Declarant
1928 Lakeway Ave, Kalamazoo, MI 49001-5195
DaveStaiger@gmail.com
Executed in accordance with 10 CFR 2.304(d)

Exhibit B: Arnold Gundersen Declaration and CV

BEFORE THE UNITED STATES
NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF	)	
	)	**Docket No. 50-255-LA-4**
HOLTEC PALISADES LLC	)	
	)	
(Steam Generator License Amendment)	)	

DECLARATION OF ARNOLD GUNDERSEN
IN SUPPORT OF PETITION TO INTERVENE
AND REQUEST FOR ADJUDICATORY HEARING
OPPOSING STEAM GENERATOR RESTORATION
BY MICHIGAN SAFE ENERGY FUTURE, DON'T WASTE
MICHIGAN, NUCLEAR ENERGY INFORMATION SERVICE,
THREE MILE ISLAND ALERT, AND BEYOND NUCLEAR

Under penalty of perjury, I, Arnold Gundersen, declare as follows:

1. I have previously provided three declarations in this matter. My CV is attached.

2. I am submitting this Declaration to supplement my previous testimony in this proceeding, which is incorporated herein by reference.

3. My Previous Steam Generator Experience

3.1. My *curriculum vitae*, which is attached, details my 50+ years of experience in the nuclear industry, However, expanding upon my CV is essential by focusing on my experience and expertise with nuclear steam generators.

3.2. When I was an engineer with Northeast Utilities (NU), corporate management was concerned that metallic debris in the condensate and feedwater systems might contaminate the new, unused steam generators at Millstone Point Unit 2. In 1974, Northeast Utilities' management appointed me as the lead engineer responsible for devising the chemical cleaning process for the condensate and feedwater systems before water entered the steam generator while Unit 2 was undergoing startup testing.

3.3. At that time, Bechtel was the construction engineer modifying the system piping connections, and NU hired Haliburton to provide the boilers, chemicals, and pumps to complete the process. Together with my team of Bechtel and Halliburton, our analysis determined that the chemical cleaning process successfully removed 5,000 pounds of metallic contaminants that otherwise would have entered and contaminated Millstone's steam generators had the chemical cleaning not occurred.

3.4. Later in my career, during the 1970s, I was the lead nuclear engineer at New York State Electric & Gas (NYSE&G) and was responsible for acquiring what turned out to be the last significant atomic power plant purchased in the United States until the Vogtle 3 and 4 units. The plant was slated for construction near the Nine Mile Point nuclear reactors in upstate New York. It was a Combustion Engineering System 80 design, which is still operating about 50 miles west of Phoenix, Arizona, at Palo Verde Units 1, 2, and 3.

3.4.1. The steam generator tube analysis was a critical part of the acquisition process in my procurement decision for NYSE&G. Therefore, I spent weeks in the labs and manufacturing facilities of Combustion Engineering, Babcock and Wilcox, and Westinghouse, where I analyzed each vendor's unique approach to engineering and manufacturing of their specific steam-generator designs. The *hideout of chemicals at the junction between the tube and its tube sheet was of particular concern to each vendor*.

3.4.2. What is a *hideout*? According to an abstract in *ScienceDirect* of the article entitled, *10 - Hideout, Hideout Return and Crevice Chemistry in Nuclear Steam Generators*[1],

> "Localized corrosion originating on the outside surface of the steam generator (SG) tubes has been a major cause of SG incapability in the commercial nuclear power industry, with the predominant modes of attack being either stress corrosion cracking or intergranular attack caused by the accumulation of highly concentrated solutions. The solutions accumulate in flow-restricted regions on the secondary side of the SG, **such as**

[1] *Hideout, hideout return and crevice chemistry in nuclear steam generators,* https://www.sciencedirect.com/science/article/abs/pii/B9780081008942000121

> **crevices formed at the intersections between the SG tubes and the tube sheet, the tube-support structure and deposits that have accumulated on the tube surface and the tube sheet**. (Emphasis Added)

3.5. During the 1980s, when I was the Vice President of Engineering at Nuclear Energy Services (NES) in Danbury, Connecticut, my utility clients consistently informed me of their difficulty in installing internal structures used to prevent water from entering the channel head at the bottom of steam generators when clients performed steam generator tube inspections. I convened my design engineering staff to think outside the box, which led to the invention of the modern steam generator nozzle dam, allowing freedom of movement inside the steam generator channel head while the refueling process was underway.

3.6. In 2012, Friends of the Earth (FOE) retained me to evaluate the cause of steam generator failures at San Onofre Units 2 and 3. I met with Senator Barbara Boxer and her staff with the help of concerned whistleblowers from within San Diego Gas and Electric (SDG&E) and within the NRC itself. I published five expert reports[2] on behalf of Friends of the Earth (FOE) that determined that the San Onofre steam generators had catastrophic tube failures because SDG&E failed to implement the legal provisions of 10 CFR 50.59 (like-for-like) in its design of replacement steam generators.

3.7. Following my five reports, I was also the FOE expert on a Section 2.206 petition and presentation to the NRC. The FOE 2.206 petition and presentation to the NRC was about the materially false statements made to the NRC by its federally regulated utility, San Diego Gas and Electric (SDG&E), regarding the new and uncertified design of the Replacement Steam Generator (RSG). The NRC 2.206 Petition Review Board analyzed the materially false statements about the condition of the steam generators for more than two years. Then, it declared the petition moot because San Onofre was permanently closed. The NRC made this decision even though the license was still in effect and San Onofre and its attorneys still employed the personnel I had identified in my report.

[2] https://www.fairewinds.org/san-onofre

3.8. In my expert work for FOE, I developed several videos describing the failure mechanism at San Onofre[3]. The new *allegedly improved steam generators* failed in only 11 months, although designed using modern computer analysis to last at least 60 years. San Onofre was permanently closed in 2013 with a financial loss exceeding $4 Billion.

3.9. In addition to the above mentioned steam generator experiences, I am familiar with the "hideout" phenomena from corrosive chemicals in nuclear heat exchangers. Specifically, I was one of the principal investigators of the Millstone Unit 1 Chloride Intrusion Incident. During the incident, corrosive chemicals found in salt water entered the nuclear steam supply system leading to a reactor scram and numerous stress corrosion failures. Damage to safety related components from stress corrosion cracking while the reactor was hot occured in fifteen seconds. While the Unit was shut down to repair the stress corrosion damage, Northeast Utilities repeatedly tried for nine months to eliminate all traces of the chemical contaminants from the NSSS, but was unable to ever completely eradicate contamination within the plant's Isolation Condenser, a safety related heat exchanger. This continuing contamination of this safety related heat exchanger led to frequent tube failures after the reactor was restarted.

4. Introduction: The History of Steam Generator Damage at the Holtec Palisades Nuclear Reactor

4.1. My analysis of the condition of the Palisades steam generators has been limited by Holtec's lack of transparency on tube inspection data. Specifically, filing of steam generator inspections at Palisades are required by Technical Specification 5.6.8. This tech spec requires reports to be submitted within 180 days. My review of the ADAMS database indicates that no tube inspection reports have been filed for Palisades since 2020, yet I am aware of at least one Holtec Steam Generator inspection that occurred in August 2024. I reserve the right to amend this report if and when Holtec ultimately files this information as required by its technical specifications

4.2. The Achilles heel of all Pressurized Water Nuclear Reactor (PWR) designs, like the Palisades reactor, has always been the integrity of Steam Generators (SG) and their

[3] https://www.fairewinds.org/nuclear-energy-education/san-onofre-bad-vibrations

uncontrolled releases of radioactivity due to Steam Generator tube failures. Indeed, the initial SGs at Palisades were replaced in 1990 after only 19 years of operation. Palisades employees inspected them frequently and accurately maintained the specific RSG water chemistry with ultra-pure water[4] to reduce metal corrosion. Presumably, the two prior owners of Palisades (Consumers Energy and Entergy) recognized that the 1990 Replacement Steam Generators (RSGs) would fail unless they were maintained by the specific RSG water chemistry and by using ultra-pure water to reduce metal corrosion.[5]

4.3. However, when Holtec International[6] bought Palisade and assumed responsibility for the reactor in late June of 2022, it simply ignored the significant safety precautions required to prolong the life of its RSGs. In 2022, before Entergy turned ownership of the plant over to Holtec, it terminated the technical specifications (tech specs) that would have required continuous maintenance and inspection of the steam generators.[7] NRC staff admitted at a January 14, 2025 public meeting that the steam generators were not put into layup status until May 2024.[8] And until Holtec's filing of its 2025 License Amendment Request (LAR) regarding the steam generators, there was no attempt to change the tech specs to preserve the generators from deterioration and corrosion.

4.4. Expressly, in May 2023, Holtec renounced Entergy's previously endorsed license requirements necessary to prolong the useful life of the Palisades RSGs in its proposed license change to the Nuclear Regulatory Commission (NRC) for Palisades. Based on

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[4] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML23075A112

[5] Response for Palisades to Generic Letter 2004-01, Requirements for Steam Generator Tube Inspections, dated October 24, 2004

[6] Holtec International and its numerous subsidiaries are referred to as "Holtec" throughout this document.

[7] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22039A198

[8] NRC staffer Andrew Johnson, in response to a question from Sierra Club Michigan Chapter member Ed McArdle, about exactly when chemically-preservative wet layup was implemented in the steam generators (SGs) to prevent accelerated corrosion of exceedingly thin-walled (merely 0.042 inches thick) heat-transfer tubes — stated: "I believe it was in the previous inspection outage call that we had back in September, in the notes, we documented that ***they had placed the generators in wet layup in May of '24. There was about a two year period where they were not in a wet layup, with controlled water chemistry.*** That was the latest information that we had." Holtec neglected Palisades' steam generator tubes for two years! - Beyond Nuclear *Also, see* audio recording of the meeting: Jan 14 2025-NRC Holtec Steam Gen LBB Sleeve.m4a - Google Drive, from 1:26:18 mark to 1:26:50 mark.

this May 20, 2023, submittal to the NRC, Holtec determined there was no reason to maintain the Palisades RSGs with proper chemical controls against corrosion. Moreover, when Holtec acquired Palisades on June 28, 2022, it never stated its intention to restart the shuttered reactor. Governor Whitmer first floated the trial balloon to continue to operate Palisades instead of shutting it down for good on April 20, 2022, as regulations and its sale had specified.[9] After Entergy closed the Palisades reactor on May 20, 2022, and Holtec took over on June 28, 2022, the possibility of restarting Palisades lingered in rumors. On September 9, 2022, Governor Whitmer and Holtec went public, and it became clear that Holtec, albeit completely inexperienced, would attempt to resurrect the Palisades Nuclear Power Plant.[10] Before March 2023, Holtec had proposed a restart scheme to the NRC.[11] The NRC held the first public regulatory pathway to restart meeting between the NRC and Holtec on March 20, 2023.[12]

4.5. When Entergy permanently closed Palisades on May 20, 2022, it had no financial incentive to place the steam generators in a wet layup. Moreover, during the January 14, 2025, public meeting, an NRC staffer acknowledged that Holtec did not set the steam generators in proper wet layup until May 2024. More disturbingly, although it had acquired Palisades and was aware of the possibility of restarting it, Holtec made no effort to protect its vital systems from corrosive chemical attacks for two more years. In early 2025, Holtec came before the NRC seeking approval and forgiveness for the damage its safety lapses inflicted on the Palisades Steam Generators. Make no mistake: these safety flaws, along with many others done to additional equipment, were caused by Holtec's gaffes and management blunders beginning in 2022 and continuing through 2024.

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[9] *Whitmer Calls for Federal Investment to Protect Jobs and Shore up Energy Needs*, https://www.michigan.gov/whitmer/news/press-releases/2022/04/20/whitmer-calls-for-federal-investment-to-protect-jobs-and-shore-up-energy-needs

[10] https://www.detroitnews.com/story/news/local/michigan/2022/09/09/palisades-owner-seeks-federal-grant-keep-michigan-nuclear-plant-open/8036078001/

[11] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML23032A399

[12] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML23075A112

4.6. Considering Holtec's gaffes and management blunders beginning in 2022 and continuing, the surrounding communities and the NRC should reflect upon, scrutinize, and analyze the extent of damage caused to Palisades' Steam Generators. If Holtec were an engineering firm experienced in designing, engineering, and operating nuclear power plants, as it should be, it would have had the knowledge to put critical operating components in the unique layup condition mandatory to protect Palisades' major steel and other essential equipment placed in hiatus for an extended period. However, Holtec allowed the damage and deterioration to crucial operating systems, and only belatedly identified the poor condition of its equipment in 2024. Now, in 2025, it desires permission from the NRC to make ill-defined and flawed repairs.

4.7. The extensive SG tube failures identified by Holtec in September 2024 were caused entirely by Holtec and were foreseeable and foreseen.[13] Yet Holtec seeks permission from the Nuclear Regulatory Commission (NRC) to move forward unequivocally without replacing the severely damaged Palisades SGs. Due to its lack of nuclear operating experience, Holtec damaged the Steam Generators (SGs) and may have completely bungled Palisades' restart.

4.8. As detailed below, it is probable that no nuclear power plant operator in the U.S. has proposed the magnitude of repairs to its deteriorated SGs as Holtec did in September 2024. Moreover, none of the other U.S. nuclear power plants have implemented the sheer number of repairs proposed by Holtec to alleviate the extensive new damage it created from its lack of prudent maintenance practices. Due to Holtec's lack of prudence, the NRC should reject Holtec's repair requests. In light of the extreme risk of radioactive releases at Palisades from its existing steam generators, the NRC should instead require the installation of new Replacement Steam Generators (RSGs) at Palisades.

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[13] NRC (Nuclear Regulatory Commission) Information Notice No.85-56: *Inadequate Environment Control For Components And Systems In Extended Storage Or Layup* (ML031180196)

4.9. The enormous increase in the number of damaged tubes uncovered in 2024 implies Palisades' unsafe and unreliable operation under any circumstances in an area of the country that is highly populated and part of the U.S. breadbasket due to its proximity to the Great Lakes and their agricultural water supply and its direct use of Lake Michigan itself. Finally, the NRC created regulations that elucidate that it should never allow Holtec Palisades and Holtec International to implement its poorly proposed Band-Aid fixes.

4.10. I note that Holtec has never operated a nuclear power facility. Consequently, the lax conditions that Holtec has created have damaged the Palisades Steam Generators (SGs). Holtec's lack of nuclear or atomic operating experience created significant damage that could be considered a rookie blunder. Disastrously, any rookie blunders made at a nuclear power plant, especially those damaging such vital safety-significant systems, structures, or components (SSCs) as already previously degraded SG tubes, might have serious public health consequences, *including a nuclear meltdown*.

5. What Does A Steam Generator Do and What Does It Look Like?

5.1. Nuclear Steam Generators[14] are massive steel tanks that are part of the reactor coolant pressure boundary and are designed to keep the hot radioactive water from inside the nuclear core separate from the non-radioactive steam that spins the turbine as it generates electricity. Radioactive water flows through the inside of thousands of U-shaped tubes within the steam generators. This radioactive water within the tubes is separated from the non-radioactive water by the tubes and tubesheet. The non-radioactive water is above the tube sheet and outside the steam generator tubes. If the Steam Generator tubes or tubesheet develop cracks, radioactive water can leak into non-radioactive steam and thereby release that radioactive steam into the environment.

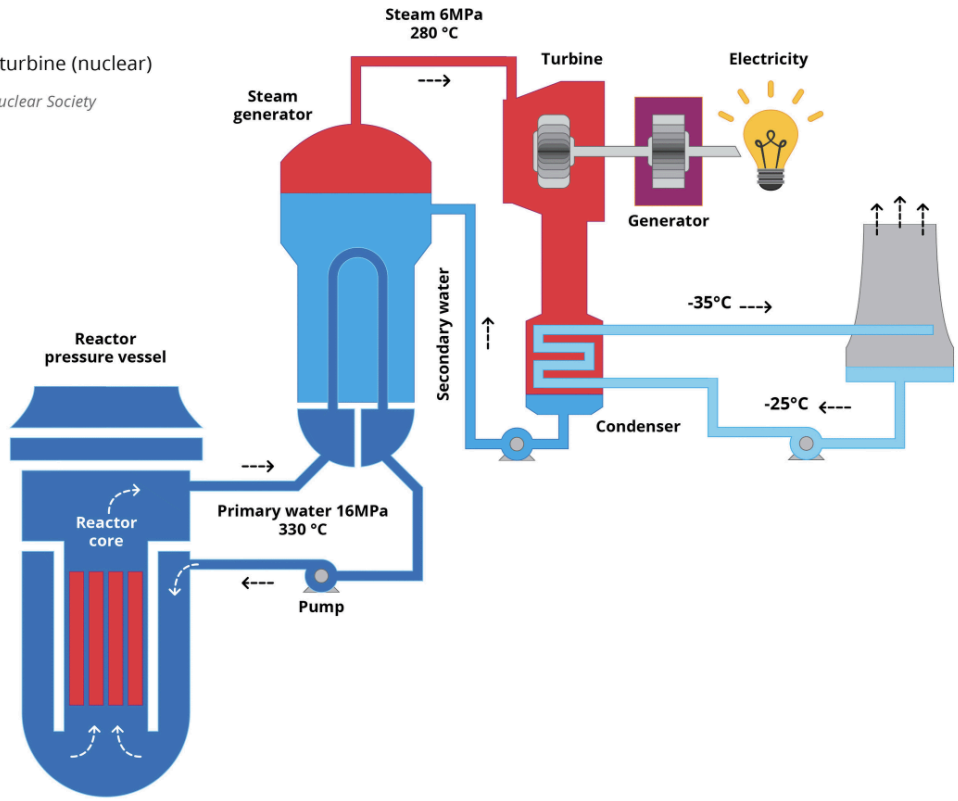
[14] https://www.mackinac.org/S2020-03#simple-cycle-combustion-turbine

If cracking is severe, the reactor coolant pressure boundary is breached and a nuclear meltdown can ensue.

5.2. A schematic drawing of a typical steam generator (not Palisades) is below.

Figure 3. Steam turbine (nuclear)

Source: European Nuclear Society



6. Palisades Steam Generators Before the Holtec Acquisition

6.1. Consumers Energy and Entergy were the two previous owner-operators of the Palisades Nuclear Reactor. Both corporations were experienced nuclear power plant operators. They submitted to and were bound by the conditions of Palisades' license extension to operate the outdated reactor from 2011 until 2031 according to the *Summary Report of License Renewal Review Questions for: AMP* Audit* (*Note – The AMP (Aging Management Plan) is necessary for all older nuclear power plants as equipment, pipes, rubber, and many other items age and simply rust or wear out.)

