UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
Before the Commission

In the Matter of	)	Docket No. 50-255-LA-3
	)	
HOLTEC DECOMMISSIONING INTERNATIONAL, LLC, AND HOLTEC PALISADES, LLC	)	April 25, 2025
	)	
(Palisades Nuclear Plant - Request for Exemption and License Amendments)	)	

NOTICE OF APPEAL OF ASLB DECISION LBP-25-04, BY BEYOND NUCLEAR, DON'T WASTE MICHIGAN, MICHIGAN CLEAN ENERGY FUTURE, THREE MILE ISLAND ALERT AND NUCLEAR ENERGY INFORMATION SERVICE, AND BRIEF IN SUPPORT OF APPEAL

Terry J. Lodge
316 N. Michigan St, Suite 520
Toledo, Ohio 43604
419-205-7084
(Fax) 419-932-6625
e-mail: tjlodge50@yahoo.com

Wallace L. Taylor
4403 1st Ave. N.E., Suite 402
Cedar Rapids, Iowa 52402
319-366-2428
(Fax) 319-366-3886
e-mail: wtaylorlaw@aol.com

CO-COUNSEL FOR PETITIONERS

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NOTICE OF APPEAL

Beyond Nuclear, Don't Waste Michigan Clean Energy Future, Three Mile Island Alert and Nuclear Energy Information Service, by and through counsel, pursuant to 10 C.F.R. § 2.311(c), hereby give notice of their appeal to the U.S. Nuclear Regulatory Commission ("Commission") from the Atomic Safety and Licensing Board's ("ASLB") ruling, LBP-25-04, "Memorandum and Order (Ruling on Intervention Petitions)" (March 31, 2025) ("ASLB Decision") in this proceeding.

Petitioners appeal and seek reversal of the Atomic Safety and Licensing Board's (ASLB's) underlying determinations and the Board's overall decision which individually and collectively denied admission of Petitioners' proffered contentions for adjudication.

/s/ Wallace L. Taylor
Wallace L. Taylor, Esq.

/s/ Terry J. Lodge
Terry J. Lodge, Esq.
Co-Counsel for Beyond Nuclear, Michigan Safe Energy Future, Don't Waste Michigan, Three Mile Island Alert and Nuclear Energy Information Service (Petitioning Organizations)

BRIEF IN SUPPORT OF APPEAL

INTRODUCTION

Holtec Decommissioning and Holtec Palisades (Holtec) have filed with the NRC a request for exemption pursuant to 10 C.F.R. § 50.12 and license amendment requests (LARs) in support of Holtec's plan to return the permanently shutdown Palisades Nuclear Plant (Palisades) to power operations. As a shut down plant, Palisades is in decommissioning status.

Both Holtec and NRC staff have admitted that "NRC regulations do not prescribe a specific regulatory path for reinstating operational authority."[1] Holtec, with the complicity of the NRC,[2] has cobbled together a scheme to attempt to use existing regulations to restore Palisades' operating license. The linchpin of this plan is a proposed exemption from the certifications provided pursuant to 10 C.F.R. § 50.82 for permanent shutdown and removal of fuel from the reactor. There is no basis in fact or law supporting this exemption, nor is there any legal or factual basis for the LAR to revise the license and technical specifications to support resumption of power operations at Palisades. There are both safety issues and National Environmental Policy Act (NEPA) compliance aspects to the LARs.

The Petitioning Organizations, Beyond Nuclear, Michigan Safe Energy Future, Don't Waste Michigan, Three Mile Island Alert and Nuclear Energy Information Service timely filed a Petition for Leave to Intervene on October 7, 2024 pursuant to a notice in the Federal Register. These Petitioners included seven proposed contentions of law and fact in their Petition. Holtec and the NRC Staff timely answered the Petition, and these Petitioners replied in support of their petition. Oral argument directed at contention admissibility took place on February 12, 2025.

On March 31, 2025, the assigned ASLB issued a ruling that granted legal standing to the Petitioning Organizations but denied all of their contentions to be inadmissible for hearing. Two members of the Board found that Contention 1, challenging the exemption request, was within the scope of the proceeding and that all of Petitioners' claims were conclusory or speculative. In a concurring opinion, however, Judge Arnold agreed with Petitioners and Holtec that Contention

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[1] Holtec letter to NRC, Regulatory Path to Reauthorize Power Operations at the Palisades Nuclear Plant, March 13, 2023 (ML23072A404.

[2] NRC Chair Christopher Hanson testimony to U.S. House Subcommittee of Energy and Commerce Committee on July 23, 2024 ("This is something we have never done before and requires some creativity by the staff as well as Holtec's part."), video at https://www.youtube.com/watch?v=TjVfV2tDomQ, starting at 1:41:00.

1 was not within the scope of this proceeding because it is not a licensing action and is not inextricably intertwined with the LAR. He noted that " the Staff has the authority to decouple the applications but has chosen a review/approval methodology that keeps them linked." Concurring Opinion p. 5. "Where such separation is possible, but the Staff 'chooses' not to separate them," Judge Arnold concluded, "in my view the term 'inextricably intertwined' just does not apply." *Id.*

Contentions 2 and 3 asserted that because Holtec's restart plan presents significant environmental issues in order to restart Palisades, a new operating license is required, and that an Environmental Impact Statement (EIS) is required instead of the Environmental Assessment (EA) that the NRC has prepared. Without actually analyzing the regulatory framing, the ASLB concluded that these contentions were beyond the scope of this proceeding because Petitioners were ostensibly challenging NRC regulations. Furthermore, the ASLB claimed that the Petitioners did not show that there were significant environmental impacts requiring an EIS.

Contention 4 asserted that there was no regulatory pathway to restarting Palisades and that the exemption request and LARs submitted by Holtec were not a valid application of the existing regulations. The ASLB claimed that Petitioners were attacking the regulations, even though Petitioners were alleging that the NRC was misapplying and misinterpreting the regulations. The regulations themselves were not being attacked.

Finally, Contentions 5, 6, and 7 alleged that the environmental document Holtec submitted did not contain a purpose and need statement, an analysis of alternatives, or a discussion of the impacts of climate change. After the contentions were filed, the NRC produced an EA that did contain those missing elements, in response to which Petitioners have since asserted that the EA presentation of those subjects is deficient. Because the EA allegedly cured the contentions of omission, the ASLB dismissed the contentions as moot.

STANDARDS FOR ADMISSIBILITY OF CONTENTIONS

The ASLB purported to set forth the standards for admissibility of contentions, but simply recited the 6 criteria for contentions in 10 C.F.R. § 2.309(f).[3] The Board then determined that, based on those criteria, the Petitioners' contentions did not satisfy the "strict admissibility standards."[4] But the § 2.309(f) criteria are not as strict as the ASLB claimed nor are they as strict as applied by the Board to the facts and issues in this case.

The pleading requirements of 10 C.F.R. § 2.309(f)(1) do not encompass the overly burdensome standards asserted by the ASLB. 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).Contentions need only have "some reasonably specific factual or legal basis." *Entergy NuclearVermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear PowerStation), 82 NRC 211, 221 (2015) (internal quotation marks omitted); see also *Entergy Nuclear Operations* (Palisades Nuclear Plant and Big Rock Point Site), 96 NRC 1 at 45 (rejecting argument that did not "establish a supported genuine dispute with the application"). Specificity is key: mere

[3] ASLB Decision, pp. 23-24.
[4] *Id.* at p. 24.

speculation is insufficient, see, *e.g., Dominion Nuclear Connecticut, Inc*. (Millstone Nuclear Power Station, Unit 2), 58 NRC 207, 216 (2003) (rejecting an argument that, at best, was based on speculation); *GPU Nuclear, Inc.* (Oyster Creek Nuclear Generating Station), 51 NRC 193, 208 (2000) (finding "bare assertions and speculation" insufficient to trigger a contested hearing), and a petitioner may not simply reference documents without clearly identifying or summarizing the portions of the documents on which it relies. See *Fansteel, Inc.* (Muskogee, Oklahoma Site), 58 NRC 195, 204 (2003); *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), 29 NRC 234, 240-41 (1989)). While petitioners need not prove their contentions at the admissibility stage, the contention admissibility standards do require petitioners to "proffer at least some minimal factual and legal foundation in support of their contentions." *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), 49 NRC 328, 334 (1999).