6.2. As such, Palisades' former owners recognized that "…good chemistry control and 100% tube inspections are some of the ways that the existing steam generators are managed to maximize their life." [15].

6.3. The owners were also aware that at least since 1990 that 308 tubes in steam generator "A" and 309 tubes in steam generator "B" were plugged before the SG was placed in service as a preventative measure, as damage and leakage from these tubes was anticipated after the manufacturing was complete but before the SGs were put in service.[16]

6.4. Therefore, the NRC renewed the Palisades 2011 license, requiring *that more than 600 tubes remained prophylactically plugged as a safety measure to prevent tube wear and failure,* which could release radioactivity into the environment, or even ultimately lead to a reactor core meltdown.**Any attempt by Holtect to remove these prophylactically plugged tubes would be a change to the 2011 Palisades license conditions, requiring new public hearings.**

6.5. As indicated in 2005 correspondence with the NRC (cited and extracted below), Consumers Energy and later Entergy acknowledged keeping the Palisades Steam Generators safe by consistently implementing good water chemistry and extensive inspections. As detailed later in this expert declaration, Holtec violated previous license conditions by allowing improper steam generator water chemistry after it acquired the Palisades plant, thus causing extensive damage to its Palisades Steam Generators. NRC approved Entergy's changes to not provide SG proper layup conditions since Palisades' operation was terminated. Why would you? But Holtec changed the game to Restart and did not perform wet layup until May 2024.[17]

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[15] ML052720250 Summary Report of License Renewal Review Questions for: AMP Audit

[16] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML18066A306

[17] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22039A198, p. 103/111 of pdf (deleting requirement of steam generation tube inspections and report).

7. ***Please Note***: *In the single-spaced paragraphs indented below, I cited and extracted from materials submitted to the Nuclear Regulatory Commission (NRC) or from the NRC in its responses to Holtec (the owner/licensee)—this is done in legal format for citations for court and docket submittal and are direct quotes. As such, the* ***[Emphasis Added] in bold*** *shows areas where we clarify the material for you, the reader, by emphasizing a direct quote or defining an acronym. Thus, we have not changed any misspellings or inaccuracies written or defined by either the NRC or Holtec, as these materials are direct quotes submitted in the Federal Docket between the Federal Regulator NRC and Holtec, the owner of the Palisades Nuclear Power Plant.*

7.1. **From Page 105:**

> **Summary Report of License Renewal Review Questions for: AMP[18] Audit[19]**
> Provide examples of trending results of inspections are documented (evaluation, and comparison with previous inspection results).
> Question B2.1.18-009
> NRC Follow-up Response is acceptable

7.2. The best source for information regarding the Palisades Steam generators is in the following correspondence with the NRC: Letters to the NRC dated April 22, 2003 (ML031190626), April 13, 2004 (ML041100667), June 28, 2004 (ML04890415), and December 1, 2004 (ML043430446) discussed the 2003 steam generator inspection results. Also, NMC [Nuclear Management Company, operator of Palisades during later years of Consumers Energy's ownership] Response for Palisades to Generic Letter 2004-01, *Requirements for Steam Generator Tube Inspections*, dated October 24, 2004, related the following about the history and design of the steam generators:

> The Generic Letter response provided a Safety Assessment that provided a good summary and trend for the replacement steam generators and results found to date. During the 2004 refueling outage inspection all tubes in both steam generators were inspected. Since we have data on all tubes and tubes with degradation are inspected each outage, trending is a natural aspect of the steam generator inspection program.

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[18] AMP on the NRC reports stands for Aging Management Plan, a program installed at the older nuclear power plants with physical material wearing out due to the reactor's age. Material includes metal, rubber, piping, electrical wires, and various other types of equipment.

[19] "Summary Report of License Renewal Review Questions for: AMP Audit" (9/27/05), p. 105, ttps://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML052720250

Good chemistry control and 100% tube inspection are some of the ways that the existing steam generators are managed to maximize their life. We have full confidence that the existing steam generators can be effectively managed to provide full power through the end of the extended period of operation.[20]

Question B2.1.18-010 NRC Follow-up Response is acceptable

Update: We have experienced all of the traditional Alloy 600 degradation mechanisms in our replaced steam generators, which have ALLOY 600 tubes. Our replacement steam generators were built a number of years prior to their replacement in 1990. That is why they have the Alloy 600 tubes. Some advantages in design were achieved with the replacement steam generators, but not with the tube material. 6/22/05 2100.

The steam generators at Palisades are Combustion Engineering **[CE]** model 2530. The replacement steam generators were installed in the fall of 1990. The tube material is mill annealed ALLOY600 with a 0.75-inch outside diameter and a 0.042-inch wall thickness. Each steam generator has 8219 tubes. The tubes were expanded through the full depth of the tube sheet using an explosive process. The tube bundle is supported by stainless steel egg crate lattice type supports comprised of horizontal egg crate supports, vertical straps and diagonal straps. Tube rows 1-18 are u-bends and rows 19-165 are square bends.

Prior to the installation of the SGs, CE advised Consumers Energy that the area around the center stay cylinder region was potentially susceptible to fretting wear at the bat wing locations. As a result, 308 tubes in steam generator "A" and 309 tubes in steam generator "B" were plugged as a preventative measure. After initial service, steam generator A was designated "Steam Generator E-50A" and steam generator B was designated "Steam Generator E-50B". **[Emphasis Added]**

After nine cycles of operation, 72 additional tubes in steam generator E-50A have been plugged for a total of 380 tubes plugged. After nine cycles of operation, 54 additional tubes in steam generator E-50B have been plugged, for a total of 363 tubes plugged. Steam Generator E-50A has 7839 active tubes with

[20] Summary Report of License Renewal Review Questions for: AMP Audit 9/27/2005, p. 106 of 139 of pdf (ML052720250), https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML052720250.

> 4.62% of the tubes plugged. Steam Generator E-50B has 7856 active tubes with 4.42% of the tubes plugged.
>
> The Generic Letter response identified active degradation mechanisms as (1) structural wear in **SG [Steam Generator]** E-50 B, and **Axial ODSCC [Crack on the Outside of the tube Diameter Stress Corrosion Cracking]** in SG E-50A&B. Potential degradation mechanisms have been identified as **Axial PWSCC [Axial means the cracks are going up the tube with Primary Water Stress Corrosion Cracking]**, **Circumferential [cracking going around the circumference around the tube] ODSCC [Cracking Outside the Tube]**, **Circumferential PWSCC [Corrosive Chemicals are within the reactor water and attacking the tubes from the reactor side]**, **Axial PWSCC [cracks going up and down the tube on the inside in the primary water system]**, tube wear, **Pitting and Oblique [holes in tubes and angled cracks] PWSCC [tubes in the Primary Water [are inside the reactor] are showing signs of Stress Corrosion Cracking**. **[Emphasis Added]**
>
> 6/30/05, Status: Closed - Accepted by Auditor Potential Docketed Response Source: AMP Audit, Information Request: 9/27/2005 Page 106 of 139 **[Emphasis Added] and [Definitions Added for Acronyms that name these systems]**

8. Palisades Steam Generators After Holtec Acquisition

8.1. Palisades was acquired by Holtec on June 28, 2022, with the apparent expectation that the facility would be dismantled and destroyed. Holtec did not maintain the required and safe water chemistry concentrations in the steam generators—which is part of the wet layup process.[21] Ignoring all industry experience for restart and operation, Holtec allowed the corrosive chemicals to attack the steam generators' internal structures. Regulators and the local community never expected Holtec to maintain the operational status of Palisades equipment, given that Holtec was allowed to purchase the aged and defunct reactor for its shutdown and decommissioning. Since neither the NRC, the local community, nor Palisades' former employees anticipated a restart, allowing steam

[21] NRC gave permission to Entergy to cease maintenance of the steam generators as operating components as part of plant shutdown, https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22039A198 see page 103/111 of pdf.

generator degradation was deemed reasonable, given the planned decommissioning and subsequent dismantlement of the Palisades Reactor with the proposed sale of outmoded equipment for scrap, or disposal as radioactive waste. However, it became a costly wrong decision when the plan changed to resurrect the reactor carcass.

8.2. Although records indicate that Holtec sought Department of Energy funding to *resurrect* Palisades on or about July 5, 2022, Holtec International formally unveiled its attempt to restart the Palisades Nuclear Power Plant on September 22, 2022.[22] Thereafter, Holtec submitted its application to the NRC for a *Regulatory Path to Reauthorize Power Operations at the Palisades Nuclear Plant*[23] on March 13, 2023.

8.3. Yet even as it pursued NRC approval for the restart in 2023, Holtec revealed its lack of nuclear experience by submitting its Final Safety Analysis Report Update Revision 36 to the NRC on March 31, 2023 with the explanation that "Revision 36 includes changing the FSAR title to Defueled Safety Analysis Report (DSAR) reflecting the transition of PNP to a permanently defueled facility."[24] Holtec further represented that "the Steam Generator Tube Integrity Program no longer applies to a plant system, structure, or component that is within the 10 CFR 54.4 Scope for License Renewal and may be eliminated."[25]

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[22] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22292A261

[23] *Regulatory Path to Reauthorize Power Operations at the Palisades Nuclear Plant,* ML23072A404, https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML23072A404

[24] Final Safety Analysis Report Update Revision 36, ML23107A064, https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML23107A064, p. 1/300 of pdf.

[25] *Id.* at p. 33/300 of pdf

8.4. ***Steam Generator Tube Integrity Program No Longer Applies… and May Be Eliminated*** [26]

Section	Title	Change	Description of Change
1.9.1.18	Steam Generator Tube Integrity Program	Delete	This section is proposed to be deleted in its entirety. Amendment 272 removed TS 5.5.8, "Steam Generator (SG) Program," which ensures that SG tube integrity is maintained, and the license will no longer contain requirements for tube integrity. After implementation of Amendment 272, the only remaining accidents are the FHA, cask drop, and the potential release of gaseous wastes or radioactive liquids, which do not credit SG tube integrity. Consequently, the Steam Generator Tube Integrity Program no longer applies to a plant system, structure, or component that is within the 10 CFR 54.4 Scope for License Renewal and may be eliminated.

8.5. ***Steam Generator Tube Degradation Is No Longer Relevant*** [27]

4.3.4.1	Steam Generator Tube Degradation	Delete	This section deleted in its entirety. Amendment 272 deleted TS Section 3.4, Primary Coolant System, and TS 5.5.8, Steam Generator Program, reflecting the permanent cessation of operations at PNP and permanent removal of fuel from the PNP reactor vessel. Certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel were submitted to the NRC in accordance with 10 CFR 50.82(a)(1)(i) and (ii) and are docketed for PNP, therefore the 10 CFR Part 50 license no longer permits operation of the reactor or placement of fuel in the reactor vessel in accordance with 10 CFR 50.82(a)(2). As a result, the SG will no longer perform a function in the permanently shut down and defueled facility. Therefore, SG tube degradation is no longer relevant.

8.6. In effect, Holtec, in the midst of preparations for restart, decided that the degradation of the steam generator tubes was irrelevant by canceling the methods by which tube deterioration might have been identified.

9. Holtec-Induced Steam Generator Damage

9.1. During routine steam generator inspections required for the continued operation of a nuclear power plant, a small amount of tube degradation is usually due to tube vibration. Following more than two years of ownership of the Palisades reactor and given its request to change its operational status, a Holtec assessment of the condition and

[26] *Id.*
[27] *Id.,* p. 59/300 of pdf.

degradation of the Palisades Steam Generators began in August of 2024 and problematic results were announced in September 2024.[28]

9.2. Because Holtec failed to institute a wet layup in 2022 and 2023, the operational condition within the steam generators and other critical mechanicals was unprotected from years of corrosive chemical attack from cold water due to the lack of chemical water treatment to the steam generator water internal structures.

9.3. More alarmingly, during its September 2024 inspection, Holtec uncovered ***at least 700 additional tubes that were newly damaged and must be plugged*** due to metal corrosion owing to its lack of preventive maintenance.[29] Amazingly, Holtec uncovered more new tube failures in 2024 (1.163)[30] than the 88 total SG tube failures at Palisades documented across 35 years of combined operation by Consumers Energy and Entergy.

9.4. Disturbingly and according to the NRC, the Stress Corrosion Cracking (SCC) on the Palisades SGs, while managed by Holtec, "far exceeded" any SCC that occurred before Holtec acquired the Palisades Nuclear Power Plant.[31]

9.5. Because Holtec did not place the system in a proper wet layup, extensive corrosion exists from cold water on the outside diameter of the steam generator tubes and between the tubes and tube sheet. Avoiding Stress Corrosion Cracking is critical to preventing a meltdown at Holtec Palisades. ***Furthermore, the NRC staff notes that stress corrosion crack indications also adversely affect the tube sheet and must be appropriately***

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[28] *Preliminary Notification of Event or Unusual Occurrence - PNO-III-24-002,* main.jsp (ML24262A) (September 18, 2024) (" During Holtec's analysis of the inspection data, preliminary results identified a large number of SG tubes with indications that require further analysis and/or repair."). For details of the tube damage and deterioration, see *Summary of Conference Call Regarding Steam Generator Tube Inspection (EPID L-2024-NFO-0008)*, https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML24267A296 (October 1, 2024).

[29] *Id.,* Summary of Conference Call immediately above, p. 5/8 of pdf.

[30] Corrosion cracking at Palisades nuclear plant exceeds previous estimates, NRC says, https://www.power-eng.com/nuclear/corrosion-cracking-at-palisades-nuclear-plant-exceeds-previous-estimates-nrc-says/

[31] *Id.*

addressed to maintain the generator's pressure boundary.[32] In a *Reuters News* article[33] published on October 2, 2024, Holtec Palisades admitted that it had expected damage to the Palisades reactor's steam generators from the chemical attack Holtec created from its improper layup between 2022 and 2024.

> "Patrick O'Brien, a company spokesperson, said the results of the inspections "were not entirely unpredicted" as the standard system "layup process", or procedure for maintaining the units, was not followed when the plant went into shutdown."

9.6. The *Reuters News* article also identified that Holtec Palisades was willing to ignore the safety implications of stress corrosion cracking and focus instead on unplugging 600 tubes that were prophylactically plugged thirty-four years earlier for safety reasons. *Reuters News* stated:

> "But he said the return of Palisades is still on schedule and that Holtec wants to fix, and not replace, the steam generators, which he said would last for 30 years after repairs. "**We expect the repair strategy will be to 'unplug' approximately 300 tubes per steam generator that were plugged at original installation,** and then address the tubes found during the inspections by plugging approximately 20% of the tubes that cannot be repaired easily and repairing the remaining 80% with sleeving, which is a common and proven repair strategy," O'Brien said. (Emphasis Added)

9.7. Other Combustion Engineering (CE) steam generators, including St. Lucie 2, San Onofre 2 and San Onofre 3 experienced substantial internal vibrations in the center of the tube bundle. Those vibrations occurred during their operational years while the steam generators were hot. The Palisades SG tubes were prophylactically plugged in 1990 before this problem occurred.

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[32] Subject: Palisades Nuclear Plant - Summary of Conference Call Regarding Steam Generator Tube Inspections ADAMS Accession No.: ML24267A296. https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML24267A296

[33] *Corrosion exceeds estimates at Michigan nuclear plant US wants to restart, regulator says,* https://www.reuters.com/business/energy/us-report-says-corrosion-michigan-nuclear-plant-above-estimates-2024-10-02/

9.8. Now, Holtec Palisades has decided that the quick solution to its technical safety-related dilemma is to unplug the tubes that Consumers Energy preemptively plugged three decades ago. Since the Holtec Palisades tubes are also experiencing Stress Corrosion Cracking (SCC), unplugging extra tubes will create more unforeseen engineering and safety predicaments.

9.9. For example, Holtec suggests that *the damaged tubes should be sleeved rather than plugged*. However, one must remember that the tube damage is due to stress corrosion cracking from chemical deposition in cold water, and *sleeving increases stress in the tube*. According to the Electric Power Research Institute's Steam Generator Sleeving Review Committee:

> **The process of forming a sleeve joint places an additional stress on both the sleeve and the parent tube materials**. The additional stress in the joint area **increases the parent tube susceptibility to environmentally induced cracking**.[34] **[Emphasis Added]**

9.10. Holtec's sleeving solution for the Palisades Steam Generator Stress Corrosion Cracking (SCC) damage will increase the stress on the tubes and tube sheet. Increasing the stress on the tubes and tube sheet by sleeving is counterintuitive and counterproductive in eliminating a problem created by Stress Corrosion Cracking (SCC).

9.11. As the *Electric Power Research Institute's Steam Generator Sleeving Review Committee noted* in the quote above, further complications arise from the chemical-induced corrosion on both the primary side of the reactor itself as well as in the secondary system of the steam generators that also has been contaminated by chemically corrosive water permeating the reactor water (primary system) and the steam generator (secondary system).

10. The Fix Proposed by Holtec Does Not Address the Underlying Stress Corrosion Cracking (SCC) Problem

[34] https://www.neimagazine.com/advanced-reactorsfusion/sg-repair-has-something-up-its-sleeve/?cf-view

10.1. Aging steam generators at nuclear facilities expect to slowly develop damage to their tubes over prolonged periods. Yet, the suddenness and extent of new damage to the Palisades steam generators under Holtec's management and ownership is astounding. At least 700 tubes developed significant defects in only 26 short months from chemical attack in cold water. The only recorded sudden incidence of gross tube failures of which I am aware occurred at the San Onofre Units 2 and 3 in California in 2012 and is similar to the number of defects at Palisades. The gross tube failures at San Onofre were induced by tube vibration while the SGs were hot, and resulted in the permanent closure of both reactors at a cost to ratepayers of $4 billion.[35] [36]

10.2. Nevertheless, the tube damage at Palisades is more critical to reactor safety than the steam generator defects uncovered at San Onofre. The damaged tubes at the Combustion Engineering (CE) reactors at San Onofre were due to tube vibration in the center of the tube bundles. Palisades, also a CE design, already prophylactically plugged more than 600 tubes to avoid this problem. Holtec now proposes to unplug all the prophylactically plugged tubes in the Palisades Steam Generators identified in 1990–some 35 years ago–to be a real danger to the safe operation of Palisades.

10.3. The San Onofre tube failures were caused by vibration while the facility operated. Unlike San Onofre, Palisades experienced stress corrosion cracking from chemicals in cold water while it was shut down for two years. Stress Corrosion Cracking (SCC) is a chemical attack on the steam generator tubes and tubesheets that is so much worse for reactor safety than what occurred at San Onofre. Why? Holtec never contemplated the restart of the defunct Palisades reactor and completely ignored the steam generator water chemistry inside the shuttered facility between 2022 and 2024.

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[35] Bad Vibrations: San Onofre steam generators cannot safely be repaired – new Fairewinds video and report | San Onofre Safety, https://sanonofresafety.org/2012/05/15/bad-vibrations-san-onofre-steam-generators-cannot-safely-be-repaired-new-fairewinds-video-and-report/

[36] Dismantling California nuke plant will cost $4.4B | AP News, https://apnews.com/general-news-f710f0e64d8747adb2c022b67ab59185

10.4. First, these harmful chemicals are concentrated deep in small crevasses next to the tubes and are impossible to eradicate. Second, if Holtec Palisades restarts, the chemical stress corrosion cracking will continue because additional heated steam in the steam generator will accelerate any interior chemical reactions. Additional tubes are in jeopardy of destruction and failure, and the stainless-steel tube sheet inside the steam generator is also subject to cracking.

11. Analysis Of Holtec's January 14, 2025, Presentation to The Nuclear Regulatory Commission (NRC) – Precedent for Sleeving at Palisades

11.1. Holtec has acknowledged that it anticipated its actions would cause extensive damage to the Palisades Steam Generators.[37] It claims that inserting sleeves into the hundreds of damaged Palisades Steam Generator tubes will mitigate that damage and allow the generators to operate safely for thirty additional years.

> "A spokesperson from the company explained that the NRC's findings werean't [sic] unexpected as proper maintenance was not carried out when the facility shutdown… They confirmed that Holtec will swifty [sic] implement a repairs[sic], which it expects to last 30 years, and remain on schedule to reopen the facility next year."[38]

11.2. Even as recently as April 2024, Holtec still clung to its unfounded belief that sleeving some of the damaged tubes will allow Palisades SG to continue to operate for thirty additional years, This claim by Holtec is unfounded in the literature of Alloy 600 Steam Generators, and in fact flies in the face of all historical data. The current Alloy 600 Palisades SG is already 34 years old, yet Holtec's lack of nuclear operating experience leads it to conclude that it can survive twice as long. Holtec states:

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[37] *Corrosion exceeds estimates at Michigan nuclear plant US wants to restart, regulator says,* https://www.reuters.com/business/energy/us-report-says-corrosion-michigan-nuclear-plant-above-estimates-2024-10-02/ (Patrick O'Brien, a company spokesperson, said the results of the inspections "were not entirely unpredicted" as the standard system "layup process", or procedure for maintaining the units, was not followed when the plant went into shutdown. But he said the return of Palisades is still on schedule and that Holtec wants to fix, and not replace, the steam generators, which he said would last for 30 years after repairs.)

[38] https://www.power-technology.com/news/palisades-steam-generators-require-repair-before-restart-nuclear-authority-says/

> Another major restart project is the refurbishment of the two Steam Generators whose tubes exhibiting localized indications will be "sleeved" using a proven method based on industry experience. This, along with other proactive measures, is projected to extend the equipment's service life by up to 30 years. The Steam Generator refurbishment schedule supports a restart in the fourth quarter of 2025.[39]

11.3. Holtec claims safe historical precedent to support their proposal for extensive sleeving of the damaged Palisades Steam Generator tubes in the experience of finally opening the Watts Bar, Unit 2 nuclear reactor in Tennessee.[40] Slide 34 of the Holtec 1/14/25 presentation to the Nuclear Regulatory Commission states that the previous sleeving of the Watts Bar 2 steam Generators in 2020 establishes historical precedent that sleeving can be accomplished at Palisades. Quote from Slides:

> ▪ Precedent
> • Most recent sleeving amendment was for Watts Bar Nuclear Plant, Unit 2. NRC issued the Safety Evaluation on August 10, 2020 (ADAMS Accession No. ML20156A018)
> • Information submitted to obtain the Watts Bar Unit 2 approval used as guidance in the development of the Palisades request[41]

11.4. Since Holtec has offered Watts Bar Unit 2 as its only example of historical precedent, it is illustrative to analyze the actual history of the Watts Bar Unit 2 steam generators. That history proves that Steam Generator sleeving at Watts Bar 2 is not indicative of the success of sleeving, but rather was a historical failure.

11.5. TVA started construction on the two-reactor Watts Bar nuclear plants in 1973. Watts Bar Unit 1 began generating electricity 23 years later in 1996, while Unit 2 was mothballed

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[39] Holtec Highlights, HH #40.08 (April 7, 2025), https://holtecinternational.com/wp-content/uploads/2025/04/HH-40.08.pdf

[40] Holtec License Amendment Request, 2/11/2025, Enclosure 1, p. 31/126 of pdf, https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25043A348

[41] *Palisades Nuclear Plant Pre-Submittal Meeting (Open Portion) License Amendment Request to Support Repairing of Steam Generator (SG) Tubes by Sleeving,* Slideshow, p. 34/55 of pdf, https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25006A181

in the mid-1980s for several decades. TVA revived Watts Bar Unit 2 in 2007,[42] and Unit 2 began producing electricity in 2016, four decades after it began construction.[43]

11.6. The steam generators at Watts Bar Unit 1 and Unit 2 were not subject to any monitoring or corrosion preservation programs during the decades the reactors sat dry and unused. While they did not experience the wear and tear of stresses from hot flowing water during heat-ups and cooldowns that other steam generators typically experience, their condition was degraded due to different aging mechanisms throughout those decades. The NRC did not address the damaged condition of the steam generators when allowing both reactors to start in 1996 (Unit 1) and 2016 (Unit 2).

11.7. I have reviewed the non-proprietary portion of the 1/14/25 Holtec/Framatome presentation[44] as well as the February 2025 License Amendment Request.[45] Holtec's use of Watts Bar Unit 2 as its only historical precedent for plugging/sleeving in its presentation is flawed, as Palisades' Steam Generator damage is unique. Unlike Watts Bar Unit 2, whose steam generators were dry for 45 years, Palisades experienced extensive Stress Corrosion Cracking because water containing corrosive contaminants *hid out* in the tube-to-tube sheet junction once Palisades was permanently closed and scheduled to be dismantled. Every other plant (including Watts Bar 2) has experienced slower, monitored trends in degradation while operating HOT. Palisades experienced 50 times more SCC after two years of exposure to a toxic cold soup of corrosive chemicals during its pre-planned termination. *The SG phenomenon called hideout,* which was discussed previously, causes corrosive contamination to enter the gap between the tube and tube sheet. These chemicals are impossible to remove and continue their chemical

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[42] https://www.cleanenergy.org/blog/did-tva-stay-on-budget-with-the-new-tva-watts-bar-2-reactor/
[43] https://www.tva.com/newsroom/watts-bar-2-project/watts-bar-unit-2-timeline
[44] *Palisades Nuclear Plant Pre-Submittal Meeting (Open Portion) License Amendment Request to Support Repairing of Steam Generator (SG) Tubes by Sleeving,* Slideshow, p. 34/55 of pdf, https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25006A181
[45] *License Amendment Request to Revise Selected Permanently Defueled Technical Specifications to Support Repairing of Steam Generator Tubes by Sleeving,* https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25043A348, p. 31/126 of pdf.

attack on the tube and tube sheet. Framatome claims an extensive background in the sleeving of tubes,[46] but the situation differs from Palisades.

11.8. In its slide presentation, Holtec/Framatome said,

> "Based on decades of experience with replacement SGs, Alloy 690 is virtually impervious to **PWSCC [Primary Water Stress Corrosion Cracking]** and has dramatically improved resistance to **ODSCC [Outside Diameter Stress Corrosion Cracking]**. In some SGs with Alloy 600 tubing, ODSCC has been found in tubesheet crevices, within lattice support plate locations, and at dents. Thus, Alloy 690 is the best alloy currently available for both primary and secondary side corrosion concerns.[47] (Emphasis added).

11.9. Framatome and Holtec rely upon the historical precedent of Watts Bar Unit 2 to claim that sleeving may prevent tube failure in the future. Watts Bar 2 was a failure, not a success. Additionally, by focusing on repairing the steam generator tubes, Holtec and Framatome ignore the more significant issue of *hideout* in the tube-to-tubesheet crevasses. Their assumption is flawed for three essential reasons.

11.9.1. Holtec has publicly claimed that the repaired Palisades steam generator will last for thirty more years,[48] while the Watts Bar Unit 2 steam generator was replaced 18 months after TVA sleeved the suspect tubes.

11.9.2. Sleeving will not prevent the continuation of the corrosive chemical reaction on the outside diameter of the tube due to the continuing hideout of chemicals in the junction between the tube and tubesheet.

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[46] *License Amendment Request to Revise Selected Permanently Defueled Technical Specifications to Support Repairing of Steam Generator Tubes by Sleeving,* https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25043A348, p. 73/126 of pdf.

[47] *Palisades Nuclear Plant Pre-Submittal Meeting (Open Portion) License Amendment Request to Support Repairing of Steam Generator (SG) Tubes by Sleeving,* Slideshow, p. 48/55 of pdf, https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25006A181

[48] *Corrosion exceeds estimates at Michigan nuclear plant US wants to restart, regulator says,* https://www.reuters.com/business/energy/us-report-says-corrosion-michigan-nuclear-plant-above-estimates-2024-10-02/ **(**"But [Patrick O'Brien, company spokesperson] said the return of Palisades is still on schedule and that Holtec wants to fix, and not replace, the steam generators, which he said would last for 30 years after repairs.")

11.9.3. While Watts Bar Unit 2 shows that sleeving is an 18-month Band-Aid fix for the affected tube, the tubesheet itself (not the tube) is also subject to the corrosive attack of chemicals hiding out in the tube-to-tubesheet junction. *Nothing* in Framatome's experience or Holtec's analysis of *tube repair* addresses the potential for a chemical attack on the tube sheet itself, which is part of the reactor coolant pressure boundary. The tubesheet itself will continue to be savaged by Stress Corrosion Cracking from chemicals hiding out in the tube to the tubesheet junction caused by Holtec's negligence after the pre-planned termination of Palisades.

11.10. TheTVA experience at Watts Bar Unit 2 also illustrates how little the industry experts understand localized crevasse chemistry and the speed at which tube degradation can occur. According to the 2020 Watts Bar Unit 2 Licensee Event Report:

> "… **the growth rate identified was greater than projected**… localized crevice chemistry at the TSP [Tube Support Plate] creates an undesirable condition that leads to initiation and growth of ODSCC."
>
> "This [2020] inspection revealed **higher than projected degradation** from axial ODSCC of the SG tubing".[49]

11.11. Using Watts Bar Unit 2 as a precedent proves that the industry projections of steam generator crack propagation cannot be relied upon to indicate that the steam generators' vital safety functions can be monitored or maintained.

11.12. During the January 14, 2025, public hearing, the NRC indicated that it is evaluating no alternative other than sleeving the Palisades steam generators. According to *Inside NRC*,

> Tom Flynn of Michigan Safe Energy Future, which opposes Palisades restart, asked during the question period why Holtec had chosen to repair steam generator tubes rather than replacing the generators entirely, noting that the Department of Energy had included $500 million for the replacement in the $1.52 billion loan guarantee it awarded Holtec to support the plant's restart.

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[49] *Licensee Event Report 391/2020-004-00, Steam Generators Degraded Due to Axial Outside Diameter Stress Corrosion Cracking,* https://www.nrc.gov/docs/ML2100/ML21007A022.pdf

> An NRC staffer replied that **the issue was "outside of our scope of safety evaluations**…" The proposed revisions to the technical specifications, the company said, would "include a repaired tube (sleeve and tube) inspection interval that shall not exceed 24 effective full power months or one refueling outage (whichever is less), and specify the allowable SG tube repair methods with the establishment of a ten-year sleeve in service limit."[50] **[Emphasis added]**

11.13. However, if Watts Bar Unit 2 is Holtec's only precedent for sleeving, the historical data argue against both Holtec and the NRC. In 2020, the basis for the NRC's acceptance of the continued operation of Watts Bar Unit 2 was the following commitment by TVA:

> "The cause of the degradation in the SGs…. is axial outside diameter stress corrosion cracking (ODSCC) of the Alloy 600 mill annealed (MA) coincident with carbon steel tube support plate interactions. **Corrective actions to prevent reoccurrence include a planned mid-cycle SG inspection and steam generator replacement"… "As a result of the identified condition, a mid-cycle inspection of SG tubes will be preformed [sic] at WBN Unit 2. Actions are in progress to move up the planned replacement of the WBN Unit 2 steam generators".** [51] **[Emphasis Added]**

11.14. In the case of Watts Bar Unit 2, ***the NRC allowed continued operation only if the reactor was shut down at its nine-month mid cycle for complete tube reinspection and that all the steam generators be wholly replaced in 18 months.*** Yet for Holtec Palisades, the NRC claims that replacing the steam generators is "**outside of our scope of safety evaluations.**" (Emphasis added). While Holtec claims that Watts Bar Unit 2 is the precedent that Palisades will follow, in contradiction, Holtec also claims that Palisades will not be reinspected for two years and that the existing steam generators can be safely operated for thirty additional years. Holtec has taken the wrong lessons from the Watts Bar Unit 2 precedent.

11.15. Based on the Holtec January 2025 presentation to the NRC, I conclude that the Palisades SGs will leak and/or fail during the plant's first cycle of operation.

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[50] *INSIDE NRC*, PLATTS/S&P GLOBAL, Commodity Insights, Volume 47 / Issue 2 / January 24, 2025
[51] LER 2002-004, pp. 1 and 5, TVA Watts Bar 2, https://www.nrc.gov/docs/ML2100/ML21007A022.pdf

12. Analysis Of Holtec's Steam Generator License Amendment Request (LAR)

12.1. Holtec has stated that it plans to *resurrect* the Palisades reactor, with a restart scheduled in the fourth quarter of 2025. *Holtec has requested that the NRC support such a never-before-accomplished resurrection by expediting its safety reviews*. The lights have remained on in Michigan since Palisades was closed in 2022, and *there is no need for the excess power that Palisades might produce*. Indeed, Holtec and its power purchasers require massive taxpayer and ratepayer subsidies if they are to restart Palisades. *Why is Holtec requesting an expedited safety review for its Palisades resurrection?* Holtec seems to be placing expediency and profitability ahead of community health and safety. More importantly, *why is the NRC supporting this rapid resurrection?*

12.2. In a July 5, 2022, funding request to the Department of Energy, Holtec acknowledged that the Palisades steam generators had degraded and should be replaced as Holtec stated:

> Designing the new equipment to **replace old worn-out hardware, such as the Steam Generators.**[52] (Emphasis added).

12.3. Yet almost three years after the DOE funding request, Holtec's License Amendment Request presents the Nuclear Regulatory Commission with a *flawed solution*, indeed with no alternative other than sleeving the Palisades steam generator tubes with a slightly different alloy (690 vs. 600).

12.4. Holtec filed its License Amendment Request (LAR) "*To Support Repairing of Steam Generator Tubes by Sleeving*" on February 11, 2025.[53] In the very first paragraph of the LAR, Holtec incorrectly frames the steam generator problems at Palisades as somehow created by an unknown mysterious cause, stating:

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[52] *Holtec International Application for Federal and State Support to Enable the Resurrection of the Palisades Nuclear Generation Station,* submitted July 5, 2022, p. 4/42 of pdf. https://beyondnuclear.org/wp-content/uploads/2023/10/7-5-22-42-page-Holtec-application-to-DOE-for-CNC-funds-to-restart-Palisades.pdf

[53] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25043A348

> The LAR would revise the Permanently Defueled Technical Specifications (POTS) to allow Framatome Alloy 690 sleeves to **repair defective steam generator (SG) tubes** as an alternative to removing the tubes from service by plugging.[54] **[Emphasis Added]**

12.5. In 1991, Palisades installed its new Steam Generators, and while they were relatively old and worn out when Holtec took control of the Palisades reactor from Entergy in 2022, ***the reactor did not have any leaking tubes***. As discussed in this expert report, *Holtec discovered hundreds of **damaged** tubes during an August 2024 inspection*.[55] Holtec states that these newly identified tubes were **defective, but the SGs had operated without failure for their final cycle under Entergy's control (May 2022).** Through the deliberate, premeditated actions of Holtec the tubes were ***damaged*** when Holtec knowingly allowed improper layup from June 2022 to May 2024.[56] Holtec's blissfully ignorant actions created the need for sleeving as a dangerous solution.

12.6. Holtec now seeks the NRC's rapid approval to perform its requested sleeving due to its unsafe actions. The extensive steam generator damage would not have been possible if Holtec had followed utility protocols by placing the Palisades Steam Generators in an industry-standard wet layup condition. Furthermore, if Holtec had prior operational nuclear power plant experience, it would have understood the absolute necessity of a proper wet layup.

12.7. At p. 8/126 of pdf in the February 2025 LAR, [57] Holtec perpetuates the myth that the tubes are "defective" rather than damaged by its own negligence stating:

> The Palisades Nuclear Power Plant Tech Specifications (PNP TSs – Tech Specs), as detailed in the Reference 1 LAR, allow defective tubes to be removed from service by installing plugs at both ends of the tube. The installation of SG tube plugs removes the heat transfer surface of **the plugged tube from service and leads to a reduction in the primary coolant flow available for core cooling**….The LAR would also prevent

[54] ML25043A348
[55] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML24267A296
[56] *Corrosion exceeds estimates at Michigan nuclear plant US wants to restart, regulator says,* https://www.reuters.com/business/energy/us-report-says-corrosion-michigan-nuclear-plant-above-estimates-2024-10-02/
[57] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25043A348

> unnecessary plugging of SG tubes, if appropriate, prior to the restart of the unit and subsequent refueling outages. (Emphasis added).