Based on the foregoing, the ASLB erred in requiring Petitioners to present enough evidence to prove the merits of the contentions at the admissibility stage.

The decision in *Pacific Gas and Electric Co.* (Diablo Canyon Independent Spent Fuel Storage Installation), 98 NRC 1 (2023) demonstrates this misuse of admissibility criteria. That proceeding concerned a hearing request from San Luis Obispo Mothers for Peace (SLOMFP) challenging an application from Pacific Gas and Electric Company (PG&E) to renew its license to store spent nuclear fuel in the Diablo Canyon Independent Spent Fuel Storage Installation (ISFSI) for an additional 40 years beyond the current license expiration date. The petitioner's contention alleged that PG&E's analysis of its financial qualifications to operate the ISFSI failed to satisfy 10 C.F.R. § 72.22(e) because the analysis was based on the invalid assumption that PG&E would not seek renewal of the operating licenses for the Diablo Canyon reactors. PG&E countered that the contention was inadmissible for failing to satisfy the materiality requirement

in § 2.309(f)(1)(iv) because "PG&E is financially qualified to continue operating the ISFSI regardless of whether the reactor licenses are renewed." However, the ASLB determined that that argument went to the merits, and that the issue at that point was only whether the petitioner had satisfied the contention admissibility requirements.

Another way to contextualize this point is to compare contention admissibility to the motion to dismiss procedure in federal court. Pursuant to Federal Rule of Civil Procedure (FRCP) 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 substantive facts to determine if there is a genuine factual dispute. That procedure is analogous to the motion for summary disposition provided in 10 C.F.R. § 2.710, which becomes available only after a contention is admitted for hearing.

The current contention admissibility standards were adopted in 1989 out of concern that the previously existing standards allowed intervention for petitioners who had no real basis for their contentions. 54 Fed. Reg. 33,168 (1989). The Federal Register discussion states that the rule, now 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 discussion contains the following statement:

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

Shortly after the 1989 amendment to the admissibility criteria, the Commission had occasion to address the intent and purpose of the rule, in *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), 49 NRC 328, 335 (1999):

> The 1989 revisions to the contention rule thus insist upon ''some factual basis'' for an admitted contention. 54 Fed. Reg. at 33,171. The intervenor must ''be able to identify some facts at the time it proposes a contention to indicate that a dispute exists between it and the applicant on a material issue.'' Id. These requirements are intended to ''preclude a contention from being admitted where an intervenor has no facts to support its position and [instead] contemplates using discovery or cross-examination as a fishing expedition which might produce relevant supporting facts.'' Id. Although in quasi-formal adjudications like license renewal an intervenor may still use the discovery process to develop his case and help prove an admitted contention, contentions shall not be admitted if at the outset they are not described with reasonable specificity or are not supported by ''some alleged fact or facts'' demonstrating a genuine material dispute. *Id.* at 33,170.

What has happened since the 1989 rule amendment, however, is that the NRC Staff and permit applicants have created axioms that misconstrue the intent of the rule and have nudged licensing boards, and sometimes the Commission, to accept and normalize overly strict contention admissibility interpretations. Petitioners respectfully request the Commission in this case to take this opportunity to clarify the contention admissibility standards.

Despite clear precedent that the standards for admissibility of contentions are not heavy and must not be used as a "fortress to deny intervention," the ASLB, as more specifically enumerated in the discussion below regarding the decision on Petitioners' contentions, contravened precedent and held Petitioners to an unreasonable standard for admissibility.

THE ASLB ERRED IN REJECTING PETITIONERS' CONTENTIONS

Contention 1

In Contention 1, the Petitioners asserted that the exemption requested by Holtec, pursuant to 10 C.F.R. § 50.12, to reverse the effects of the certifications for decommissioning filed by Palisades' prior owner, Entergy, does not satisfy the exemption requirements of 10 C.F.R. § 50.12. Petitioners argued that the exemption request was not within the scope of this licensing proceeding, but that even if it was, the contention should be admitted for hearing. Two of the ASLB members held that the exemption request is within the scope of this proceeding, but that it was inadmissible. Judge Arnold, in a concurring opinion, agreed with the Petitioners that the exemption request is not a licensing action and was not admissible in this proceeding.

1. The Exemption Request Is Not A Licensing Action And Should Not Be Considered In This Proceeding.

As stated in Petitioners' Petition, Holtec's exemption request is the linchpin upon which the subsequent elements of Holtec's plan to restart Palisades rests.[5] But it is not a licensing action. Even if the exemption were granted, the subsequent license amendments could still be denied. Moreover, the granting of the requested exemption would not change the status or any aspects of the license. It would simply allow Palisades to be removed from decommissioning status. So Holtec correctly argues that Contention 1 is outside the scope of this proceeding. The Commission's decision in *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Station, Units 1, 2, and 3 and ISFSI), 93 NRC 1 (2021) is instructive. In that case, as in this case, Holtec had obtained ownership of the nuclear plant for the alleged purpose of decommissioning. Holtec requested an exemption to use the decommissioning trust fund for non-decommissioning activities. The Commission held that the exemption request was properly

[5] Petition to Intervene, p. 30.

addressed in the licensing proceeding because the exemption requests "were 'completely dependent on the [license-amendment request]' and 'cannot take effect unless and until the [license-amendment request] is approved.'" *Id*. at 16, citing *Entergy Nuclear Vermont Yankee, LLC* (Vermont Yankee Nuclear Power Station), 82 NRC 68, 78 (2015). See *id.* at 16, n. 78 ("Where a requested exemption raises questions that are material to a proposed licensing action and bear directly on whether the proposed action should be taken, however, a petitioner may propose exemption-related arguments in the licensing proceeding."). The requested exemption in this case does not depend on granting the LARs nor does it bear directly on whether the LARs should be granted.

Petitioners presented Contention 1 only because the NRC inferred that the exemption request was so closely intertwined with the license amendment requests that it must be included as a contention in this proceeding.[6] Out of an abundance of caution, Petitioners have submitted Contention 1, so as not to waive any challenge to the exemption request, if indeed, the challenge to the exemption must be raised in this proceeding.

It is significant that Holtec agreed with the Petitioners that the exemption request is not within the scope of this proceeding. As Holtec pointed out, "Congress intentionally limited the opportunity for a hearing to certain designated agency actions—agency actions that do not include exemptions."[7] Holtec's Answer went on to state:[8]

> NRC has allowed hearings on exemption requests that make up the "required elements" of a parallel licensing action, such that the proposed exemption "directly bears on whether the proposed action should be granted." Put another way, when NRC's review of a licensing action necessarily involves consideration of the same subject matter as its review of an exemption request, Section 189a of the Atomic Energy Act does not remove the exemption request from scope of matters that may be adjudicated on the licensing

[6] Order of the Secretary, September 26, 2024 (ML24270A263).
[7] Holtec Answer, p. 39, citing *Commonwealth Edison Co.* (Zion Nuclear Power Station, Units 1 & 2), 51 N.R.C. 91, 96 (1999).
[8] *Id.* at p. 43.

> action. This situation most often presents itself when an exemption request is bundled with a licensing action, such that the applicant cannot meet the criteria for approval of the licensing action without receiving approval of the related exemption.