12.8. On page 5 of Enclosure 1, Holtec states,

> "Sleeving is a method used to repair defective SG tubes and thus keep the tubes in service."[58]

12.9. In making its sleeving claim, Holtec fails to acknowledge that all steam generators have excess steam generator tubes to allow for plugging as the steam generators age. Instead, Holtec *purposely misrepresents or technically misunderstands* the unique engineering specifications of plugging Steam Generator (SG) tubes. Rather than giving the correct technical specifications and engineering requirements, Holtec wrongly claims and misrepresents that it causes "a reduction of primary coolant flow available for core cooling" and is performed to "keep the tubes in service."

12.10. Throughout its entire LAR, Holtec fails to acknowledge that there are alternatives other than sleeving the damaged tubes created by its negligence. Technically feasible alternatives include:

12.10.1. As at Watts Bar Unit 2, the severely damaged steam generators should be replaced. After all, the previous owners of Palisades installed these steam generators in 1991, and Holtec identified them as "worn out" in its 2022 funding request to the Department of Energy. And even as far back as 2006, Consumers Energy wanted to sell Palisades, because of the degraded condition of the steam generators, among other factors.

12.10.2. No LAR would be necessary if Holtec were to plug the tubes as PNP Tech Specs detail, rather than incur additional expense and technical risk to plant safety of sleeving the tubes. Plugging the tubes reduces the heat load transmitted by the affected tube into the tubesheet, and it decreases the possibility of increased Stress Corrosion Cracking from a hideout in the tubesheet near the plugged tube.

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[58] *Id.*, p. 9/126.

Therefore, plugging is a safer alternative that is already foreseen and allowed by the existing plant specifications.

12.10.3. Throughout the LAR, Holtec fails to identify with specificity the number of tubes it might plug without any *"reduction of primary coolant flow available for core cooling*." Holtec's claim of flow reduction is wholly unproven and unprovable without the specificity of calculations and analytical detail.

12.10.4. Why is Holtec demanding that the NRC approve sleeving instead of plugging? It appears that Holtec is telling the NRC that sleeving will "*keep the tubes in service*" while simultaneously telling DOE that the steam generators are *old, worn-out hardware*. Holtec's technical precedent at Watts Bar Unit 2 indicates that sleeving lasted only 18 months until new Replacement Steam Generators (RSGs) replaced the old defective steam generators. What is also clear is that Holtec has acknowledged that 10 to 12 sleeves have the same flow resistance as a single plug. So if they want full reactor power, they are forced to use sleeves or else there may not be enough channels to force the water through. This Holtec claim is not supported by evidence or calculations.

12.11. As important as the content within Holtec's LAR (License Amendment Request) claim is, what Holtec does not say in that LAR is even more significant. As a nuclear engineer, an internationally recognized expert witness, an author of three peer reviewed international papers, and a best-selling technical book regarding the triple meltdowns at Fukushima Dai-Ichi, I am professionally astonished that the LAR has passed any NRC acceptance review[59] since it is lacking extensive critical information. It appears that the NRC focuses on meeting Holtec's financial scheduling rather than adequately assessing the LAR's impact on community health and safety and environmental protection near Palisades.

[59] Palisades Nuclear Plant - Audit Plan In Support Of Review Of License Amendment Request Regarding Steam Generator Repair By Sleeving (EPID L-2025-LLA-0036) ML25070A153,

12.12. It is irresponsible for the NRC to claim it can thoroughly review Holtec's proposed *steam generator resurrection gambit* without further information in the following areas:

12.12.1. Holtec has previously stated that it intends to remove the plugs from 600 tubes that were prophylactically plugged in 1991 and to sleeve those previously closed tubes. Yet the LAR is silent on what tubes Holtec intends to sleeve. Should Holtec inspect and sleeve the previously plugged tubes, the inspection report identifying those activities might only become available to the public after Holtec's planned restart date. Yet, prior owners prophylactically plugged those tubes to avoid radiation releases.

12.12.2. The entire focus of the LAR is on the proposed sleeving operation on hundreds of tubes that Holtec previously damaged through its own negligence. For the record, I have no opinion on the acceptability of Alloy 690 compared to Alloy 600. Moreover, Holtec refuses to address the broader issue of ongoing damage to both the sleeved and unsleeved tubes due to chemical hideout if it restarted the Palisades' steam generators.

12.12.3. The LAR is utterly silent on the anticipated chemical attack on the tubesheet (NOT the tubes) by chemicals deposited in the tube-to-tubesheet gap. *Failure or leakage of the tubesheet is a reactor coolant pressure boundary failure, which Holtec must evaluate before the NRC can consider any restart of Palisades.*

12.12.4. The LAR never discusses how Holtec knowingly damaged the steam generator tubes, but rather simply claims that the tubes are *defective*. These tubes were damaged by a chemical attack due to exposure of contaminated cold water while Holtec was preparing to dismantle the steam generators during the decommissioning of Palisades. Those intrusive chemicals remain in the tube to tubesheet junction due to the phenomenon called *hideout.*

12.12.5. *Heating the steam generators will exacerbate the chemical attack on all the steam generator tubes*, not just those that Holtec has already identified as needing

repair. The LAR contains no discussion of the likelihood of continued chemical attack from hideout on the sleeved tube nor on those tubes that remain unsleeved.

12.12.6. Holtec has identified that the sleeving operations will degrade the performance of the steam generators during a Main Steam Line Break (MSLB). Holtec stated,

> After the leak and cyclic tests were complete, MSLB leak testing was performed to represent the maximum pressure expected from an MSLB accident. **The leak rates measured** during this testing, performed at room temperature, **were higher than those previously recorded during room temperature leak testing**. However, no joint failure was noted during testing.[60] (Emphasis added).

12.12.7. Holtec identifies that in one statistically insignificant test of a few tubes in cold laboratory conditions, leak rates were measured to be higher than previously recorded. Yet it suggests that since there were no gross failures, sleeving remains adequate.

12.12.8. Yet Holtec's MSLB testing does not accurately model the actual conditions that now exist inside the damaged Palisades steam generators. Not only the tubes that Holtec proposes to sleeve, but all tubes inside the steam generators, will be under continuing chemical attack and will be further weakened if the NRC allows these old steam generators to be restarted. The MSLB tests performed by Holtec do not include any further degradation of all the tubes caused by hideout under hot operating conditions, but instead represents the cold-water condition of only the damaged tubes identified in the inspection report following the August 2024 tube inspection.[61]

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[60] *License Amendment Request to Revise Selected Permanently Defueled Technical Specifications to Support Repairing of Steam Generator Tubes by Sleeving,* https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25043A348, p. 21/126 of pdf.

[61] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML24267A296

12.12.9. *Likely this new MSLB damage assessment* is *why Holtec is proposing changing its license conditions on Leak Before Break considerations*. The radiation released from the new analysis of tube failures is already identified as beyond what was previously anticipated.

12.12.10. More importantly, Holtec has already identified hundreds of damaged tubes that will require sleeving, yet it is not specific as to where on the tubesheet those sleeved and plugged tubes are located. Even though a complete Steam Generator Inspection report is required by Palisades technical specifications to be filed in ADAMS within 6 months of the inspection, Palisades has apparently ignored this filing requirement. Additionally, Holtec assumes that the tube repairs will occur in random locations, stating in its Flow Induced Vibration[62] discussion (FIV) below,

> The FIV analyses evaluated fluid-elastic stability margins (FSM) **and random turbulence vibration response** for TSP sleeves installed at the TSPs on the hot leg. The natural frequencies and mode shapes of the SG tube and sleeve combination were determined. The FIV tube model included the hot leg , U-bend, and cold leg tubing from tubesheet to tubesheet [sic]. The FIV analyses indicated that the sleeves are acceptable for installation based on FSM and **random turbulence vibration** considerations. (Emphasis added)

12.12.11. Holtec provides absolutely no specificity about its assumption that flow induced vibration will occur in random turbulence. Plugging and sleeving patterns likely will create turbulence vibration that is not located randomly. If the turbulence vibrations are not random, the tubes may interact with each other causing destruction similar to what occurred at San Onofre Units 2 and 3.

13. Ramifications of Hideout and Temperature on Stress Corrosion Cracking

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[62] *License Amendment Request to Revise Selected Permanently Defueled Technical Specifications to Support Repairing of Steam Generator Tubes by Sleeving,* https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25043A348, p. 99/126 of pdf.

The focus of Holtec is to repair the stress corrosion cracking caused by their own improper wet layup under cold conditions, *ie,* all the tube cracks that they now want to sleeve appeared in cold metal. Holtec LAR request has failed to acknowledge that chemical HIDEOUT exists in all the thousands of tube-to-tubesheet crevices. Holtec also fails to acknowledge that high temperatures when operating will not just exacerbate continued crack propagation in the already identified tubes that it plans to sleeve but also hideout will exacerbate in the tube sheet and as yet undetected tube flaws creating new flaws. Palisades is unique in that all the tube-to-tubesheet crevasses are contaminated but only a few hundred have already developed 40% flaws because the tubes were cold when the SCC occurred.

The scientific literature is replete with references to SCC being exacerbated by high temperature:

> Stress corrosion cracking (SCC) is a severe and insidious form of material degradation that occurs when susceptible metals are exposed to a corrosive environment under tensile stress. Elevated temperatures significantly exacerbate this process. Unlike uniform corrosion, which leads to a predictable material loss, SCC can cause sudden and often unexpected failure of critical infrastructure, sometimes without visible signs of deterioration.
>
> The formation of microcracks, which are fine and often invisible at first, is a defining characteristic of SCC. **These microcracks propagate over time, potentially leading to catastrophic failure even if the material appears intact externally. High temperatures can accelerate the SCC process by increasing both the corrosion rate and the cracking mechanism, thereby enhancing the chemical reactions between the metal and its corrosive environment. This makes SCC particularly hazardous in high-temperature environments, where the risk of failure is significantly elevated.**[63]

14. Analysis of Non-Confidential Framatome Report

Framatome Inc.Engineering Information Record
Document No.: 51-9385467-002

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[63] *Stress corrosion cracking (SCC): Causes and Prevention, Technical Causes of Stress Corrosion Cracking (SCC),* https://inspenet.com/en/articulo/stress-corrosion-cracking-prevention/ (February 28, 2025).

Steam Generator Mechanical TSP Sleeve Qualification Report for ¾" Tubes at Palisades Nuclear Power Plant
March 26, 2024

14.1. (Framatome quotations are in standard text while Gundersen comments are in bold, italicized text.)

14.2. Revision 2 was issued on March 26, 2024:

In July 2022, Holtec began its plan for securing funds from DOE to resurrect Palisades. As part of its request for funds, Holtec requested more than $500M for the SG replacement, claiming condition of the Palisades SGs was beyond repair. But apparently in late 2023, Holtec commissioned Framatome to sleeve the SGs, claiming the SGs would last as long as 30 additional years after being sleeved. The Technical Specification submittals in the ADAMS database show that no eddy current tests were performed until September 2024, which implies that Holtec had no basis to change its DOE analysis that the SGs were in poor condition. What prior knowledge did Holtec have that lead it to believe that sleeving was necessary and that Framatome should be retained?

Even in late 2023, there was time for Holtec to use the appropriated DOE funds to order new SGs to be completed and installed in late 2025. Instead of replacement, Holtec chose Framatome's sleeves instead of SG replacement. The goal of the Framatome report seems to be to revise the Tech Spec requirements on tube plugging by identifying sleeving as an acceptable alternative. Yet Holtec hired Framatome before the SG damage was identified and then waited more than half a year after the Framatome report was completed in March 2024 before asking for the LAR to change its technical specifications. I conclude that Holtec never planned to replace the SGs but applied for the DOE funds anyway.

14.3. Page 3, Record of Revision: Revision #002: Revised Section 7.7 and Deleted Section 11 "No Significant Hazards and Environmental Considerations".[64]

There is no basis for Framatome's choice to exclude an analysis of significant hazards in Revision #002 that was already provided in Revision #001.

14.4. Page 8, Section 1.0, Executive Summary: "The analytical evaluations were originally completed to qualify the Framatome sleeves for use in Westinghouse steam generators. When necessary, the qualification has been extended by analysis to provide a qualified TSP sleeve at Palisades."[65]

Apparently this report is limited to placing sleeves within tubes near tube support plates (TSP) and is an old analysis of sleeving for the Westinghouse design that

[64] 2/11/2025 LAR, p. 67/126 of pdf.
[65] 2/11/2025 LAR, p. 72/126 of pdf.

was modified to address the Combustion Engineering design at Palisades. There are significant differences in the tube-to-tubesheet connection methods and the tube support plate designs used by CE and Westinghouse. The steam generator problems identified by Framatome's September 2024 inspection are unique and have never been previously encountered. Those newly identified problems from September 2024 could not be analyzed in the Framatome report which was written previously in March of 2024. There is no analysis in the Framatome report of sleeving at the tubesheet, nor is there any analysis of chemical hideout on the tube outside diameter.

14.5. Page 8, Section 1.0, Executive Summary: "The limiting case was the burst pressure criteria during normal operation for the joint region of the sleeve. This resulted in a calculated acceptable flaw depth of [ ] through wall…. The results of this evaluation validate that flaws less than [ ] TW satisfy all performance criteria including NDE uncertainty and flaw growth."[66]

Due to Holtec's negligence by not placing the Palisades in proper wet layup for two years, chemical contaminants now reside in the tube-to-tube sheet gaps. The Framatome report fails to address that these contaminants will continue to attack both the tubes and the tubesheet, and that chemical attack will be enhanced when the steam generator is at operating temperature. The chemical attack is not limited to tubes that have already been shown to be damaged, but will also include tubes that presently do not meet Palisades repair criteria.

14.6. Page 8, Section 1.0, Executive Summary: "…. the Palisades Steam Generator Program currently requires plugging of crack-like indications on detection in the parent tubing, except in areas within the tube sheet covered by alternative repair criteria. This same plug-on-detection criteria applies to the parent tubing portion of the pressure boundary in the sleeve joint region. SG tube surveillance requirements continue to ensure that defective tubes will be repaired or removed from service upon detection."[67]

Framatome is basing its safety conclusions on the Palisades Technical Specifications that existed in March 2024. Those Technical Specifications required tube inspections at every refueling outage. Holtec is now requesting NRC approval to delay those tube inspections for two effective full power years refueling outages, which is not supported by the inspection assumptions made by Framatome.

14.7. Page 9, Section 2.1, Purpose: "This report contains sufficient information to support a technical specification change allowing installation of these sleeves and demonstrates

[66] *Id.*
[67] *Id.*

that reactor operation with sleeves installed in the Palisades RSGs will not increase the probability or consequences of a postulated accident that has been previously evaluated. The sleeve installation will not create the possibility of a new or different kind of accident and will not reduce the existing margin of safety…. The sleeves are acceptable to be installed within any tube support plate except elevations that are geometrically limiting at Palisades Nuclear Power Plant."

Framatome's analysis is limited to the tube support plates and not the tubesheet. Apparently, Holtec commissioned this Framatome report KNOWING that it intended to change Technical Specifications to allow for sleeving of steam generator tubes instead of plugging them. At the time Framatome was retained, Holtec had not inspected the Steam Generators and claimed to have no knowledge of any SG degradation. Also, Framatome is basing its safety conclusions on the Palisades Technical Specifications that existed in March 2024. Those Technical Specifications required tube inspections at every refueling outage (1.5 EFPY). Holtec is now requesting NRC approval to delay those tube inspections for two effective full power years, which is not supported by the inspection assumptions made by Framatome.

14.8. Page 34, Section 7.5, Sleeved Tube Seismic Considerations: "Ground accelerations for the operational basis earthquake used for containment design purposes and all seismic Class 1 structures are 0.10g applied horizontally and 0.07g applied vertically. In addition, ground acceleration of 0.2g horizontal and 0.13g vertical are used for the design basis earthquake."

Framatome's seismic analysis is based on the ground acceleration of the containment building and not the amplified response spectra acceleration that can be reasonably be expected to be significantly greater than the ground acceleration.

14.9. Page 36, Section 7.7, Design Analysis Conclusion: "Therefore, the sleeves are acceptable for installation at the Palisades Nuclear Plant… The current PNP Administrative Controls Technical Specification (TS) 5.5.8c, Steam Generator Program, limit of a depth equal to or exceeding 40% of the nominal tube wall thickness is conservative. A sleeved tube is plugged on detection of degradation in the sleeve/tube assembly."

Framatome is basing its safety conclusions on the Palisades Technical Specifications that existed in March 2024. Those Technical Specifications required tube inspections at every refueling outage. Holtec is now requesting NRC approval to delay those tube inspections for two effective full power years, which is not supported by the inspection assumptions made by Framatome.

14.10. Page 57, Section 10.4, Eddy Current Restrictions on Sleeve Installations: "Installation of sleeves in both the hot and cold leg tube support locations of the same tube will impede the ability to efficiently inspect the un-sleeved section of the tube.

Framatome only intends to sleeve the hot leg side of damaged steam generator tubes. While this may have been reasonable based on what it knew in March 2024, the latest data from the September 2024 inspections indicated extensive damage throughout the thousands of tubes within the steam generators. This assumption is no longer valid for sleeving.

15. CONCLUSION

15.1. The only purpose of the entire Framatome report is to highlight the superiority of Alloy 690 sleeves placed in damaged Alloy 600 tubes at the tube support plates. However, the steam generator inspections of September 2024 indicate extensive damage well beyond that anticipated by Framatome in March 2024. Due to two years of Holtec's incompetence which allowed extensive chemical attacks of the tubes and tube sheet, it is clear that sleeving will not solve the ongoing degradation of the Palisades Steam Generators. Chemical contaminants cannot be dislodged in the tube-to-tubesheet crevasses and continuing damage to sleeved and unsleeved tubes is inevitable if the steam generators are allowed to restart. Failure of sleeved or unsleeved generator tubes is inevitable, as is the potential of tubesheet cracking and potential failure.

The Framatome report also based its safety conclusions for Alloy 690 sleeves on the Palisades Technical Specifications in place in March 2024 which required complete tube reinspection during every refueling outage, at 1.5 EFPY.(Effective Full Power Years). Holtec appears to be ignoring its own Tech Spec analysis and reporting requirements, requesting a re-inspection interval of 2.0 EFPY. Thus Holtec is ignoring the analysis of its own consultant while basing its proposed LAR changes on that same consultant's analysis.

The proposed revisions to the technical specifications, the company said, would "include a repaired tube (sleeve and tube) inspection interval that shall not exceed 24 effective full power months or one refueling outage (whichever is less), and specify the allowable SG tube repair methods with establishment of a ten-year sleeve in service limit."[68]

15.2. The Holtec LAR simply qualifies Alloy 690 sleeves at the tube support plates:

"By letter dated February 11, 2025 (Agencywide Documents Access and Management System Accession No. ML25042A692), Holtec Palisades, LLC requested U.S. Nuclear Regulatory Commission (NRC) review and approval of a license amendment request (LAR) to revise the Palisades Nuclear Plant (PNP) technical specifications to allow the use of Framatome Alloy 690

[68] Inside NRC, Platts/S&P Global, Commodity Insights, Volume 47 / Issue 2 / January 24, 2025.

sleeves to repair defective steam generator (SG) tubes as an alternative to removing the tubes from service by plugging."[69]

15.3. There is an assumption that any defect below 40% will not grow to the breaking point in one refueling cycle

The applicable tube plugging criteria, specified in the TS, are that tubes found during in service inspection to contain flaws with a depth equal to or exceeding 40 percent of the nominal wall thickness shall be plugged, unless the tubes are permitted to remain in service through application of alternate repair criteria provided in the TS

15.4. The Framatome sleeve report only qualifies the sleeves for the tube support plates

15.5. The layup damage is at the tube sheet, not the tube support plates.

15.6. The extensive damage identified in the September 2024 inspection is not within the realm of parameters analyzed by Framatome nor previous industry experience, and was caused when the unit was in cold shutdown condition.

15.7. Sleeving tubes that exceed 40% TW will not prevent tubes less than 40% from extensive rapid crack propagation once the SGs are heated and pressurized. THE DAMAGE HAS METASTASIZED although it does not yet meet 40% sleeving requirements. There is no historical precedent for the extensive spread of SCC at Palisades under cold conditions while the unit was not operating.(spacing should be 1.5?)

15.8. The Framatome report for Alloy 690 sleeves is clear that the analysis based on decades of its experience only applies to tube support plates. Yet the LAR suggests that sleeving will be used at the tube support plate and tube sheet. Holtec is using the Framatome report to support LAR changes that are not addressed in the Framatome report. And the NRC seems to be making no distinction, either. While this may have been reasonable based on what Framatome knew in March 2024, the latest data from the September 2024 inspections indicated extensive SCC damage throughout the thousands of tubes within the steam generators. Thus Framatome's assumption is no longer valid for sleeving.

15.9. After reviewing all the data provided by Holtec in the LAR (License Amendment Request), I opine that Palisades is <u>*NOT*</u> capable of extended operations. Furthermore, Palisades' degraded condition means that it *cannot be considered as a reliable power source on the electric grid for Michigan because of the inevitability of a steam generator failure which means therefore it cannot be critical for system reliability*.

16. From my review of the extensive documentation cited in my analysis I conclude that sleeving the tubes in the Palisades steam generator will reduce critical safety margins and increase the

[69] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML25128A171

risk to public health and safety as well as the environment. In my research and assessment, it is not a question of whether the Palisades steam generators will leak. They will. Rather, it is a question of when the first leak will occur and how serious the radiation leak will be to the surrounding community and to Lake Michigan. Based on the Watts Bar Unit 2 precedent cited by Holtec, if the NRC allows Palisades to restart, at least one tube and likely more will fail and release radiation that moves beyond the plant boundary within one year of restart.

16.1. I conclude that Holtec has created this expedited LAR for its private commercial reasons. It has set a Fall 2025 restart to assure its funding does not dry up. Why then is the NRC bowing to commercial pressures, rather than insisting that the "worn out" Palisades Steam Generators are replaced before the "resurrection" of Palisades is completed?

16.2. The already-suspect steam generators at Palisades became even less safe because Holtec did not adequately maintain them between 2022 and 2024. There is no methodology for safely repairing the safety-compromised steam generators within Palisades. Most importantly, the existing Palisades Steam Generators are so damaged from Stress Corrosion Cracking (SCC) of the tubesheet that they create a significant risk to public health and safety and must be replaced with new Steam Generators.

16.3. Furthermore, adding to the fact that there is no existing methodology for safely repairing the safety-compromised steam generators within Palisades, Holtec now arbitrarily proposes to sleeve 700 additional tubes and unplug the more than 600 tubes purposely plugged 35 years ago. The maneuver of *mass unplugging,* accompanied by plugging other existing tubes, is unprecedented anywhere in the industry. Moreover, such a *mass unplugging* violates the condition of the NRC's 2011 license extension that would have allowed Palisades nuclear power plant to continue operating until 2031.

16.4. Thus, Holtec must replace all steam generators at an additional cost of at least $510 million,[70] and bear the delayed startup that will result. This is the only responsible

[70] *Holtec International Application for Federal and State Support to Enable the Resurrection of the Palisades Nuclear Generation Station,* submitted July 5, 2022, p. 9/42 of pdf,

interpretation of the applicable federal statutes and regulations. Complete replacement of Holtec's steam generators is the only reasonable means of protecting the health and safety of the people, communities, Lake Michigan and the unique lakeside ecology of Michigan and Wisconsin

Declaration Electronic Signature Page

I hereby declare under penalty of perjury that the testimony submitted in this proceeding is true and correct to the best of my knowledge. The facts presented in this expert report are true and accurate to the best of my knowledge, and the opinions expressed are based on my best professional judgment.

Executed in accordance with 10 CFR 2.304 (d) and 2.326 (b),

/S/ Arnold Gundersen

Arnold Gundersen, MENE, RO
Fairewinds Associates, Inc

Dated: June 16, 2025

https://beyondnuclear.org/wp-content/uploads/2023/10/7-5-22-42-page-Holtec-application-to-DOE-for-CNC-funds-to-restart-Palisades.pdf

Arnold Gundersen, Curriculum Vitae

Education and Training

ME NE	Master of Engineering Nuclear Engineering Rensselaer Polytechnic Institute, 1972 U.S. Atomic Energy Commission Fellowship Thesis: Cooling Tower Plume Rise
BS NE	Bachelor of Science Nuclear Engineering Rensselaer Polytechnic Institute, Cum Laude, 1971 James J. Kerrigan Scholar
RO	Licensed Reactor Operator, U.S. Atomic Energy Commission, License # OP-3014

Patents

Energy Absorbing Turbine Missile Shield – U.S. Patent # 4,397,608 – 8/9/1983

Honors

U.S. Atomic Energy Commission Fellowship, 1972
B.S. Degree, Cum Laude, RPI, 1971, 1st in nuclear engineering class
Tau Beta Pi (Engineering Honor Society), RPI, 1969 – 1 of 5 in the sophomore class of 700
James J. Kerrigan Scholar 1967–1971
Publicly commended to the U.S. Senate by NRC Chairman Ivan Selin in May 1993 – "It is true...everything Mr. Gundersen said was absolutely right; he performed quite a service."

Expert Qualifications – including and not limited to:

- Chief Engineer, Fairewinds Associates, Inc, 2003 to present
- Nuclear Engineering, Safety, and Reliability Expert
- Federal and Congressional hearing testimony, Expert Witness testimony, Public Utility Commission Testimony, state legislative hearings, community stakeholder expert witness
- Vermont Community Research Fellow, University of Vermont
- Former Senior Vice President Nuclear Licensee
- Former Licensed Reactor Operator
- Atomic Energy Commission Fellow
- More than 52 years of nuclear industry experience and oversight

Publications

Co-author — *Radioactive Microparticles Related to the Woolsey Fire in Simi Valley, CA; Journal of Environmental Radioactivity*, Volume 240, released October 8, 2021: Coauthor with corresponding author Dr. Marco Paul Johann Kaltofen, Boston

Chemical Data, Natick, MA, USA and Maggie Gundersen, Founder of Fairewinds Energy Education, Charleston, SC, USA.

Co-author — *Radioactive Isotopes Measured at Olympic and Paralympic Venues in Fukushima Prefecture and Tokyo, Japan, Journal of Environmental Engineering Science* Volume 38, Number 2, 2021, Mary Ann Liebert, Inc., DOI: 10.1089/ees.2020.0139

Co-author with corresponding author Dr. Marco Paul Johann Kaltofen, Department of Physics, Worcester Polytechnic Institute (WPI), Worcester, MA, USA, and Maggie Gundersen, Founder of Fairewinds Energy Education, Charleston, SC, USA.

Co-author — *Science of the Total Environment* (STOTEN) published a peer-reviewed article entitled: *Radioactively-hot particles detected in dusts and soils from Northern Japan by combination of gamma spectrometry, autoradiography, and SEM/EDS analysis and implications in radiation risk assessment*. Co-authored with Dr. Marco Kaltofen, Boston Chemical Data, it details the analysis of radioactively hot particles collected in Japan following the Fukushima Dai-ichi meltdowns.
[http://www.sciencedirect.com/science/article/pii/S0048969717317953]

Published Lecture — *The Lessons of the Fukushima Daiichi Nuclear Accident* published in the *International Symposium on the Truth of Fukushima Nuclear Accident and the Myth of Nuclear Safety,* August 30, 2012 University of Tokyo, Iwanami Shoten Publishers, Tokyo, Japan

Published Lecture -- *Crisis Without End: The Medical and Ecological Consequences of the Fukushima Nuclear Catastrophe, from the Symposium at the New York Academy of Medicine, The New Press, 2014, Chapter 12, What Did They Know and When*

Author — *The Echo Chamber: Regulatory Capture and the Fukushima Daiichi Disaster, Lessons from Fukushima,* February 27, 2012, Greenpeace International

Author — *Fukushima Daiichi: Truth and The Way Forward,* Shueisha Publishing, February 17, 2012, Tokyo, Japan. Written with Reiko Okazaki, Barrister, and Maggie Gundersen, Fairewinds' president.

Co-author — *DOE Decommissioning Handbook, First Edition*, 1981-1982, invited author.

[Additional Publications continued on the last page.]

University Fellowship, Teaching, and Academic Administration
University of Vermont Community Research Fellow, appointed from January 2016 through 2018
Community College of Vermont – Mathematics Professor – 2007 through Spring 2013

Rensselaer Polytechnic Institute (RPI) – Advanced Nuclear Reactor Physics Lab

Professional Films:

SOS: The San Onofre Syndrome: Nuclear Power's Legacy is an Ecological Options Network (EON) production, October 2023, directed by James Heddle, Mary Beth Brangan, and Morgan Peterson, produced/ executive produced by Mary Beth Brangan, and edited by Morgan Peterson. Christopher Hedge is the composer. Mocamedia runs the impact campaign with Lisa Smithline and Chelo Alvarez-Stehle as Impact Producers.
https://vimeo.com/685302673

The Fukushima Disaster, **by filmmaker Philippe Carillo**, was released in February 2023. There has been endless hand-wringing and finger-pointing following the 2011 Fukushima Nuclear Disaster. However, the full effects of the disaster are still shrouded in secrecy, and both TEPCO and the Japanese Government have limited any meaningful analysis of the disaster's impact on health and the environment. Featuring interviews with scientists and whistle-blowers, this unwavering documentary reveals the political and financial interests at work behind the most severe nuclear accident since Chornobyl.
https://exposurefilmstrust.com/index.html

Netflix: ***Meltdown: Three Mile Island***, Released May 2022, "This gripping four-part documentary series tackles the near catastrophe at Three Mile Island nuclear power plant in Pennsylvania through the lens of chief engineer and whistleblower Richard Parks, as well as the community it impacted. Insiders recount the events, controversies, and lingering effects of the worst nuclear incident in U.S. history."
https://www.youtube.com/watch?v=nAOIH8HRdDo

Power Lines**: Forage Films Documentary, Laura Asherman, filmmaker and founder of Forage Films,** Released October 25, 2018
Power Lines is a short documentary about the expansion of Plant Vogtle, a nuclear power plant located in Waynesboro, Georgia. With a timeline already five years behind schedule and a current price tag of more than $13 billion over original estimates, the addition of two nuclear reactors has proven to be a black hole for both citizens of Waynesborough and the state of Georgia.
https://www.powerlinesfilm.com/

Power Struggle, **by Turning Tide Production and directed by Robbie Leppzer**, was released in 2019 in the U.S. The shortened version was released in Japan in 2018 and produced with NHK TV, Japan.
Power Struggle portrays a heated political battle to shut down the Vermont Yankee nuclear power plant on the banks of the Connecticut River in southern Vermont. The film follows the unfolding drama as citizen activists and elected state officials—alarmed at increasing safety violations—take on the federal government and one of the biggest power companies in the United States and eventually win.
https://www.powerstrugglemovie.com/

Committee Memberships

Board of Directors, Fairewinds Energy Education Corp, 501(c)3 2008 to present.
Vermont Yankee Public Oversight Panel, appointed in 2008 by President Pro-Tem Vermont Senate
National Nuclear Safety Network (NNSN) – Founding Board Member
Three Rivers Community College, Thames, Connecticut – Nuclear Academic Advisory Board

Connecticut Low-Level Radioactive Waste Advisory Committee – 10 years, founding member
Radiation Safety Committee, NRC Licensee – founding member
ANSI N-198, Solid Radioactive Waste Processing Systems

Expert Witness Testimony and Nuclear Engineering Analysis and Consulting
Presentation to the New York State Decommissioning Oversight Board (DOB) Concerning Indian Point Decommissioning by Holtec Decommissioning International, April 24, 2024, Cortlandt, New York, Town Hall. PowerPoint Presentation to the DOB Regarding onsite storage of liquid radioactive waste adjacent to the Hudson River.

Rebuttal Report of Arnold Gundersen, MENE, BSNE, RO, Fairewinds Associates, Inc to Arthur Desrosiers, Ph.D. February 16, 2024*, In the matter of: Steward Et Al., V. Honeywell International, Inc., Case No.: 3:18-Cv-01124-Smy, City of Metropolis, Illinois, And County of Massac V. Honeywell International, Inc., Case No. 3:21-Cv-00860, Dassing V. Honeywell International Inc. Defendant. Consolidated, Case No. 3:21-Cv-00485-Smy, Rebuttal*

Before The United States Nuclear Regulatory Commission, December 5, 2023, *Declaration of Arnold Gundersen in Support of The Motion Petition to Intervene and Request for Adjudicatory Hearing by Michigan Safe Energy Future, Don't Waste Michigan, And Beyond Nuclear, In The Matter Of Holtec Palisades LLC, Request For Exemption*, Docket No. 50-255

Expert Report of Arnold Gundersen, September 22, 2023, *Honeywell Metropolis and Its Failure to Follow Federal Nuclear Regulations; How Honeywell Metropolis Violated Nuclear Power Regulations and Standard Industry Practices Thereby Compromising Public Health and Safety*

United States District Southern District of Illinois East St. Louis Division June 20, 2023, *Declaration of Arnold Gundersen Civil Action* Case No.: 3:22-cv-02114 for Thompson and Barney, Attorneys at Law, and Cooper Law to review the attached Brochure: *Responsible Care, Our Commitment To Sustainability*, created by the Honeywell Corporation in April 2010, 2768 North US 45 Road, Metropolis, IL 62960, (618) 524-6200, www.honeywell.com, 2010 Honeywell International, Inc.

Before The United States of America Nuclear Regulatory Commission Declaration of Arnold Gundersen, April 26, 2023. *Amended Declaration of Arnold Gundersen of Fairewinds Associates, Inc., for Physicians for Social Responsibility Wisconsin (PSR-WI) Arnold Gundersen to review a license application to the Nuclear Regulatory Commission (NRC) to extend the licensed life of NextEra's Point Beach nuclear reactors until they have operated for 80 years, along with the related Environmental Report for NextEra Energy Point Beach, LLC's Point Beach Nuclear Plant, Units 1 and 2.*

Before The United States of America Nuclear Regulatory Commission Declaration of Arnold Gundersen, March 21, 2023. *Declaration of Arnold Gundersen of Fairewinds Associates, Inc., for Physicians for Social Responsibility Wisconsin (PSR-WI) Arnold Gundersen to*

review a license application to the Nuclear Regulatory Commission (NRC) to extend the licensed life of NextEra's Point Beach nuclear reactors until they have operated for 80 years, along with the related Environmental Report for NextEra Energy Point Beach, LLC's Point Beach Nuclear Plant, Units 1 and 2.

September 29, 2022, United States District Court Southern District Of Illinois East St. Louis Division, *Affidavit Of Arnold Gundersen Concerning Radiological Contamination Of The Crow Hill Property* Case No.: 3:18-cv-01124-MJR-SCW *Roger Steward, Saundra Steward, Clyde Schmidt, Joan Schmidt, Tim Beck, Charlotte Beck, Randy Langford, Brenda Langford, Todd Faulkner, And Kim Faulkner, Illinois residents, on behalf of themselves individually and all others similarly situated, Plaintiffs, v. Honeywell International, Inc., a Delaware corporation, individually and as successor-in-interest to Allied-Signal, Inc., Defendant.*

Department of Veterans Affairs, July 28, 2021, *Expert opinion by Arnold Gundersen, MENE, RO, regarding a U.S. Service Veteran with thyroid cancer due to their duty experiences in military service resulting from exposure(s) to ionizing radiation while serving their country.*

Before the United States of America Nuclear Regulatory Commission, April 26, 2021. In the Matter of NextEra Energy, Point Beach, LLC (Point Beach Nuclear Plant, Units 1 and 2). *Declaration of Arnold Gundersen for Physicians for Social Responsibility Wisconsin (PSR-WI). This declaration supplements an earlier declaration I provided in this case on March 23, 2021.* During 2020, the Electric Power Research Institute (EPRI) became aware of errors in the computer codes its members use to predict the neutron embrittlement of components inside US nuclear reactors. EPRI determined that these embrittlement codes are inaccurate and underpredicting the extent of embrittlement damage to reactor components within the atomic reactor cores. Underpredicting the damage from neutron embrittlement is definitely "non-conservative" and may create serious safety flaws if left unchecked.

Before the United States of America Nuclear Regulatory Commission, In the Matter of NextEra Energy Point Beach, LLC, (Point Beach Nuclear Plant, Units 1 and 2), March 23, 2021. Docket Nos. 50-266 and 50-30, NRC–2021–0021, *Declaration of Arnold Gundersen For Physicians for Social Responsibility Wisconsin (PSR-WI) to review a license application to the Nuclear Regulatory Commission (NRC) to extend the licensed life of NextEra's Point Beach nuclear reactors until they have operated for 80 years and a related Environmental Report for NextEra Energy Point Beach, LLC's Point Beach Nuclear Plant, Units 1 and 2.* This declaration examines and analyzes the technical and environmental issues regarding the License Renewal Request by NextEra for 20 more years of operation, extending the operating life of Point Beach Units 1 and 2 from a 60-year license to an 80-year license.