Finally, Holtec correctly concluded:[9]

> But the fact that the Exemption Request and the LARs are both aimed at the same ultimate objective - authorizing the restart - does not mean that NRC's approval of the LARs is dependent on its parallel review of the Exemption Request. Put differently, just because both the exemption and the amendments may ultimately be required to resume power operations does not mean that the two are co-dependent in a manner that scopes the Exemption Request into the Section 189a hearing process. They are separate approvals on parallel tracks, just like the license transfer application that is also not within the scope of this proceeding. Whether NRC grants the exemption from 10 CFR 50.82(a)(2) to allow application to rescind the certifications of shutdown and defueling will not affect the criteria against which the LARs are judged.

However, even in the face of this clear precedent, a majority of the ASLB discarded the Petitioners' and Holtec's argument in one short paragraph[10] without referring to any of the authority cited by the Petitioners and Holtec, nor considering the definition of "inextricably intertwined," as Judge Arnold did.[11] The majority simply concluded that because the exemption was necessary to the restart plan, it was therefore inextricably intertwined with the LARs, without considering whether the LARs could be denied even if the exemption were granted.

Judge Arnold, in his concurring opinion, correctly made the distinction between the concepts of intertwined and linked, relying on the statements of NRC counsel that the exemption and LARs could be separated.[12] The Board majority should have made a similar analysis, but did not.

Consequently, the majority erred in finding that the exemption request is within the scope of this licensing proceeding.

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[9] *Id.* at p. 44-45.
[10] ASLB Decision, p. 43.
[11] *Id.*, concurring opinion, p. 2.
[12] *Id.*, concurring opinion, p. 5.

2. Even If The Exemption Is Within Scope, Contention 1 Should Have Been Admitted

On May 20, 2022, Entergy, the previous owner of Palisades, closed Palisades and placed the plant into decommissioning status. As a part of the decommissioning process, Entergy certified, pursuant to 10 C.F.R. § 50.82(a)(1)(i), that power operations permanently ceased at Palisades on May 20, 2022, and that pursuant to 10 C.F.R. § 50.82 (1)(a)(ii), the fuel was permanently removed from the Palisades reactor vessel and placed in the spent fuel pool on June 10, 2022.[13] Holtec, the current owner of Palisades, now requests an exemption pursuant to 10 C.F.R. § 50.12 from the impact of the 50.82 certifications. But an exemption is not so easily obtained. The District of Columbia Circuit has limited the granting of exemptions to "exigent circumstances":

> Section 50.12 provides a mechanism for obtaining an exemption from the procedures incorporated in section 50.10, but one that may be invoked only in extraordinary circumstances. The Commission has made clear that section 50.12 is available "only in the presence of exigent circumstances, such as emergency situations in which time is of the essence and relief from the Licensing Board is impossible or highly unlikely." [citing *Washington Public Power Supply System*, 5 NRC 719, 723 (1977)].

NRDC v. NRC, 695 F.2d 623 (D.C. Cir. 1982). The Commission has similarly emphasized that § 50.12 exemptions are to be granted sparingly and only in cases of undue hardship. 39 Fed. Reg. 14,506, 14,507 (1974). So Holtec bears an extremely heavy burden to justify its request for an exemption.

It is clear that exemptions are meant to apply, *ad hoc*, to specific situations in specific cases, much like a variance in zoning cases. The abuse of the exemption procedure, as demonstrated here by Holtec and the NRC Staff, is not being narrowly invoked just for Palisades, but is being directly replicated in efforts to restart the reactors at Three Mile Island and

[13] Letter, "Certifications of Permanent Cessation of Power Operations and Permanent Removal of Fuel from the Reactor Vessel," June 13, 2022, (ML22164A067).

Duane Arnold.[14] This "exemption" is actually a new policy, not an exemption. Indeed, the exemption provision is an unofficial rulemaking procedure, albeit one that bypasses the formal rulemaking requirements of 10 C.F.R. §§ 2.800 *et seq.* That is clearly not the purpose of an exemption.

Exemptions under § 50.12 must first be authorized by law.[15] The ASLB majority opinion claimed that the Petitioners cited no legal authority for the proposition that § 50.12 requires affirmative legal authorization.[16] But the majority did not cite any legal authority for its claim that silence is authorization. Taken to its logical conclusion, the majority's position means that anything is authorized unless it is specifically prohibited. That would essentially make the regulatory regime a nullity.

The majority next criticizes the Petitioners' argument that the exemption doesn't serve the purpose of § 50.82, as required by § 50.12(2)(ii).[17] The purpose of § 50.82 is to provide a process for decommissioning and operating license termination. The majority apparently claims that somehow the restart of Palisades is a circumstance that would achieve the underlying purpose of the rule.[18] In fact, restarting Palisades would contradict the purpose of a rule focused on decommissioning and license termination. There is absolutely nothing in § 50.82 that even infers a purpose to restart a decommissioning reactor, and the ASLB majority did not identify one.

Beyond those misguided attacks on Petitioners' Contention, the ASLB majority simply attacks the Petitioners' claims and evidence as generalized, conclusory and speculative.[19] In doing so, the majority is misapplying the standards for admissibility as discussed in the first

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[14] Three Mile Island application (ML24324A048); Duane Arnold application (ML25023A270).
[15] 10 C.F.R. § 50.12(a)(1).
[16] ASLB Decision, p. 50.
[17] *Id.*
[18] *Id.*
[19] *Id.* at p. 49-51

section of this Brief.

Even though the ASLB majority did not really discuss or address the Petitioners' arguments as to why Holtec's exemption request does not satisfy the requirements of § 50.12, Petitioners believe the Commission would benefit from such a discussion.

A request for a § 50.12 exemption must show that the exemption will not present an undue risk to the public health and safety and common defense and security. In an attempt to satisfy this requirement, Holtec simply states that Palisades will be returned to the condition it was in prior to decommissioning. The problem with that assertion, however, is that there were significant safety problems with the plant that militated against such a conclusion. In fact, risks to the public health and safety prompted Palisades to be shut down earlier than anticipated. The attached declaration of Arnold Gundersen[20] establishes the undue risks to public health and safety and common defense and security if Palisades is reopened. Pointing out that "[t]he overall design of the Palisades reactor is not licensable to the 21st century standards,"[21] Mr. Gundersen asserts that "the Palisades atomic facility is one of the world's most decrepit and flawed nuclear reactors. When Entergy sold it to Holtec two years ago, the reactor was operating with poorly maintained parts, woefully inadequate safety equipment, and outdated and outmoded components."[22] In discussing Holtec's void of corporate nuclear power plant construction and operating experience, he observes that "Relicensing and resuscitating a shuttered, aged and defunct atomic reactor by a corporation with no nuclear operations or engineering experience, while relying on a workforce of mercenaries without corporate nuclear operations and management knowledge, is a recipe for an atomic disaster."[23] He sees several reasons prompting "genuine danger and risk from Holtec

[20] Declaration and CV of Arnold Gundersen, Exhibit A to Petitioning Organizations' October 10, 2024 Petition to Intervene filing ("Gundersen Declaration").
[21] Gundersen Declaration, p. 22.
[22] Gundersen Declaration, p. 8.
[23] Gundersen Declaration, p. 11.

attempting to bring Palisades back to life." These include that "[t]he long-standing equipment problems at Holtec Palisades are substantial and extensive. Additionally, Holtec's entire proposal completely underestimates the extreme costs of these repairs and equipment fabrication in its whole proposal. Furthermore, the duration for making said repairs is grotesquely underestimated and minimized by years."[24] Besides the requirements for an exemption in 10 C.F.R § 50.12(a)(1), § 50.12(a)(2) lists several special circumstances, at least one of which must be present. Holtec relied on circumstances ii, iii, and vi, discussed as follows:

(ii) Application of the regulation in the particular circumstance would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.