Before The United States of America Nuclear Regulatory Commission Office of The Secretary — December 7, 2020. *Declaration Of Arnold Gundersen to Support The Motion To Reopen Proceeding And Request To Amend Contention By The Blue Ridge Environmental Defense League And Its Chapter Concerned Citizens Of Shell Bluff Regarding Southern*

Nuclear Operating Company's Request For A License Amendment And Exemption For Unit 3 Auxiliary Building Wall 11 Seismic Gap Requirements, Lar-20-001. In the Matter of the Southern Nuclear Operating Company License Amendment Application for Combined License NPF-91 at the Vogtle Electric Generating Plant Unit 3. Docket No. 52-025-LA-3

Before The United States of America Nuclear Regulatory Commission Office of The Secretary – May 11, 2020, In the Matter of the Southern Nuclear Operating Company License Amendment Application for Combined License NPF-91 at the Vogtle Electric Generating Plant Unit 3. Docket No. 52-025-LA-3 *Declaration of Arnold Gundersen to Support The Petition For Leave To Intervene And Request For Hearing By The Blue Ridge Environmental Defense League And Its Chapter Concerned Citizens Of Shell Bluff Regarding Southern Nuclear Operating Company's Request For A License Amendment And Exemption For Unit 3 Auxiliary Building Wall 11 Seismic Gap Requirements, Lar-20-001*

State of Arkansas District Court Russellville AR, 2017-12-14, *Expert Report Regarding Arkansas Nuclear One (ANO) Stator Drop, Prepared for Bailey & Oliver Attorneys at Law, In Support Of Susan Allen et al. V. Siemens Energy and Entergy Corporation*.

Before the State of Vermont Public Utilities Commission, *Surrebuttal Testimony of Arnold Gundersen.* December 1, 2017. VTPUC Docket 8880, Joint Petition of NorthStar Decommissioning Holdings, LLC.

Before the State of Vermont Public Utilities Commission. August 30, 2017. *Testimony of Arnold Gundersen Supporting the New England Coalition: An Evaluation of The Financial Risks to Vermont In the Proposed Sale of The Entergy Nuclear Vermont Yankee Power Plant Site to NorthStar Decommissioning Holdings, LLC.* VTPUC Docket 8880, Joint Petition of NorthStar Decommissioning Holdings, LLC.

Before the United States District Court Northern District of Illinois, May 25, 2017. *Steve Lawson And Darla Lawson, Other Similar Situated Individuals, Plaintiffs, VS. General Electric, And Does 1- 200, Defendants. Expert Witness Report by Arnold Gundersen, Prepared for Plaintiffs Attorney: Charles A. Bonner, Esq. Sb# 85413*. Analysis of radiation exposure to GE journeyman welder.

Before the Public Utilities Commission of The State of California – January 27, 2017 – *Prepared Direct Testimony of Arnold Gundersen of Fairewinds Associates, Inc., For San Luis Obispo Mothers for Peace* regarding the Application of Pacific Gas and Electric Company for Approval of the Retirement of Diablo Canyon Power Plant, Implementation of the Joint Proposal, and Recovery of Associated Costs Through Proposed Ratemaking Mechanisms Application 16-08-006 (Filed August11, 2016)

Nuclear Regulatory Commission Before the Secretary – May 2, 2016, – *Declaration of Arnold Gundersen To Support the Petition for Leave to Intervene And Request For Hearing By The Blue Ridge Environmental Defense League Regarding Southern Nuclear Operating Company's Vogtle Electric Generating Plant Units 3 And 4 Request For License Amendment And Exemption: Containment Hydrogen Igniter Changes (LAR-15-003)*

Fairewinds Energy Education Report Submitted to NRC in Response to an Advance Notice of Proposed Rulemaking for Regulatory Improvements for Decommissioning Power Reactors: – March 17, 2016, *The Nationwide Failures of Decommissioning Regulation: Decommissioning Trust Funds or Slush Funds?*

Fairewinds Energy Education Report Submitted to NRC for Public Comment to Staff Regarding the Decommissioning of the Vermont Yankee Atomic Reactor – March 23, 2015, *Vermont Yankee's Decommissioning as an Example of Nationwide Failures of Decommissioning Regulation*

NRC Before the Atomic Safety and Licensing Board (ASLB) – December 1, 2014, *Gundersen Declaration Palisades Embrittlement,* Docket No. 50-255, Entergy, Palisades, *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*.

NRC Before the Commission – November 6, 2014, *Second Supplemental Declaration of Arnold Gundersen*, In the Matter of Florida Power & Light Co., Docket No. 50-389, St. Lucie Plant, Unit 2. NRC Atomic Safety and Licensing Board (ASLB) – October 10, 2014 – *Diablo Canyon Nuclear Power Plant, Units 1 and 2 – Gundersen Affidavit Supporting Friends of the Earth's Petition to Intervene: In the matter of Pacific Gas & Electric Company Docket No. 50-275-LR & Docket No. 50-323-LR, License Renewal Application*.

NRC Hearing Request – *Declaration of Arnold Gundersen Supporting Hearing Request*, March 10, 2014 – retained by Southern Alliance for Clean Energy (SACE) in the matter of Florida Power & Light Co., Docket No. 50-389, St. Lucie Plant, Unit 2

NRC ASLB Proceeding Fermi Unit 3 52-033-COL – October 30, 2013 – Retained by Don't Waste Michigan, Beyond Nuclear et al., Oral Expert Witness Testimony regarding Contention 15: Quality Assurance.

State of Utah Seventh District Court of Emory County – September 25, 2013 – Retained by HEAL Utah et al. as an expert witness testifying on cooling tower consumptive use of water for a proposed nuclear power plant owned by Blue Castle Holdings and located on the Green River. The defendants were Kane County Water Conservancy District.

Canadian Nuclear Safety Commission – May 29-30, 2013 – Retained by Durham Nuclear Awareness to present expert witness testimony in hearings regarding the proposed life extension for the Pickering Nuclear Station owned Ontario Power Generation.

Nuclear Regulatory Commission – May 30, 2013 – Expert witness report Before the Secretary NRC *in the Matter of Detroit Edison Nuclear Power Station: Rebuttal Testimony of Arnold Gundersen Supporting of Intervenors' Contention 15: DTE COLA Lacks Statutorily Required Cohesive QA Program.* Retained by Don't Waste Michigan, Beyond Nuclear, et al.

Nuclear Regulatory Commission – May 20, 2013 – Expert witness report Before the Secretary NRC *in the Matter of Davis Besse Nuclear Power Station: Expert Witness Report of Arnold Gundersen to Support the Petition for Leave to Intervene and Request for Hearing by*

Beyond Nuclear, Citizens Environment Alliance Southwest Ontario Canada, Don't Waste Michigan, and The Sierra Club. Retained by Beyond Nuclear, Citizens Environment Alliance Southwest Ontario Canada, Don't Waste Michigan and The Sierra Club.

Nuclear Regulatory Commission – May 6, 2013 – Expert witness report Before the Secretary NRC: *Expert Witness Report of Arnold Gundersen to Support the Petition for Leave to Intervene and Request for Hearing by The Blue Ridge Environmental Defense League, Bellefonte Efficiency and Sustainability Team, And Mothers Against Tennessee River Radiation.* Fairewinds was retained by BREDL et al.
Nuclear Regulatory Commission – April 30, 2013 – Expert witness report to Atomic Safety and Licensing Board: *Testimony of Arnold Gundersen Supporting of Intervenors Contention 15: DTE Cola Lacks Statutorily Required Cohesive QA Program.* Fairewinds was retained by Don't Waste Michigan, Beyond Nuclear, et al.

Canadian Nuclear Safety Commission (CNSC) – April 29, 2013 – Expert witness report to Canadian Nuclear Safety Commission (CNSC): *Analysis of The Relicensing Application for Pickering Nuclear Generating Station*. Durham Nuclear Awareness retained Fairewinds.

Nuclear Regulatory Commission – January 16, 2013 – Expert witness presentation to NRC Petition Review Board: *2.206 Presentation San Onofre Units 2 and 3 Replacement Steam Generators Meeting with Petitioner Friends of the Earth, Requesting Enforcement Action Against Southern California Edison Under 10 CFR 2.206*

Expert Witness Report for Friends of The Earth – July 11, 2012 – *San Onofre's Steam Generators: Significantly Worse Than All Others Nationwide,* Fairewinds Associates, Inc
Expert Witness Report for Friends of the Earth – May 15, 2012 – *San Onofre Steam Generator Failures Could Have Been Prevented*, Fairewinds Associates, Inc

Expert Witness Report for Friends of the Earth – April 10, 2012 – *San Onofre Cascading Steam Generator Failures Created by Edison: Imprudent Design and Fabrication Decisions Caused Leaks,* Fairewinds Associates, Inc

Expert Witness Report for Friends of the Earth – March 27, 2012 – *Steam Generator Failures at San Onofre: The Need for A Thorough Root Cause Analysis Requires No Early Restart,* Fairewinds Associates, Inc

Expert Witness Report for Greenpeace – February 27, 2012 – *Lessons from Fukushima: The Echo Chamber Effect,* Fairewinds Associates, Inc

Nuclear Regulatory Commission – December 21, 2011 – Expert witness report to Atomic Safety and Licensing Board: *Prefiled Direct Testimony of Arnold Gundersen Regarding Consolidated Contention RK-EC-3/CW-EC-1 (Spent Fuel Pool Leaks)*

New York State Department of Environmental Conservation – November 15-16, 2011 – Expert witness report for Riverkeeper: hearing testimony regarding license extension application for Indian Point Units 2 and 3 – contention: tritium in the groundwater.

Nuclear Regulatory Commission – November 10, 2011 – Expert witness report entitled: *Fukushima and the Westinghouse-Toshiba AP1000, A Report for the AP1000 Oversight Group by FairewindsAssociates, Inc,* and Video. Submitted to NRC by the AP1000 Oversight Group.

Nuclear Regulatory Commission – October 7, 2011 – *Testimony to the NRC Petition Review Board Re: Mark 1 Boiling Water Reactors*, Petition for NRC to shut down all BWR Mark 1 nuclear power plants due to problems in containment integrity in the Mark 1 design.

New York State Department of Environmental Conservation – October 4, 2011 – *Prefiled Rebuttal Testimony of Arnold Gundersen On Behalf of Petitioners Riverkeeper, Inc., Scenic Hudson, Inc., And Natural Resources Defense Council, Inc. To The Direct Testimony of Matthew J. Barvenik (Senior Principal GZA Geoenvironmental, Inc.) Regarding Radiological Materials*

Southern Alliance for Clean Energy (SACE) submission to TVA Board of Directors – August 3, 2011– Expert witness report entitled: *The Risks of Reviving TVA's Bellefonte Project,* and Videoprepared for the Southern Alliance for Clean Energy (SACE).

New York State Department of Environmental Conservation, July 22, 2011 – Prefiled Direct Testimony of Arnold Gundersen On Behalf of Petitioners Riverkeeper, Inc., Scenic Hudson, Inc., And Natural Resources Defense Council, Inc. Regarding Radiological Materials

Nuclear Regulatory Commission – May 10, 2011 – *Comment to the proposed rule on the AP1000 Design Certification Amendment Docket ID NRC-2010-0131 As noticed in the Federal Register on February 24, 2011* Retained by Friends of the Earth as Expert Witness.

NRC Advisory Committee on Reactor Safeguards (ACRS) – May 26, 2011 – Lessons learned from Fukushima and Containment Integrity on the AP1000.

Vermont Energy Cooperative (VEC) – April 26, 2011 – Presentation to the Vermont Energy Cooperative Board of Directors, *Vermont Yankee – Is It Reliable for 20 more years?*

Vermont State Nuclear Advisory Panel (VSNAP) – February 22, 2011 – Testimony and presentation entitled the *Vermont Yankee Public Oversight Panel Supplemental Report* regarding management issues at the Vermont Yankee Nuclear Power Plant to the reconvened Vermont State Nuclear Advisory Panel.

Vermont State Legislature Senate Committee on Natural Resources and Energy – February 8, 2011. Testimony: *Vermont Yankee Leaks and Implications*.
(http://www.leg.state.vt.us/jfo/envy.aspx)

Vermont State Legislature – January 26, 2011 – House Committee on Natural Resources and Energy, and Senate Committee on Natural Resources and Energy – Testimony regarding Fairewinds Associates, Inc's report: *Decommissioning the Vermont Yankee Nuclear Power Plant and Storing Its Radioactive Waste* (http://www.leg.state.vt.us/jfo/envy.aspx). Additional testimony was also given regarding the newest radioactive isotopic leak at the Vermont Yankee nuclear power plant.

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee – *Decommissioning the Vermont Yankee Nuclear Power Plant and Storing Its Radioactive Waste* January 2011. (http://www.leg.state.vt.us/jfo/envy.aspx).

U.S. Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards (NRC-ACRS) AP1000 Sub-Committee – *Nuclear Containment Failures: Ramifications for the AP1000 Containment Design,* Supplemental Report submitted December 21, 2010. (http://fairewinds.com/reports)

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee – *Reliability Oversight Entergy Nuclear Vermont Yankee, December 6, 2010.* Discussion regarding the leaks at Vermont Yankee, the ongoing monitoring of those leaks, and ENVY's progress in addressing the 90 items identified in Act 189 that require remediation. (http://www.leg.state.vt.us/jfo/envy.aspx).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) – *Declaration of Arnold Gundersen Supporting Blue Ridge Environmental Defense League's Contention Regarding Consumptive Water Use at Dominion Power's Newly Proposed North Anna Unit 3 Pressurized Water Reactor* in the matter of Dominion Virginia Power North Anna Power Station Unit 3 Docket No. 52-017 Combined License Application ASLBP#08-863-01-COL, October 2, 2010.

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) – *Declaration of Arnold Gundersen Supporting Blue Ridge Environmental Defense League's New Contention Regarding AP1000 Containment Integrity on the Vogtle Nuclear Power Plant Units 3 And 4* in the matter of the Southern Nuclear Operating Company Vogtle Electric Generating Plant, Units 3&4 Combined License Application, Docket Nos. 52-025-COL and 52-026-COL and ASLB No. 09-873-01-COL-BD01, August 13, 2010.

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee – July 26, 2010 – Summation for 2009 to 2010 Legislative Year for the Joint Fiscal Committee Reliability Oversight Entergy Nuclear Vermont Yankee (ENVY) Fairewinds Associates 2009-2010. This summary includes an assessment of ENVY's progress (as of July 1, 2010) toward meeting the milestones outlined by the Act 189 Vermont Yankee Public Oversight Panel in its March 2009 report to the Legislature, the new milestones that have been added since the incident with the tritium leak and buried underground pipes, and the new reliability challenges facing ENVY, Entergy, and the State of Vermont. (http://www.leg.state.vt.us/jfo/envy.aspx)

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) – *Declaration of Arnold Gundersen Supporting Blue Ridge Environmental Defense League's Contentions* in Dominion Virginia Power North Anna Station Unit 3 Combined License Application, Docket No. 52-017, ASLBP#08-863-01-COL, July 23, 2010.

Florida Public Service Commission (FPSC) Licensing and construction delays due to problems with the newly designed Westinghouse AP1000 reactors in *Direct Testimony in Re: Nuclear Plant Cost Recovery Clause by The Southern Alliance for Clean Energy (SACE)*, FPSC Docket No. 100009-EI, July 8, 2010.

U.S. Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards (NRC-ACRS) AP1000 Sub-Committee – Presentation to ACRS regarding design flaw in AP1000 Containment – June 25, 2010 PowerPoint Presentation: http://fairewinds.com/content/ap1000-nuclear-design-flawaddressed-to-nrc-acrs.

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) – *Second Declaration of Arnold Gundersen Supporting Supplemental Petition of Intervenors Contention 15: DTE COLA Lacks Statutorily Required Cohesive QA Program* – June 8, 2010.

NRC Chairman Gregory Jaczko, ACRS, Secretary of Energy Chu, and the White House Office of Management and Budget – *AP1000 Containment Leakage Report Fairewinds Associates – Gundersen, Hausler, 4-21-2010.* This report, commissioned by the AP1000 Oversight Group, analyzes a potential flaw in the containment of the AP1000 reactor design.

Vermont State Legislature House Committee on Natural Resources and Energy – April 5, 2010 – Testified to the House Committee on Natural Resources and Energy – regarding discrepancies in Entergy's TLG Services decommissioning analysis. See *Fairewinds Cost Comparison TLG Decommissioning* (http://www.leg.state.vt.us/jfo/envy.aspx).

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee – February 22, 2010 – The Second Quarterly Report by Fairewinds Associates, Inc to the Joint Legislative Committee regarding buried pipe and tank issues at Entergy Nuclear Vermont Yankee and Entergy proposed Enexus spinoff. See two reports: *Fairewinds Associates 2nd Quarterly Report to JFC* and *Enexus Review by Fairewinds Associates*. (http://www.leg.state.vt.us/jfo/envy.aspx).

Vermont State Legislature Senate Natural Resources – February 16, 2010 – Testified to Senate Natural Resources Committee regarding causes and severity of tritium leak in unreported buried underground pipes, status of Enexus spinoff proposal, and health effects of tritium.

Vermont State Legislature Senate Natural Resources – February 10, 2010 – Testified to Senate Natural Resources Committee regarding causes and severity of tritium leak in unreported buried underground pipes. http://www.youtube.com/watch?v=36HJiBrJSxE

Vermont State Legislature Senate Finance – February 10, 2010 – Testified to Senate Finance Committee regarding *A Chronicle of Issues Regarding Buried Tanks and Underground Piping at VT Yankee.* (http://www.leg.state.vt.us/jfo/envy.aspx).

Vermont State Legislature House Committee on Natural Resources and Energy – January 27, 2010 – *A Chronicle of Issues Regarding Buried Tanks and Underground Piping at VT Yankee*. (http://www.leg.state.vt.us/jfo/envy.aspx).