This requirement means that applying § 50.82 to this case would not serve the purpose of § 50.82. The purpose of § 50.82 is to ensure that the reactor is certified to be in decommissioning status in order to facilitate decommissioning. Palisades has been in the process of decommissioning since June 2022. It is absurd to think that § 50.82 is not serving its purpose in this case.

Holtec's attempted justification for reliance on this factor is twofold. First, Holtec claims that application of § 50.82 in this case would not serve its purpose because that would prevent Holtec from reopening Palisades. The fallacy of that argument is self-evident. It is not the purpose of § 50.82 to allow a reactor in decommissioning status to restart. On the contrary, as explained above, the purpose of the rule is to facilitate decommissioning.

Second, Holtec claims that the purpose of § 50.82 is simply to notify the NRC of Entergy's intent to place Palisades into decommissioning status. If that is so, why does Holtec need an exemption? It could just rescind the certification. Furthermore, Holtec has not shown that application of § 50.82 in this case would not serve that rule's purpose. If the rule's purpose, as

[24] Gundersen Declaration, p. 21.

Holtec alleges, is just to notify the NRC of the intent to decommission, that purpose is accomplished without an exemption.

What Holtec tacitly admits is that the actual purpose of § 50.82 is to formally undertake the decommissioning process. That application of the rule is clearly served in this case by continuing the decommissioning process, not by attempting to restart Palisades.

(iii) Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated.

In its attempt to support this factor, Holtec relies on support it has received from the State of Michigan. It is not at all clear how there will be an undue hardship on Holtec if the requested exemption is not granted. Even if, as Holtec contends, reopening Palisades would benefit the people of Michigan (a concept with which Petitioners vehemently disagree), that does not show an undue hardship on Holtec. Holtec merely finds itself in a difficult situation of its own making. To the contrary, Holtec knew Palisades was going to be in decommissioning status when it bought the plant. This is certainly not an exigent circumstance or undue hardship, except for Holtec's profit motive. See, *NRDC v. NRC, supra*. Holtec's argument brings to mind the quip about the boy who killed his parents and then begged for mercy because he is an orphan.

(vi) There is present any other material circumstance not considered when the regulation was adopted for which it would be in the public interest to grant an exemption.

The public interest criterion for granting an exemption under 10 C.F.R. § 50.12(b) is a stringent one: exemptions of this sort are to be granted sparingly and only in extraordinary circumstances. *United States Dep't of Energy, et al.* (Clinch River Breeder Reactor Plant), 16 NRC 412, 426 (1982), citing *Washington Public Power Supply System* (WPPSS Nuclear Power Projects Nos. 3 & 5), 5 NRC 719 (1977).

Here, Holtec contends that NRC regulations for decommissioning, including § 50.82, were adopted for reactors intended to be permanently shut down, not reactors that are proposed to be restarted. But that does not mean that NRC did not consider the possibility of restarting a reactor in decommissioning status when it promulgated the decommissioning rules. On the other hand, if the NRC had considered the possibility of restarting a decommissioning reactor, it would have provided for that possibility in the rules. Beyond that, however, Holtec must establish that restarting Palisades is in the public interest.

Holtec insists that its scheme to restart is just a simple matter of getting the requested exemption and then a few license amendments. But in a February 9, 2023, interview with NRC Commissioner Bradley Crowell by the *ExchangeMonitor*,[25] Commissioner Crowell acknowledges that a Palisades restart would be a difficult and complicated process. Crowell said the NRC has no authority to license a restart, and that Holtc would have to apply for a new license. He surmised that Holtec would have to "start from scratch."[26]

Holtec relies on the fact of having monetary support appropriated by the Michigan legislature to support its argument that restarting Palisades is in the public interest. But political support of Holtec does not equate to a scientific or technical basis for the restart scheme. Petitioners attached the declaration of Mark Z. Jacobson, recognized as a premier expert in the country on renewable energy and future energy policy. He makes it clear that nuclear power is not the energy source of the future, and consequently restarting Palisades is not in the public interest:

> Nuclear power contributes to global warming and air pollution in the following ways: (1) emissions of air pollutants and global warming agents from the background grid due to its long planning-to-operation and refurbishment times (Section 3.2.2.1); (2) lifecycle

[25] www.exchangemonitor.com/nuclear-renaissance-now-or-never-30-minutes-with-bradley-crowell-commissioner-nuclear-regulatory-commission/
[26] *Id.*

> emissions of air pollutants and global warming agents during construction, operation, and decommissioning of a nuclear plant; (3) heat and water vapor emissions during the operation of a nuclear plant (Sections 3.2.2.2 and 3.2.2.3); (4) carbon dioxide emissions due to covering soil or clearing vegetation during the construction of a nuclear plant, uranium mine, and waste site (Section 3.2.2.5); and (5) the emissions risk of air pollutants and global warming agents due to nuclear weapons proliferation (Section 3.3.2.1).
>
> **Every one of these categories represents an actual emission or emission risk, yet most of these emissions, except for lifecycle emissions, are incorrectly ignored in virtually all studies of nuclear energy impacts on climate**. Virtually no study considers the impact of nuclear energy on air pollution mortality. By ignoring these factors, studies distort the impacts on climate and air pollution health associated with some technologies over others.[27]

(Emphasis added).

The declaration of Kevin Kamps further demonstrates that public support from the State of Michigan and Federal Government does not automatically allow the conclusion that Holtec's scheme is in the public interest because Holtec is driven by whatever public funding it can garner, not by an established history of starting up and operating nuclear power plants. Besides some $3.12 billion in state and federal largesse, Holtec insists on a locked-in power purchase agreement ("PPA") guaranteeing electrical sales at a fixed price that may be well above comparable market prices. As Kamps notes, "Holtec's scheme would protect it from free market competition at the Palisades zombie reactor via $3.3 billion in government subsidies, and $412.5 million per year in new PPA revenues, yet another form of subsidization."[28]

Petitioners' expert nuclear engineer, Arnold Gundersen, explains what the previous fixed-price PPA meant for Palisades when Entergy was the owner and operator: Entergy's corporate laser-like focus on minimizing costs became apparent as Palisades approached 2022. Because Entergy couldn't make a profit at Palisades without the Michigan ratepayer-funded subsidy created by the Power Purchase Agreement, Entergy stopped investing in essential nuclear

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[27] Declaration of Mark Z. Jacobson accompanying this Petition, Ex. C, p. 9
[28] Declaration of Kevin Kamps accompanying Petition, Ex. B., p. 4.

power plant repairs and upgrades made at other nuclear electrical generators during the years leading up to 2022. Simply put, Entergy risked the safety of the Palisades community and the atomic reactor's capacity to operate again in order to make a profit. By not making essential repairs and upgrades, Entergy drove Palisades into the ground before its 2022 closing.[29]

Of significance here, Vogtle Units 3 and 4 in Georgia were the first nuclear reactors to be licensed in over 30 years. Also, 16 reactors have been permanently shut down since the 1990s. It is clear, therefore, that even the nuclear industry knows enough to quit when faced with reality. In this case, if it were not for the billions of DOE dollars on the table, and hundreds of millions of State of Michigan dollars as well, Holtec would not be proposing to restart Palisades, either. The NRC must not abandon the strictures of Atomic Energy Act requirements. Granting the requested exemption would violate NRC regulations

Contentions 2 and 3

The ASLB in this case considered Contentions 2 and 3 together because they assert from different perspectives that the LARs in this case require an EIS to be prepared, rather than an EA. Contention 2 pointed out that restarting a closed and decommissioning reactor is a major federal action with significant environmental impacts, at least as significant as a license renewal, which requires an EIS.[30] Contention 3 asserted that because § 50.82 does not provide a pathway to restart once decommissioning has begun, a new operating license is required. This would necessitate issuance of a new operating license, which would require an EIS.[31]

Regarding Contention 2, what Holtec proposes to do, and what the NRC proposes to permit, is changing a presently unusable operating license into a fully functional operating license, through an exemption and several LARs. Notably, the NRC Staff itself has referred to the

[29] Gundersen Declaration accompanying this Petition, Ex. A p. 13.
[30] 10 C.F.R. § 51.20(b)(2)
[31] *Id.*

Holtec exemption request as a "major licensing action."[32] The Staff then asserts that "[b[ecause license amendments are typically used to change the authorities and requirements for a reactor in decommissioning, the amendment process may be used to restore those authorities so long as the amendment standards in 10 C.F.R. § 50.92(a) are met."[33] Petitioners agree that the standards of 10 C.F.R. § 50.92(a) must be met. According to § 50.92(a):

> In determining whether an amendment to a license, construction permit, or early site permit will be issued to the applicant, the Commission will be guided by the considerations which govern the issuance of initial licenses, construction permits, or early site permits to the extent applicable and appropriate. If the application involves the material alteration of a licensed facility, a construction permit will be issued before the issuance of the amendment to the license. . . .

Alterations of the type that require a construction permit are those that involve substantial changes that, in effect, introduce significant new issues relating to the nature and function of the facility. See *Portland General Electric Co.* (Trojan Nuclear Plant), 6 NRC 1179, 1183 (1977). To trigger the need for a construction permit, the change must "essentially [render] major portions of the original safety analysis for the facility inapplicable to the modified facility." See *Id.*; *Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant), 53 NRC 370, 391-92 (2001).

Petitioners submitted to the ASLB the expert declaration of Arnold Gundersen, detailing the major technical and mechanical flaws in the Palisades systems, structures, and components that must be replaced or significantly repaired before Palisades could reasonably be returned to operational status.[34] In fact, one of the most significant points made by Mr. Gundersen – the significant deterioration of the steam generators -- has now been acknowledged by Holtec and NRC Staff, resulting in the submission of a license amendment request by Holtec.[35]

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[32] NRC Staff Answer p. 78 ("[T]the Staff considers climate change to be within the scope of the NEPA environmental review for 'major licensing actions,' a term that the Staff concludes would apply to the restart and resumption of operations at Palisades.")
[33] NRC Staff Answer p. 23.
[34] Petitioners' Petition to Intervene, p. 60-63, 70-73
[35] Holtec Steam Generator LAR (ML25043A348)

In any event, Contention 2 has now been amended in accordance with the Board's Order approving a schedule for amending contentions.[36]

Regarding Contention 3, because there is no legitimate regulatory pathway to restart a closed decommissioning reactor, a new license must be issued. That clearly requires preparation of an EIS.[37] Rather than applying for a new license, Holtec proposes to accomplish the restart with license amendments, and also changes pursuant to 10 C.F.R. § 50.59, essentially a paper transaction, to return Palisades to operational status.

The ASLB claimed that contentions 2 and 3 are not within the scope of this proceeding because they allegedly challenge NRC regulations and policy.[38] The ASLB relied on language in *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), 49 NRC 328, 334 (1999). This was an incorrect reading of *Oconee*. What the Commission said was, "a petitioner may not demand an adjudicatory hearing to attack generic NRC requirements or regulations, or to express generalized grievances about NRC policies." *Id.* Petitioners are clearly not attacking generic NRC requirements or making generalized grievances about NRC policies.

The Board claimed that Petitioners are challenging regulations and policy since the NRC Staff has determined that the restart of Palisades can be accomplished by using existing regulations.[39] But that is a self-serving argument. Reference was made to a decision by the NRC that denied a request for a rule that would allow retired nuclear reactors to return to operation.[40] The NRC decision simply found that a rule was not justified at that time. The NRC specifically emphasized that no request for restarting a closed reactor had ever been made and that reactor

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[36] ASLB Order on amended contentions (ML25041A133)
[37] 10 C.F.R. § 51.20(b)(2)
[38] ASLB Decision, p. 53
[39] *Id.*
[40] The denial of the petition is found at https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML20205L305

operators expressed no interest in adopting the requested rule. The NRC mentioned in passing that existing regulations might be available, through an exemption, to accomplish the purpose, but § 50.12 was not mentioned. The Commission's May 2021 decision in PRM-50-117 was not an adjudication, and was far more equivocal than the ASLB would have it:

> While current regulations do not specify a particular mechanism for reauthorizing operation of a nuclear power plant after both certifications are submitted, *there is no statute or regulation prohibiting such action. Thus, the NRC may address such requests under the existing regulatory framework.*

The ASLB treats the rejection of a rulemaking as the making of a rule, that Volume 10 of the Code of Federal Regulations is consigned to corporate applicants to restart candidate reactors to pick and choose among existing regulations to divine a "pathway," and that the "pathway" has the force and effect of a new Commission regulation. The ASLB has transformed the rejection of a petition for rulemaking and the fact that the Commission specified no definitive regulatory pathway, into an affirmative and unassailable adjudication of a new procedure having the effect of a new rule. It is a new rule leaving it to the applicants to state which rules they intend to follow, whereby the NRC Staff accepts the applicant's proffer outside of the formal notice, comment and court challenge procedures that are part of an actual APA rulemaking.

The ASLB seems to hail the PRM-50-117 rulemaking rejection as the pronouncement of a new Commission policy, *i.e.,* recognition for the first time that existing NRC regulations support a pathway for a shutdown reactor in decommissioning can reverse course and restart the nuclear power plant. And if indeed the Commission was authoritatively re-interpreting its regulations, that is a statement of policy at odds with prior history. If a policy statement changes the agency's interpretation of a rule, it may constitute an interpretive rule and would therefore require notice and comment. *MetWest Inc. v. Sec'y of Labor*, 560 F.3d 506, 509-12 (D.C. Cir. 2009), citing *Alaska Professional Hunters Assn v. F.A.A.*, 177 F.3d 1030, 1034 (D.C. Cir.1999)

("Once an agency gives its regulation an interpretation, it can only change that interpretation as it would formally modify the regulation itself: through the process of notice and comment rulemaking."). An agency has less leeway in its choice of the method of changing its interpretation of its regulations than in altering its construction of a statute. "Rule making," as defined in the APA, includes not only the agency's process of formulating a rule, but also the agency's process of modifying a rule. 5 U.S.C. § 551(5). *Paralyzed Veterans of America v. D.C. Arena,* 117 F.3d 579, 586 (D.C. Cir. 1997) (When an agency has given its regulation a definitive interpretation, and later significantly revises that interpretation, the agency has in effect amended its rule, something it may not accomplish without notice and comment). *Syncor Int'l Corp. v. Shalala*, 127 F.3d 90, 94-95 (D.C. Cir. 1997) (modification of an interpretive rule construing an agency's substantive regulation will "likely require a notice and comment procedure.").

The ASLB conclusively reinforces its "new interpretation" campaign by pointing to the NRC Staff's issuance of a guidance document allegedly establishing a regulatory pathway to restart[41] in August of 2024, long after Holtec's letter proposed a pathway to restart. The NRC guidance amounts to a mere *post hoc* rationalization for approving Holtec's novel scheme. Although NRC guidances are routine agency policy pronouncements that do not carry the binding effect of regulations. *International Uranium (USA) Corp.*, CLI-00-1, 51 NRC 9, 19 (2000); *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-07-3, 65 NRC 237, 254 (2007), the new guidance evidences the need to clarify the NRC's policy change – and that requires treatment as a rulemaking, which has never occurred in the wake of the PRM-50-117 ruling.

In addition, NRC Staff, during the oral argument before the ASLB, described the guidance document as follows:

[41] Palisades Nuclear Plant Restart Inspection Plan, ML24228A195.