Submittal to Susquehanna River Basin Commission, by Eric Epstein – January 5, 2010 – *Expert Witness Report of Arnold Gundersen Regarding Consumptive Water Use of the Susquehanna River by The Proposed PPL Bell Bend Nuclear Power Plant* in the Matter of RE: Bell Bend Nuclear Power Plant Application for Groundwater Withdrawal Application for Consumptive Use BNP-2009-073.

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) – *Declaration of Arnold Gundersen Supporting Supplemental Petition of Intervenors Contention 15: Detroit Edison COLA Lacks Statutorily Required Cohesive QA Program*, December 8, 2009.

U.S. NRC Region III Allegation Filed by Missouri Coalition for the Environment – Expert Witness Report entitled: *Comments on the Callaway Special Inspection by NRC Regarding the May 25, 2009 Failure of its Auxiliary Feedwater System,* November 9, 2009.

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee – Oral testimony given to the Vermont State Legislature Joint Fiscal Committee October 28, 2009. See report: *Quarterly Status Report - ENVY Reliability Oversight for JFO* (http://www.leg.state.vt.us/jfo/envy.aspx).

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee – The First Quarterly Report by Fairewinds Associates, Inc to the Joint Legislative Committee regarding reliability issues at Entergy Nuclear Vermont Yankee, issued October 19, 2009. See report: *Quarterly Status Report - ENVY Reliability Oversight for JFO* (http://www.leg.state.vt.us/jfo/envy.aspx).

Florida Public Service Commission (FPSC) – Gave direct oral testimony to the FPSC in hearings in Tallahassee, FL, September 8 and 10, 2009 in support of Southern Alliance for Clean Energy (SACE) contention of anticipated licensing and construction delays in newly designed Westinghouse AP 1000 reactors proposed by Progress Energy Florida and Florida Power and Light (FPL).

Florida Public Service Commission (FPSC) – NRC announced delays confirming my original testimony to FPSC detailed below. My supplemental testimony alerted FPSC to NRC confirmation of my original testimony regarding licensing and construction delays due to problems with the newly designed Westinghouse AP 1000 reactors in *Supplemental Testimony in Re: Nuclear Plant Cost Recovery Clause by The Southern Alliance for Clean Energy*, FPSC Docket No. 090009-EI, August 12, 2009.

Florida Public Service Commission (FPSC) – Licensing and construction delays due to problems with the newly designed Westinghouse AP 1000 reactors in *Direct Testimony in Re: Nuclear Plant Cost Recovery Clause by The Southern Alliance for Clean Energy (SACE)*, FPSC Docket No. 090009-EI, July 15, 2009.

Vermont State Legislature Joint Fiscal Committee Expert Witness Oversight Role for Entergy Nuclear Vermont Yankee (ENVY) – Appointment from July 2009 to May 2010. Contracted by the Joint Fiscal Committee of the Vermont State Legislature as an expert witness to oversee the compliance of ENVY to reliability issues uncovered during the 2009 legislative session by the Vermont Yankee Public Oversight Panel of which I was appointed a member along with former NRC Commissioner Peter Bradford for one year from July 2008 to 2009. At the time, Entergy Nuclear Vermont Yankee (ENVY) was under review by Vermont State Legislature to determine if it should receive a Certificate for Public Good (CPG) to extend its operational license for another 20-years. Vermont was the only state in the country that had

legislatively created the CPG authorization for a nuclear power plant. Act 160 was passed to ascertain ENVY's ability to run reliably for an additional 20 years.

U.S. Nuclear Regulatory Commission – Expert Witness Declaration regarding Combined Operating License Application (COLA) at North Anna Unit 3 *Declaration of Arnold Gundersen Supporting Blue Ridge Environmental Defense League's Contentions* (June 26, 2009).

U.S. Nuclear Regulatory Commission – Expert Witness Declaration regarding Through-wall Penetration of Containment Liner and Inspection Techniques of the Containment Liner at Beaver Valley Unit 1 Nuclear Power Plant *Declaration of Arnold Gundersen Supporting Citizen Power's Petition* (May 25, 2009).

U.S. Nuclear Regulatory Commission – Expert Witness Declaration regarding Quality Assurance and Configuration Management at Bellefonte Nuclear Plant *Declaration of Arnold Gundersen Supporting Blue Ridge Environmental Defense League's Contentions in their Petition for Intervention and Request for Hearing*, May 6, 2009.

Pennsylvania Statehouse – Expert Witness Analysis presented in formal presentation at the Pennsylvania Statehouse, March 26, 2009 regarding actual releases from Three Mile Island Nuclear Accident. Presentation may be found at: http://www.tmia.com/march26

Vermont Legislative Testimony and Formal Report for 2009 Legislative Session – As a member of the Vermont Yankee Public Oversight Panel, I spent almost eight months examining the Vermont Yankee Nuclear Power Plant and the legislatively ordered Comprehensive Vertical Audit. Panel submitted Act 189 Public Oversight Panel Report March 17, 2009 and oral testimony to a joint hearing of the Senate Finance and House Committee on Natural Resources and Energy March 19, 2009. http://www.leg.state.vt.us/JFO/Vermont%20Yankee.htm

Finestone v Florida Power & Light Company (FPL) (11/2003 to 12/2008) Federal Court – Plaintiffs' Expert Witness in United States District Court for the Southern District of Florida. Retained by Plaintiffs' Attorney Nancy LaVista, from Lytal, Reiter, Fountain, Clark, Williams, West Palm Beach, FL. Case# 06-11132-E. This case involved two plaintiffs in cancer cluster of 42 families alleging that illegal radiation releases from nearby nuclear power plant caused children's cancers. Production request, discovery review, preparation of deposition questions and attendance at Defendant's experts for deposition, preparation of expert witness testimony, preparation for Daubert Hearings, ongoing technical oversight, source term reconstruction and appeal to Circuit Court.

U.S. Nuclear Regulatory Commission Advisory Committee Reactor Safeguards (NRC-ACRS) – Expert Witness providing oral testimony regarding Millstone Point Unit 3 (MP3) Containment issues in hearings regarding the Application to Uprate Power at MP3 by Dominion Nuclear, Washington, and DC. (July 8-9, 2008).

Appointed by President Pro-Tem of Vermont Senate Shumlin (later elected as Vermont Governor) to Legislatively Authorized Nuclear Reliability Public Oversight Panel – To oversee Comprehensive Vertical Audit of Entergy Nuclear Vermont Yankee (Act 189) and

testify to State Legislature during 2009 session regarding operational reliability of ENVY in relation to its 20-year license extension application. (July 2, 2008 to present).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) – Expert Witness providing testimony regarding *Pilgrim Watch's Petition for Contention 1 Underground Pipes* (April 10, 2008).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) – Expert Witness supporting *Connecticut Coalition Against Millstone in Its Petition for Leave to Intervene, Request for Hearing, And Contentions Against Dominion Nuclear Connecticut Inc.'s Millstone Power Station Unit 3 License Amendment Request for Stretch Power Uprate* (March 15, 2008).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) – Expert Witness supporting *Pilgrim Watch's Petition for Contention 1*: *specific to issues regarding the integrity of Pilgrim Nuclear Power Station's underground pipes and the ability of Pilgrim's Aging Management Program to determine their integrity*. (January 26, 2008).

Vermont State House – 2008 Legislative Session –

- House Committee on Natural Resources and Energy – Comprehensive Vertical Audit: *Why NRC Recommends a Vertical Audit for Aging Plants Like Entergy Nuclear Vermont Yankee (ENVY)*
- House Committee on Commerce – Decommissioning Testimony

Vermont State Senate – 2008 Legislative Session –

- Senate Finance – testimony regarding Entergy Nuclear Vermont Yankee Decommissioning Fund
- Senate Finance – testimony on the necessity for a Comprehensive Vertical Audit (CVA) of Entergy Nuclear Vermont Yankee
- House Committee on Natural Resources and Energy – testimony regarding the placement of highlevel nuclear fuel on the banks of the Connecticut River in Vernon, VT

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) – MOX Limited Appearance Statement to Judges Michael C. Farrar (Chairman), Lawrence G. McDade, and Nicholas G. Trikouros for the "Petitioners": Nuclear Watch South, the Blue Ridge Environmental Defense League, and Nuclear Information & Resource Service in support of *Contention 2: Accidental Release of Radionuclides, requesting a hearing concerning faulty accident consequence assessments made for the MOX plutonium fuel factory proposed for the Savannah River Site*. (September 14, 2007).

Appeal to the Vermont Supreme Court (March 2006 to 2007) – Expert Witness Testimony in support of *New England Coalition's Appeal to the Vermont Supreme Court Concerning: Degraded Reliability at Entergy Nuclear Vermont Yankee as a Result of the Power Uprate*. New England Coalition represented by Attorney Ron Shems of Burlington, VT.

State of Vermont Environmental Court (Docket 89-4-06-vtec 2007) – Expert witness retained by New England Coalition to review Entergy and Vermont Yankee's analysis of alternative

methods to reduce the heat discharged by Vermont Yankee into the Connecticut River. Provided Vermont's
Environmental Court with analysis of alternative methods systematically applied throughout the nuclear industry to reduce the heat discharged by nuclear power plants into nearby bodies of water and avoid consumptive water use. This report included a review of the condenser and cooling tower modifications.

U.S. Senator Bernie Sanders and Congressman Peter Welch (2007) – Briefed Senator Sanders, Congressman Welch, and their staff members regarding technical and engineering issues, reliability and aging management concerns, regulatory compliance, waste storage, and nuclear power reactor safety issues confronting the U.S. nuclear energy industry.

State of Vermont Legislative Testimony to Senate Finance Committee (2006) – Testimony to the Senate Finance Committee regarding Vermont Yankee decommissioning costs, reliability issues, design life of the plant, and emergency planning issues.

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) – Expert witness retained by New England Coalition to provide Atomic Safety and Licensing Board with an independent analysis of the integrity of the Vermont Yankee Nuclear Power Plant condenser (2006).

U.S. Senators Jeffords and Leahy (2003 to 2005) – Provided the Senators and their staffs with periodic overview regarding technical, reliability, compliance, and safety issues at Entergy Nuclear Vermont Yankee (ENVY).

10CFR 2.206 filed with the Nuclear Regulatory Commission (July 2004) – Filed 10CFR 2.206 petition with NRC requesting confirmation of Vermont Yankee's compliance with General Design Criteria.

State of Vermont Public Service Board (April 2003 to May 2004) – Expert witness retained by New England Coalition to testify to the Public Service Board on the reliability, safety, technical, and financial ramifications of a proposed increase in power (called an uprate) to 120% at Entergy’s 31- year-old Vermont Yankee Nuclear Power Plant.

International Nuclear Safety Testimony – Ten Days advising the President of the Czech Republic (Vaclav Havel) and the Czech Parliament on their energy policy for the 21st century.

Nuclear Regulatory Commission (NRC) Inspector General (IG) – Assisted the NRC Inspector General in investigating illegal gratuities paid to NRC Officials by Nuclear Energy Services (NES) Corporate Officers. In a second investigation, assisted the Inspector General in showing that materially false statements (lies) by NES corporate president caused the NRC to overlook important violations by this licensee.

State of Connecticut Legislature – Assisted in the creation of State of Connecticut Whistleblower Protection legal statutes.

Federal Congressional Testimony –

• Publicly recognized by NRC Chairman, Ivan Selin, in May 1993 in his comments to U.S. Senate, "It is true...everything Mr. Gundersen said was absolutely right; he performed quite a service."

• Commended by U.S. Senator John Glenn, Chair NRC Oversight Committee for public – for testimony to NRC Oversight Committee

PennCentral Litigation – Evaluated NRC license violations and materially false statements made by management of this nuclear engineering and materials licensee.

Three Mile Island Litigation – Evaluated unmonitored releases to the environment after accident, including containment breach, letdown system and blowout. Proved releases were 15 times higher than government estimate and subsequent government report.

Western Atlas Litigation – Evaluated neutron exposure to employees and license violations at this nuclear materials licensee.

Commonwealth Edison – In-depth review and analysis for Commonwealth Edison to analyze the efficiency and effectiveness of all Commonwealth Edison engineering organizations, which support the operation of all of its nuclear power plants.

Peach Bottom Reactor Litigation – Evaluated extended 28-month outage caused by management breakdown and deteriorating condition of the plant.

Presentations, Events, & Media

• *How to Dismantle an Atomic Lie—taking apart the nuclear falsehoods,* 2021 NEC Conference, April 29, 2021, Austria Via Zoom due to Covid-19.

• *Three Mile Island (TMI)* Presentations and Events, March 23 through March 27, 2019

- *A Legacy of Lies,* PennState TMI 40th Commemoration Keynote, March 27, 2019, followed by 4-TV interviews, available on CSPAN
- NBC TV Andrea Mitchell Interview filmed 2019-3-26, aired March 28, 2019
- Presentation Pennsylvania State House Rotunda, Harrisburg, PA, March 25, 2019
- TMI Survivors Banquet, Keynote and Q&A, March 23, 2019
- Media Interviews with WHP 21 (CBS), WGAL (NBC), WHP 27 (ABC)
- Keynote Harrisburg Historical Society, keynote, Harrisburg, Pennsylvania March 23, 2019

• *The Fukushima Vogtle Connection,* hosted by Georgia Wand and Nuclear Watch South, March 9, 2019

• *Power Lines* Documentary Premier at Emory University, Atlanta, GA, October 2018

• CCTV, Nuclear Free Future TV with host Margaret Harrington, *Picking Up the Pieces from Atoms for Peace*, May 10, 2018

• CCTV, Nuclear Free Future TV with host Margaret Harrington, Nuclear Update with Fairewinds Energy Education - March 10, 2018

• Chicago, NIRS meetings and group presentations November 28 to December 4, 2017

• Radio Interviews, November 2017: David Goodman, October 25, 2017; Project Censored with Mickey Huff, November 2017

• Fukushima Prefecture, Japan, September 7-18, 2017, Arnie Gundersen and Dr. Marco Kaltofen,

research and data review technical meeting with the Deputy Director General and the Senior Associate with the Japanese Atomic Energy Agency (JAEA). Trip to Japan was organized and funded by Fairewinds Energy Education.
• CCTV, Nuclear Free Future TV with host Margaret Harrington, *Fukushima, Three Mile Island, and Chernobyl [Chornobyl],* March 30, 2017
• Radio Ecoshock, Alex Smith Interview*, Nuclear Power Is Not a Climate Change Solution,* January 26, 2017
• *38 Years and Five Meltdowns Later: The Real Lessons from TMI (Three Mile Island),* March 25, 2017, keynote presentation hosted by Three Mile Island Alert, Harrisburg, PA
• *Arnie Gundersen speaks with Margaret Prescod*, March 14, 2017, Sojourner Truth Radio, Pacifica Radio on the Sixth-Year Commemoration of the Fukushima Daiichi nuclear power disaster.
• *Arnie Gundersen interviewed on Radiation Rattles Robot in Fukushima, Newsday - BBC World Service*. High levels of nuclear radiation have forced a robot to cut short its investigations of the Fukushima reactor in Japan. The probe's mission was to clean a passage to enable further robotic exploration, February 10, 2017.
• *Extreme Nuclear Dangers, Radio Ecoshock host Alex Smith interviews Arnie Gundersen*, the relationship between the nuclear power industry and nuclear weapons development, February 2, 2017.
• *Arnie Gundersen Appears on Project Censored with Dan Simon, Ted Rall, and Maggie Gundersen,* November 27, 2016
• *Arnie Gundersen Appears on Solartopia's Green Power and Wellness Hour,* November 16, 2016
• *Nuclear Power Is Not "Green Energy": It Is a Fount of Atomic Waste,* Published in Truthout, November 14, 2016
• *Powerstruggle Sneak Preview Panel Discussion,* Northampton, MA (October 23, 2016) Brattleboro, VT (Nov 3, 2016), organized by Turning Tide Productions
• *Is Solar Power in Nuclear Disaster Exclusion Zones Advisable?* published in *The Bulletin of the Atomic Scientists*, September 15, 2016
• *CO2 Smokescreen Presentation,* Montreal, Canada, invited speaker at the World Social Forum at the University of Quebec at Montreal (August 8, 2016) & McGill University, (August 10, 2016)
• *Gendai Business Online* exclusive interview with Fairewinds Chief Engineer Arnie Gundersen entitled: *American nuclear expert warns: "There is a possibility that now in Fukushima recontamination is occurring."*, June 14, 2016.
• *Seacoast Anti-Pollution League Annual Meeting,* Seabrook, NH, organized by the Seacoast Anti- Pollution League, open to the public, May 16, 2016
• *Arnie Gundersen Appears on Project Censored with Medea Benjamin,* March 30, 2016
• *Pilgrim Coalition Decommissioning Forum*, Plymouth, MA, organized by the Pilgrim Coalition, March 23, 2016
• *Osaka Global Environment Forum 2016*, in Osaka City, Japan, organized by Choetsu Kiko Association of Osaka and Friends of the Earth, February 27, 2016
• *Peace Forum Presentation*, in Kobe City, Japan, organized by YMCA, UNICEF, and Kobe Cooperative, February 22, 2016
• *Nuclear and Human Beings after Fukushima Event*, in Hiroshima City, Japan organized by Hiroshima YMCA, and Hiroshima Cooperative HANWA (Hiroshima Alliance for Nuclear Weapons Abolition), February 20, 2016

• *Peace Event at Jimmy Carter Civic Center*, in Konu-town Miyoshi, Hiroshima, Japan organized by Peace Platform, February 17, 2016
• *Middlebury College Student Global Affairs Conference: Power and Protest*, Middlebury, VT at
Middlebury College, invited speaker for a student-organized event, January 22, 2016
• *Ready for the Big One? Diablo Canyon Earthquake Vulnerability*, San Luis Obispo, invited guest of the San Luis Obispo Mothers for Peace, December 2, 2015
• *Expect the Unexpected: Nuclear Power's Unlearned Lessons*, California Polytechnic Institute, December 1, 2015
• *World in Danger: From Fukushima to California*, University of California at Berkeley, in conversation with Joanna Macy, November 22, 2015
• *World in Danger: The Fukushima - California Connection*, Point Reyes Station, in conversation with Mary Beth Brangan, November 21, 2015
• *World in Danger: Fukushima,* Sonoma State University, in conversation with Majia Nadesan, November 18, 2015
• *Fukushima's Impact at Five Years,* World Uranium Symposium 2015: Fukushima Workshop,
April 2015, Quebec, Canada
• *Did Tesla Just Kill Nuclear Power?* May 1, 2015, Article written by journalist Jeff McMahon for
Forbes Magazine that captures the excitement and buzz surrounding Tesla's big announcement and Arnie's auspicious speech
• *Building New Nukes Would Make Global Warming Worse* April 30, 2015, Presentation at Northwestern University, Chicago, IL
• *Fairewinds' Report: Vermont Yankee's Decommissioning As An Example of Nationwide Failures of Decommissioning Regulation presented to the Senate Committee for Natural Resources and Energy* April 22, 2015, Presentation Vermont Statehouse, Montpelier, VT
• *An Economic Analysis of the Cost of Nuclear Power* April 14, 2015, Presentation at the World Uranium Symposium, Quebec City, Quebec, Canada, Keynote Speaker
• *Commemoration of Meltdown at Fukushima Daiichi: 4-Years Later* March 11, 2015, Presentation to the House of Commons in London, England
• *Should Nuclear Energy Be Expanded to Help Create a More Sustainable Future?* November 20, 2014, Invited guest speaker in Debate at Hofstra University
• *Radiation Knows No Borders* August 2, 2014, Invited speaker at The Wave Conference, Life Chiropractic West, San Francisco, CA
• *Thirty-Five Years and Five Meltdowns Later: The Real Lessons of Three Mile Island* March 28, 2014, Three Mile Island at 35 (TMI@35) Symposium at Penn State, Harrisburg, PA, Keynote Speaker
• *The Nuclear Renaissance? Is It Too Big To Fail?* November 20, 2013, University North Carolina, Chapel Hill, NC.
• *Speaking Truth to Power* October 22, 2013 – Clarkson University, Potsdam, NY
• *The United States at A Crossroads: Two Futures* October 17 2013, Global Forum, Waitsfield, Vermont
• *A Road Less Taken*: *Energy Choices for the Future* – October 16, 2013, Johnson State College, Johnson, Vermont.
• *Fukushima: Ongoing Lessons for Boston* – October 9, 2013 – Boston, Massachusetts State House. Speakers were Arnie Gundersen, Former Japanese Prime Minister Naoto Kan, Former

NRC Chair Gregory Jaczko, Former NRC Commissioner Peter Bradford, and Massachusetts State Senator Dan Wolf.
• *Fukushima: Ongoing Lessons for New York* – October 8, 2013 – New York City 82nd Street YMCA. Speakers were Arnie Gundersen, Riverkeeper President Paul Galley, Former Japanese Prime Minister Naoto Kan, Former NRC Chair Gregory Jaczko, Former NRC Commissioner Peter Bradford, and Ralph Nader.
• *Fukushima: Ongoing Lessons for California* – June 4, 2013 – New York City 82nd Street YMCA. Speakers were Arnie Gundersen, Riverkeeper President Paul Galley, Former Japanese Prime Minister Naoto Kan, Former NRC Chair Gregory Jaczko, Former NRC Commissioner Peter Bradford, and Friends of the Earth Nuclear Campaigner Kendra Ulrich.
• *What Did They Know and When? Fukushima Daiichi Before and After the Meltdowns,* Symposium: The Medical and Ecological Consequences of the Fukushima Nuclear Accident, The New York Academy of Medicine, New York City, NY, March 11, 2013
• *A Mountain of Waste 70 Years High,* Presentation: Old *and New Reactors*, University of Chicago, December 1, 2012
• Congressional Briefing September 20, 2012; invited by Representative Dennis Kucinich
• Presentations in Japan August/September 2012: Presentation at University of Tokyo (August 30, 2012), Presentation at Japanese Diet Building (members of the Japanese Legislature - August 31, 2012), Presentation to citizen groups in Niigata (September 1, 2012), Presentations to citizen groups in Kyoto (September 4, 2012), Presentation to Japanese Bar Association (September 2,
2012), and Presentation at the Tokyo Olympic Center (September 6, 2012)
• Multi-media Opera: *Curtain of Smoke,* by Filmmaker Karl Hoffman, Composer Andrea Molino, and Dramatist Guido Barbieri, Rome, Italy (2012-5-21,22)
• Curtain of Smoke Symposium (2012-5-21), with Dr. Sherri Ebadi 2004 Nobel Laureate
• The Italian National Press Club Rome (2012-5-21) with Dr. Sherri Ebadi 2004 Nobel Laureate: the relationship between nuclear power and nuclear weapons,
• Radio 3 Rome (2012-5-21) Discussion of Three Mile Island and the triple meltdown at Fukushima Daiichi (Japan),
• Sierra Club Panel Discussions (2012-5-5): Consequences of Fukushima Daiichi with Paul Gunter and Waste Disposal with Mary Olson,
• Physicians for Social Responsibility Seattle (2012-3-17),
• Fukushima Daiichi Forum with Chiho Kaneko, Brattleboro, VT (2012-3-11),
• Physicians for Global Responsibility Vancouver (2012-3-11) Skype Video Lecture,
• University of Vermont (2 – 2011),
• Boston Nuclear Forum, Boston Library (6/16/11),
• Duxbury Emergency Management (6/15/11),
• Vermont State Nuclear Advisory Panel (VSNAP),
• New Jersey Environmental Federation (5/14/11),
• Press Conference for Physicians for Social Responsibility (5/19/11),
• St. Johnsbury Academy – Nuclear Power 101.

More than 200 Educational videos on nuclear safety, reliability and engineering particularly Fukushima issues. Videos may be viewed @ fairewinds.org (501c3 non-profit)

Expert commentary (hundreds of TV, radio, print media, and internet interviews): CNN (8), The John King Show (16), BBC, CBC, Democracy Now, *Washington Post*, *New York Times*,

Tampa Bay Times, The Guardian, *Bloomberg* (print & TV), *Reuters*, *Associated Press*, *The Global Post*, *Miami Herald*, *Orange County Times, LA Times, Al Jazeera* (print), Al Jazeera America, Fox News. *Huffington Post* (Paris) named Fairewinds.com the best go-to site for information about the Fukushima Daiichi accident (5/9/11), KPBS (Radio & TV) VPR, WPTZ, WCAX, WBAI, CCTV, NECN, Pacifica Radio, CBC (radio & TV) (4), Rachel Maddow Show, *The Tennessean*, The Chris Martinson Show, *Mainichi News*, TBS Japan, *Gendai Magazine*, Russia Today, NHK television, and *Scientific American*.

Special Remediation Expertise:
Director of Engineering, Vice President of Site Engineering, and the Senior Vice President of Engineering at Nuclear Energy Services (NES) Division of Penn Central Corporation (PCC)

- NES was a nuclear licensee that specialized in dismantlement and remediation of nuclear facilities and nuclear sites. Member of the radiation safety committee for this licensee.
- Department of Energy chose NES to write the *DOE Decommissioning Handbook* because NES had a unique breadth and depth of nuclear engineers and nuclear physicists on staff.
- Personally, I wrote the "Small Bore Piping" chapter of the DOE's first edition Decommissioning Handbook, personnel on my staff authored other sections, and I reviewed the entire Decommissioning Handbook.
- Served on the Connecticut Low-Level Radioactive Waste Advisory Committee for 10 years from its inception.
- Managed groups performing analyses on dozens of dismantlement sites to thoroughly remove radioactive material from nuclear plants and their surrounding environment.
- Managed groups assisting in decommissioning the Shippingport nuclear power reactor. Shippingport was the first large nuclear power plant ever decommissioned. The decommissioning of Shippingport included remediation of the site after decommissioning.
- Managed groups conducting site characterizations (preliminary radiation surveys prior to commencement of removal of radiation) at the radioactively contaminated West Valley site in upstate New York.
- Personnel reporting to me assessed the dismantlement of the Princeton Avenue Plutonium Lab in New Brunswick, NJ. The lab's dismantlement assessment was stopped when we uncovered extremely toxic and carcinogenic underground radioactive contamination.
- Personnel reporting to me worked on decontaminating radioactive thorium at the Cleveland Avenue nuclear licensee in Ohio. The thorium had been used as an alloy in turbine blades. During that project, previously undetected extremely toxic and carcinogenic radioactive contamination was discovered belowground after an aboveground gamma survey had purported that no residual radiation remained on site.

Additional Expert Qualifications – including and not limited to:

- Nuclear engineering management assessment, prudency assessment, contract administration, assessment, and review
- Nuclear power plant licensing and permitting – assessment and review
- Decommissioning experience: including radioactive waste processes, storage issue assessment, and waste disposal

- Nuclear safety and risk assessment, source term reconstruction, dose assessments, criticality analysis, and thermohydraulic assessment (i.e. power plant steam generation)
- Systems engineering and structural engineering assessments
- Cooling tower operation, cooling tower plumes, thermal discharge assessment, and consumptive water use
- Technical patents, nuclear fuel rack design and manufacturing, and nuclear equipment design and manufacturing
- Reliability engineering, & aging plant management assessments, in-service inspection
- Employee awareness programs, whistleblower protection, and public communications
- Quality Assurance (QA) & records

Nuclear Engineering Experience 1970 to Present

Expert witness testimony in nuclear litigation and administrative hearings in federal, international, and state court and to Nuclear Regulatory Commission, including but not limited to: Three Mile Island, US Federal Court, US NRC, NRC ASLB, ACRS, and Petition Review Board, California Public Utilities Commission, Canadian Nuclear Safety Commission (CNSC), Diet (Parliament) Japan, House of Commons (UK), Vermont State Legislature, Vermont State Public Service Board, Vermont Public Utility Commission, Florida Public Service Board, Czech Senate, Connecticut State Legislature, Western Atlas Nuclear Litigation, U.S. Senate Nuclear Safety Hearings, Peach Bottom Nuclear Power Plant Litigation, and Office of the Inspector General NRC, and numerous Congressional Briefings and Hearings.

Nuclear Engineering, Safety, and Reliability Expert Witness 1990 to Present

- Fairewinds Associates, Inc – Chief Engineer, 2005 to Present
- Arnold Gundersen, Nuclear Safety Consultant and Energy Advisor, 1995 to 2005
- GMA – 1990 to 1995, including expert witness testimony regarding the accident at Three Mile Island.

Nuclear Energy Services, Division of PCC (Fortune 500 company) 1979 to 1990

Corporate Officer and Senior Vice President - Technical Services – Responsible for the overall performance of the company's Inservice Inspection (ASME XI), Quality Assurance (SNTC 1A), and Staff Augmentation Business Units – up to 300 employees at various nuclear sites.

Senior Vice President of Engineering – Responsible for the overall performance of the company's Site Engineering, Boston Design Engineering and Engineered Products Business Units. Integrated the Danbury based, Boston based and site engineering functions to provide products such as fuel racks, nozzle dams, and transfer mechanisms and services such as materials management and procedure development.

Vice President of Engineering Services – Responsible for the overall performance of the company's field engineering, operations engineering, and engineered products services. Integrated the Danbury-based and field-based engineering functions to provide numerous products and services required by nuclear utilities, including patents for engineered products.

General Manager of Field Engineering – Managed and directed NES' multi-disciplined field engineering staff on location at various nuclear plant sites. Site activities included structural analysis, procedure development, technical specifications and training. Have personally applied for and received one patent.

Director of General Engineering – Managed and directed the Danbury based engineering staff. Staff disciplines included structural, nuclear, mechanical and systems engineering. Responsible for assignment of personnel as well as scheduling, cost performance, and technical assessment by staff on assigned projects. This staff provided major engineering support to the company's nuclear waste management, spent fuel storage racks, and engineering consulting programs.

New York State Electric and Gas Corporation (NYSE&G) — 1976 to 1979

Reliability Engineering Supervisor – Organized and supervised reliability engineers to upgrade performance levels on seven operating coal units and one that was under construction. Applied analytical techniques and good engineering judgments to improve capacity factors by reducing mean time to repair and by increasing mean time between failures.

Lead Power Systems Engineer – Supervised the preparation of proposals, bid evaluation, negotiation and administration of contracts for two 1300 MW NSSS Units including nuclear fuel, and solid-state control rooms. Represented corporation at numerous public forums including TV and radio on sensitive utility issues. Responsible for all nuclear and BOP portions of a PSAR, Environmental Report, and Early Site Review.

Northeast Utilities Service Corporation (NU) — 1972 to 1976

Engineer – Nuclear Engineer assigned to Millstone Unit 2 during start-up phase. Lead the high velocity flush and chemical cleaning of condensate and feedwater systems and obtained discharge permit for chemicals. Developed Quality Assurance Category 1 Material, Equipment and Parts List. Modified fuel pool cooling system at Connecticut Yankee, steam generator blowdown system and diesel generator lube oil system for Millstone. Evaluated Technical Specification Change Requests.

Associate Engineer – Nuclear Engineer assigned to Montague Units 1 & 2. Interface Engineer with NSSS vendor, performed containment leak rate analysis, assisted in preparation of PSAR and performed radiological health analysis of plant. Performed environmental radiation survey of Connecticut Yankee. Performed chloride intrusion transient analysis for Millstone Unit 1 feedwater system. Prepared Millstone Unit 1 off-gas modification licensing document and Environmental Report Amendments 1 & 2.

Rensselaer Polytechnic Institute (RPI) — 1971 to 1972

Critical Facility Reactor Operator, Instructor – Licensed AEC Reactor Operator instructing students and utility reactor operator trainees in start-up through the full-power operation of an atomic reactor.

Public Service Electric and Gas (PSE&G) — 1970

Assistant Engineer – Performed shielding design of radwaste and auxiliary buildings for Newbold Island Units 1 & 2, including the development of computer codes.

Additional Publications (continued from the front page)
Co-author — *Fairewinds Associates 2009-2010 Summary to JFC, July 26, 2010* State of Vermont, Joint Fiscal Office, (http://www.leg.state.vt.us/jfo/envy.aspx).
Co-author — *Supplemental Report of the Public Oversight Panel Regarding the Comprehensive Reliability Assessment of the Vermont Yankee Nuclear Power Plant July 20, 2010,* to the Vermont State Legislature by the Vermont Yankee Public Oversight Panel.
Co-author — The Second Quarterly Report by Fairewinds Associates, Inc to the Joint Legislative Committee regarding buried pipe and tank issues at Entergy Nuclear Vermont Yankee and Entergy proposed Enexus spinoff. See two reports: *Fairewinds Associates 2nd Quarterly Report to JFC* and *Enexus Review by Fairewinds Associates.*
Co-author — Fairewinds Associates, Inc *First Quarterly Report to the Joint Legislative Committee*, October 19, 2009.
Co-author — *Report of the Public Oversight Panel Regarding the Comprehensive Reliability Assessment of the Vermont Yankee Nuclear Power Plant*, March 17, 2009, to the Vermont State Legislature by the Vermont Yankee Public Oversight Panel.
Co-author — *Vermont Yankee Comprehensive Vertical Audit – VYCVA – Recommended Methodology to Thoroughly Assess Reliability and Safety Issues at Entergy Nuclear Vermont Yankee, January 30, 2008 Testimony to Finance Committee Vermont Senate.*
Co-author — *Decommissioning Vermont Yankee – Stage 2 Analysis of the Vermont Yankee Decommissioning Fund – The Decommissioning Fund Gap*, December 2007, Fairewinds Associates, Inc. Presented to Vermont State Senators and Legislators.
Co-author — *Decommissioning the Vermont Yankee Nuclear Power Plant: An Analysis of Vermont Yankee's Decommissioning Fund and Its Projected Decommissioning Costs*, November 2007, Fairewinds Associates, Inc.

Media Organizations - including and not limited to:
Featured Nuclear Safety and Reliability Expert (1990 to present) for Television, Newspaper, Radio, & Internet – Including, and not limited to: DemocracyNow, CNN: JohnKingUSA, CNN News, Earth Matters; NECN, WPTZ VT, WTNH, VPTV, WCAX, RT, CTV (Canada), CCTV Burlington, VT, CAN TV (Chicago Access), ABC, TBS/Japan, Bloomberg: EnergyNow, KPBS, Japan National Press Club (Tokyo), Italy National Press Club (Rome), The Crusaders, Front Page, Five O'Clock Shadow: Robert Knight, Mark Johnson Show, Steve West Show, Anthony Polina Show, WKVT, WDEV, WVPR, WZBG CT, Seven Days, AP News Service, Houston Chronicle, Christian Science Monitor, Reuters, The Global Post, International Herald, The Guardian, New York Times, Washington Post, LA Times, Miami Herald, St. Petersburg Times, Brattleboro Reformer, Rutland Herald, Times-Argus, Burlington Free Press, Litchfield County Times, The News Times, The New Milford Times, Hartford Current, New London Day, Vermont Daily Briefing, Green Mountain Daily, EcoReview, Huffington Post, DailyKos, Voice of Orange County, AlterNet, Common Dreams, Gendai Media, Truthout, Progressive Radio Network, Project Censored and numerous other national and international blogs

Public Service, Cultural, and Community Activities

2008 to Present –Fairewinds Energy Education Corp 501(C)3 non-profit board member
2005 to Present – Public presentations and panel discussions on nuclear power safety, reliability, economics, waste disposal, and decommissioning at numerous universities and colleges in the US, Canada, and Japan – including DePaul University, Plymouth State University, Northwestern University, Life Chiropractic West, Middlebury College, McGill University, Hofstra University, New York School of Medicine, Cal Poly, Sonoma State, Amherst College, University of Vermont, Vermont Law School, Tokyo University, and before the Nuclear Regulatory Commission in hearings, Federal Court, Town and City Select Boards, Legal Panels, Local Schools, and via National & International Media: Television, Radio, Print, & Internet.

2007-2008 – Energy Production – created concept of Solar Panels on Burlington High School; worked with Burlington Electric Department and Burlington Board of Education Technology Committee on a Grant to install solar collectors for Burlington Electric peak summer use; Grant was developed with assistance from Senator Sanders.

Vermont State Legislature – Public Testimony to Legislative Committees regarding nuclear power and energy issues

NNSN – National Nuclear Safety Network, Founding Advisory Board Member, meetings with and testimony to the Nuclear Regulatory Commission Inspector General (NRC IG)

New York State Electric & Gas (NYSE&G) Speakers Club speaking about nuclear waste issues.

Northeast Utilities Representative Conducting Public Lectures on Nuclear Safety Issues with the Northeast Utilities Speakers Bureau