> It's an inspection manual chapter, and it concerns inspection and oversight and states that the licensing is discussed only to the extent necessary to provide that context that's needed for the oversight piece. And so we don't see that inspection manual chapter as having the same significance that Holtec does.[42]

It is problematic for the ASLB majority that the NRC Staff made a valid determination that a decommissioning reactor can be restarted using existing regulations. Absent notice and comment opportunity, the overblown significance ascribed to the PRM-50-117 *dicta* that the regulations may allow a restart cannot suffice as a basis for rejecting the Petitioning Organizations' Contentions 2 and 3.

In sum, the ASLB has transformed a Commission rejection of a rulemaking into a hard-and-fast limitation on the "scope" of this proceeding, But whether there is, in fact, an existing regulatory pathway to restart is exactly the factual and legal question the Petitioning Organizations have presented in their petition. The Petitioning Organizations are not challenging a regulation; rather, they are challenging the NRC Staff's misconstruction (or perhaps, deconstruction) and misapplication of specific regulations.

Of Contentions 2 and 3, the ASLB states that "Petitioning Organizations' claims that Applicants' operating license may not be amended or that Applicants may not seek exemptions from regulations amount to an impermissible challenge to agency policy and regulations." Those are striking mischaracterizations of what these Petitioners have stated. They have not stated that the Palisades operating license may not be amended, but instead, that the regulatory scheme of shutdown and decommissioning goes only in one direction, *viz.*, from shutdown to and through decommissioning to termination of license, and that logically, an operating license conditioned by fuel removal and the onset of decommissioning activities is not amenable to whimsy-based reversal. Nor have these Petitioners stated, as the ASLB claims, that Holtec may not seek

[42] Transcript of February 12, 2025 oral argument, p. 89.

exemptions from regulations; to the contrary, the Petitioning Organizations have in considerable detail laid out precisely why the Holtec exemption request, once made, must fail according to the historically limited range of activities for which exemptions have been granted.

In contentions 2 and 3, the Petitioning Organizations have not attacked "generic NRC requirements or regulations," nor have they expressed "generalized grievances about NRC policies," per *Duke Energy Corporation* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 334 (1999). Rather, they are challenging the lack of sufficient facts and law which would allow the Commission to countenance a means of authorizing the *ad hoc* restart of Palisades.

The present proceeding is the very first litigation opportunity the public has had to legally question this changed regulatory philosophy of the Nuclear Regulatory Commission. The Petitioning Organizations here timely raised their contentions; fleshed them out with disputed facts about the effects of climate change necessitating new components at Palisades; provided an alternative critique of the usefulness of the steam generator tubes at Palisades; and have questioned the unprecedented restart "pathway" suggested by an applicant and merely vouchsafed by the NRC Staff. None of this has ever before been tested in a legal proceeding, and the ASLB is incorrectly precluding any contentions that challenge key already-made NRC decisions about applicable regulations.

The Petitioning Organizations explained earlier in this brief how overlitigation at the contention stage contravenes the established standards for contention admissibility. That has happened with respect to Contentions 2 and 3, and they should, instead, be assigned for adjudication.

Contention 4

The ASLB decision on this contention principally reiterates its ruling as to Contentions 2 and 3. The Licensing Board maintains that:

> . . . Petitioning Organizations' argument that restart-specific statutory and regulatory provisions are necessary to allow Applicants to restart Palisades is not cognizable in this adjudicatory proceeding. The Commission has determined that the agency's existing regulatory framework applies to restart requests, and a challenge to the use of this framework is a challenge to both the NRC's regulations and Commission policy.

Memorandum and Order p. 58. Using this reasoning, the ASLB avoided having to decide whether restart constitutes a "major question" that requires clear Congressional approval.

The Petitioning Organizations respond with the same points they made in defense of Contentions 2 and 3. The ASLB has distorted the Commission's May 2021 decision to deny the rulemaking requested in PRM-50-117; it was far more equivocal a ruling than the ASLB is willing to admit.

But if, as the ASLB maintains, the rulemaking rejection was a precedential Commission statement of policy, then its use as a barrier to the Petitioning Organizations' contentions should founder on the requirements of NRC rulemaking. As the Organizations pointed out, *supra*, if a policy statement changes the agency's interpretation of a rule, it may constitute an interpretive rule and would therefore require notice and comment. *MetWest Inc. v. Sec'y of Labor*, 560 F.3d 506, 509-12 (D.C. Cir. 2009), citing *Alaska Professional Hunters Assn v. F.A.A.*, 177 F.3d 1030, 1034 (D.C. Cir. 1999); *Paralyzed Veterans of America v. D.C. Arena,* 117 F.3d 579, 586 (D.C. Cir. 1997); *Syncor Int'l Corp. v. Shalala*, 127 F.3d 90, 94-95 (D.C. Cir. 1997). There was no public notice and opportunity to comment provided the public in the wake of the rulemaking rejection.

The NRC Staff and the ASLB position that Holtec is allowed to plot its own pathway

through agency regulations to restart Palisades sharply contradicts the long-understood roles of regulator and regulated. Just as regulations that reference the ASME code were not intended to give over the Commission's full rulemaking authority to a private organization on an ongoing basis, neither may a private organization become the authority concerning the criteria necessary to the issuance of a license. *Texas Utilities Generating Co.* (Comanche Peak Steam Electric Station, Units 1 & 2), LBP-83-33, 18 NRC 27, 35 (1983). The ASLB interpretation of the significance of PRM-50-117 works to outsource the substance of regulatory action to the regulated. After Holtec posited its pathway to restart, the NRC Staff bolstered Holtec's choice by publishing a *post hoc* guidance document that coincidentally is 100% congruent with Holtec's pathway proposal. By this *post hoc* guidance, the NRC quietly approved a unique new procedure that has completely bypassed the rigors of an announced, intentional interpretive rulemaking. While the ASLB repeatedly characterized the rulemaking rejection as merely an embrace of the NRC's "existing regulatory framework,"[43] it is anything but that endorsement of the routine. The restart pathway delineated by Holtec states a contrived and completely novel, unprecedented procedure for undoing an operating license downgrade that is an interim step toward license termination.

The ASLB found the NRC Staff's argument against applicability of the "major questions doctrine" to undermine the Petitioning Organizations' doctrinal invocation, but the Staff actually buttressed these Petitioners' argument that a new license must be sought. The Staff contended that "if the challenged restart requests involve an issue of such 'economic and political significance' that the 'major questions' doctrine applies, then the doctrine would appear to apply to all new reactor licensing, a result that would undermine the Court's characterization of the

[43] See Memorandum and Order pp.4, 28, 31, 35, 37, 39, 53, 56, 58.

doctrine as one reserved for 'extraordinary cases.'" [44] These Petitioners had previously pointed out that there are at least two other formally shutdown reactors that are moving toward restart and that there are inherently concerning issues involved in restarting a plant that has been inconsistently mothballed for a period of years while approaching startup. The point of citing *West Virginia v. USEPA* was to argue by allowing a unique bypass of the Atomic Energy Act's purposes and existing regulations, that the NRC is applying the AEA in a way which Congress has not clearly delegated to the agency. Holtec's novel relicensing navigation is aimed at avoidance of having to qualify Palisades for a completely new reactor operating license.

The ASLB engages in another false characterization of Contention 4 by referring to "Petitioning Organizations' claim that 10 C.F.R. § 50.59 may not be used to update the UFSAR." That is not at all the nature of the contention. Far from urging that § 50.59 can't be used, the Petitioning Organizations assert that subjecting major componentry at Palisades to the § 50.59 threshold analysis, given future operations will be influenced by deteriorated equipment and the effects of climate change certainly will militate in favor of a very changed, new SAR. The ASLB again reconstituted these Petitioners' contention into a target that it could streamroll instead of acknowledging the factual and legal merit, finding issues of fact were stated, and setting the matter for hearing. That is what the ASLB should have done instead of misstating the nature and thrust of the actual contentions. The Commission should reverse the ASLB decision based on the Petitioning Organizations' compliance with the standards of contention content and presentation.

Contentions 5, 6 and 7

The ASLB noted that "Petitioning Organizations appear to request that we wait until new and amended contentions are filed before dismissing Contentions 5, 6, and 7."[45] In contrast to the

[44] Staff Answer quoted at Memorandum and Order, pp. 58-59.
[45] Memorandum and Order p. 63.

Board mischaracterizations described hereinabove, *supra,* as to Contentions 5, 6 and 7, the Board seems to have correctly understood Petitioning Organizations' objective. For whatever reasons, the Board forbore from dismissing these Petitioners' Contentions 5, 6, and 7 until proposed amendments and supplements were timely filed by these Petitioners.

CONCLUSION

The pleading requirements of 10 C.F.R. § 2.309(f)(1) do not encompass the overly burdensome standards that were repeatedly applied by the ASLB against the Petitioning Organizations. The standards are not meant to be used as a "fortress to deny intervention," *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), 49 NRC 328, 335 (1999), yet here, once again, they were. The Petitioning Organizations repeatedly provided the requisite "reasonably specific factual or legal basis." *Entergy NuclearVermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear PowerStation), 82 NRC 211, 221 (2015) (internal quotation marks omitted). These Petitioners "proffer[ed] at least some minimal factual and legal foundation in support of their contentions." *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), 49 NRC 328, 334 (1999). But it was unavailing, and consequently, the Petitioning Organizations now look to the Commission to thoroughly review the matters they have raised in this Brief, reverse the Atomic Safety and Licensing Board, and remand Contentions 1, 2, 3 and 4 to the ASLB for adjudication on the merits.

April 25, 2025

/s/ Wallace L. Taylor
Wallace L. Taylor, Esq.
4403 1 Ave. S.E., Suite 402
Cedar Rapids, Iowa 52402
319-366-2428; (Fax) 319-366-3886
wtaylorlaw@aol.com

/s/ Terry J. Lodge
Terry J. Lodge, Esq.
316 N. Michigan St., Ste. 520
Toledo, OH 43604-5627
(419) 205-7084; (Fax) 419-932-6625
tjlodge50@yahoo.com
Co-Counsel for Petitioning Organizations
(Beyond Nuclear, Michigan Safe Energy Future, Don't Waste Michigan, Three Mile Island Alert and Nuclear Energy Information Service)

CERTIFICATE OF SERVICE

Pursuant to 10 CFR § 2.305, I hereby certify that a copy of the foregoing "NOTICE OF APPEAL AND BRIEF IN SUPPORT" was deposited in the Electronic Information Exchange (NRC Filing System) in the captioned proceeding this 25th day of April, 2025, and that according to the protocols of the EIE they were served upon all parties registered with the system.

/s/ Terry J. Lodge
Terry J. Lodge, Esq.
Co-Counsel for Petitioning Organizations

Exhibit A: Arnold Gundersen Declaration and CV

BEFORE THE UNITED STATES
NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF	)	
	)	Docket No. 50-255
HOLTEC PALISADES LLC	)	
	)	
(Request for Exemption)	)	

DECLARATION OF ARNOLD GUNDERSEN
IN SUPPORT OF PETITION TO INTERVENE
AND REQUEST FOR ADJUDICATORY HEARING 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, Arnie Gundersen, am over eighteen (18) and have personal knowledge and specific recollection of the facts in this Affidavit. Pursuant to 28 U.S.C. Section 1746, I declare under penalty of perjury under the laws of the United States that the following is true and correct, to the best of my knowledge, information, and belief. I, Arnie Gundersen, submit the following:

2. Michigan Safe Energy Future, Don't Waste Michigan, Nuclear Energy Information Service, Three Mile Island Alert, and Beyond Nuclear have retained Fairewinds Associates, Inc to review the request for exemption from The Nuclear Regulatory Commission (NRC) by Holtec Palisades LLC. By instituting this process, Holtec Palisades LLC, a demolition contractor with a background limited to only nuclear power decommissioning and nuclear reactor dismantlement, has applied for significant exemptions to current nuclear operations regulations to restart and operate the derelict and decrepit Palisades nuclear reactor at one of the oldest atomic sites in the United States (US).

3. My observations and conclusions are offered to a reasonable degree of scientific certainty based upon my 50+ years of experience in the atomic power industry and my nuclear engineering background and professional certifications.

4. I have reviewed relevant information sources regarding Holtec Palisades LLC, its lack of atomic power operations expertise, and its background, which is limited to nuclear waste decommissioning and dismantlement processes.

5. The sources I have reviewed indicate that Holtec International, Holtec Decommissioning International (HDI), Holtec Palisades, and all their subsidiaries have never been licensed to operate a nuclear power plant and are inexperienced in atomic regulations, nuclear design, engineering, and operations. Throughout this declaration, all the Holtec Corporations and its many subsidiaries will be referred to as Holtec if they are not specified.

6. Moreover, my review of the regulatory record shows an utter lack of statutory authority and precedence for the changes proposed by Holtec Palisades. The inexperienced Holtec Palisades is begging the NRC to allow an operating license change that has never been attempted by even the most experienced firms in the nuclear industry's 60 years of operational history.

7. My declaration examines and analyzes the technical and environmental issues regarding Holtec's radical exemption request at its Holtec Palisades LLC. This request for exemption appears to circumvent regulations and the rights of the stakeholder communities to participate in proper safety reviews for the already closed, deficient, uneconomical, high-risk, and dilapidated Palisades reactor.

My Background

8. I hold a Bachelor of Nuclear Engineering (BSNE) degree cum laude and a Master of Engineering in Nuclear Engineering (MENE) from Rensselaer Polytechnic Institute (RPI) in Troy, New York. I earned my Master of Engineering in Nuclear Engineering

(MENE) at RPI via a prestigious Atomic Energy Commission Fellowship. In addition, I taught reactor physics and was a licensed nuclear reactor operator at the university.

9. I have more than 50 years of experience as a nuclear engineer and atomic power executive. I am the former nuclear executive (Sr. VP) of Nuclear Energy Services (NES) in Danbury, CT, where I had extensive experience decommissioning different atomic facilities. In addition, I was a founding member of that firm's Radiation Safety Committee for its Nuclear Regulatory Commission (NRC) license, which I helped prepare. I am a chapter author of the first edition of the DOE Decommissioning Handbook. Since leaving NES, I have co-authored three peer-reviewed papers detailing how radioactive microparticles migrate into communities following nuclear disasters. Additionally, I am the co-author of a best-selling book in Japan about Japan's Fukushima Disaster and triple atomic power reactor meltdowns.

Relevant Experience

10. My relevant experience significant in these Proceedings includes and is not limited to:

    10.1. My unique background is in nuclear engineering, decommissioning, and tracing the migration of radioactive isotopes.

    10.2. As a nuclear engineer and executive officer for the corporation, I spent considerable time in decommissioning when employed by Nuclear Energy Services (NES).

    10.3. NES had extensive experience dismantling radioactively contaminated facilities and was awarded a contract by the U.S. Department of Energy to prepare the first edition of its "Decommissioning Handbook" (DOE/EV/10128-1). Therefore, I am one of the original chapter authors of the first edition of the Decommissioning Handbook.

10.4. Furthermore, while I was a senior executive with NES, the groups reporting to me conducted radiological monitoring of the West Valley Nuclear Waste Site near Buffalo, New York, a reprocessing center and a nuclear dump. They also assisted in dismantling the Shippingport Reactor in Pennsylvania, the first commercial atomic reactor to be decommissioned.

10.5. Additionally, the groups reporting to me also dismantled numerous other facilities containing extensive radioactive contamination, including, but not limited to, plutonium.

10.6. I began my career as a reactor operator and instructor in 1971. I progressed to Senior Vice President for a nuclear licensee before becoming a nuclear engineering and operations consultant and expert witness. My Curriculum Vitae (CV) is Attachment 1.

10.7. I have testified as an expert witness to the Nuclear Regulatory Commission (NRC), its Atomic Safety and Licensing Board (ASLB), and its Advisory Committee on Reactor Safeguards (ACRS). Additionally, I have testified in Federal Court and before the State of Vermont Public Service Board, the State of Vermont Environmental Court, the Florida Public Service Commission, and the California Public Utility Commission (CPUC), as well as numerous other state and local adjudicatory agencies, boards, and regulatory bodies. Finally, I will continue to testify worldwide to regulatory bodies and agencies.

10.8. I have more than 50-years of professional nuclear experience, *including and not limited to* Nuclear Plant Operation, Nuclear Management, Nuclear Safety Assessments, Reliability Engineering, In-service Inspection, Criticality Analysis, Licensing, Engineering Management, Thermohydraulics, Radioactive Waste Processes, Decommissioning, Waste Disposal, Structural Engineering Assessments, Nuclear Fuel Rack Design and Manufacturing, Nuclear Equipment Design and Manufacturing, Cooling Tower Operation, Cooling Tower Plumes, Consumptive Water Loss, Prudency Defense, Employee Awareness Programs, Public Relations, Contract Administration, Technical Patents, Archival Storage

and Document Control, Source Term Reconstruction, Dose Assessment, Whistleblower Protection, and NRC Regulations and Enforcement.

10.9. I am the chief engineer for Fairewinds Associates Inc, an expert witness and paralegal services firm specializing in nuclear engineering, nuclear operations, nuclear power plant safety analysis and assessment, and atomic reactor operations and regulations.

Declaration Executive Summary:

11. The Palisades nuclear reactor was designed in the mid-1960s, and its on-site construction began in 1967. The Atomic Energy Commission (AEC) licensed it for full-power operation in 1971. It is one of the oldest nuclear reactors ever built, and it was built at the very beginning of the commercial atomic power industry. As explained below, its aging design and degraded condition do not meet current regulatory requirements. Holtec Palisades should not be allowed to be constructed and operated today if it applies for a new operating license in 2024 or any time in the future.

12. When the Palisades atomic power reactor was under design, the Atomic Energy Commission (AEC) had not yet developed the General Design Criteria (GDC) for U.S. reactors. The GDCs were finally added to 10 CFR Part 50 as Appendix A in February 1971, long after the design for Palisades was completed.

13. Similarly, while the Palisades reactor was under design, the AEC had not yet developed Quality Assurance (QA) regulations for its proposed fleet of nuclear power reactors. In June 1970, the AEC published 18 QA criteria as Appendix B of atomic power reactor regulations. The QA criteria in Appendix B were published long after the Palisades reactor was designed and while its construction was being completed.

14. Since its design began in the mid-1960s, it was licensed by the Atomic Energy Commission (AEC) —the agency that granted me my unique AEC Fellowship. At the same time, I was a graduate student at Rensselaer Polytechnic Institute from 1971 to 1972. In 1976, Congress changed the agency responsible for regulating atomic power to the Nuclear Regulatory Commission (NRC), the current regulatory body. Chartered by Congress in the 1950s, the old Atomic Energy Commission was created to fulfill two roles: promote and regulate nuclear power. Congress determined that these dual roles—promoting and regulating atomic power created irreconcilable safety concerns. In 1976, the Nuclear Regulatory Commission (NRC) was created by Congress to take over nuclear regulations as derived in The Code of Federal Regulations (10 CFR).

15. In 2011, the NRC issued a license extension to the Entergy-owned Palisades reactor until 2031, despite the old AEC only approving it to operate until 2011. During that process, the NRC ignored the fact that Entergy Palisades did not meet current operational, metallurgical, or electrical standards. Palisades was closed in 2022 and sold for scrap well before its 2031 license extension expired. Entergy, its owner at the time, determined the nuclear power plant would be unprofitable if it completed all the required safety and operational upgrades to the atomic facility.

16. Holtec Decommissioning International (HDI) purchased the defunct Palisades nuclear power plant from Entergy in 2022 to dismantle and sell off as scrap. Holtec (HDI) has never claimed that resurrecting Holtec Palisades would be economical or profitable without the associated State of Michigan and federal Department of Energy (DOE) subsidies.

17. By the way, and of great concern, Palisades has undergone three ownership changes since it became operational in 1971. First owned by Consumers Power, the reactor was sold in 2007 because Consumers Power determined it was too costly to maintain in its condition. Then, the Palisades reactor was purchased by Entergy Corp, which also ascertained that electric production from this plant was so expensive it could not make a substantial profit. However, Entergy kept operating Palisades because it

received a lucrative Power Purchase Agreement (PPA) that subsidized Entergy to keep Palisades operating. Knowing that the PPA would expire in 2022, Entergy stopped investing in plant improvements and made a simple economic decision to close the facility.

18. When Entergy terminated Palisades' operating license in 2022, nine years before its NRC operating license expired, Holtec Palisades was no longer authorized to perform any power operations. In 2022, Entergy sold the remnants of the aged and disintegrating Palisades reactor site to Holtec Palisades as scrap without its approved operating license. As a demolition contractor, Holtec Palisades received the Decommissioning Trust Fund established by the ratepayers to allow Holtec Palisades to decommission and dismantle the entire site. Holtec has never designed a working reactor, constructed any designed atomic facility, or operated an existing nuclear power plant. Instead, Holtec and its subsidiaries specialize in decommissioning, including dismantling and securing old radioactive nuclear sites and selling non-radioactive parts for scrap metal. Holtec also claims to be designing Small Modular Reactors (SMRs), although no designs have been submitted to the Nuclear Regular Commission (NRC).

19. After acquiring the defunct Palisades site for its supposed demolition, Holtec Palisades, LLC suddenly changed course. With no nuclear power operations, design, or engineering experience, Holtec Palisades LLC now attempts to relicense the obsolete and antiquated atomic reactor so the corporation can restart and operate a heavily subsidized and outmoded Palisades reactor—that was designed and constructed before General Design Criteria (GDC) and Quality Assurance (QA) program requirements were even issued by the Atomic Energy Commission (AEC).

20. Knowing Palisades would be uneconomical, Holtec Palisades has sought taxpayer-funded financial subsidies from the State of Michigan and the U.S. Government Department of Energy (DOE). Additionally, Holtec Palisades plans for ratepayer subsidies from the Michigan Public Service Commission and the U.S. Department of Agriculture. No federal agency, the NRC or the original founding Atomic Energy

Commission (AEC), ever allowed or envisioned an old, degraded reactor being sold for scrap and dismantlement to apply for restart. Palisades previous owner renounced its operating license and planned for its non-radioactive parts to be sold for scrap. No one in the nuclear industry envisioned a non-nuclear corporation attempting to relicense, refit, and restart the beleaguered carcass of the former operational Palisades atomic power reactor.

21. Even with these potential new state and federal subsidies totaling billions of dollars, the Holtec Palisades nuclear reactor is still not competitive financially with any renewable or sustainable electric generation facility—including solar, wind, wave, water, geothermal, and other new technologies under development. After Holtec's proposed billions in repairs, the aged and decrepit facility—almost 60 years old–will require State and Federal subsidies for any electricity it may belatedly produce.

22. Most disturbingly, the Palisades atomic facility is one of the world's most decrepit and flawed nuclear reactors. To relicense the Holtec Palisades carcass, Holtec seeks exemptions from federal safety regulations that will make the Palisades reactor even more dangerous to operate than it ever was. When Entergy sold it to Holtec two years ago, the reactor was operating with poorly maintained parts, woefully inadequate safety equipment, and outdated and outmoded components. This declaration will further detail the degraded condition of the aged, old-fashioned, and patently unsafe reactor.

23. In a 2022 filing with the US Department of Energy, Holtec admitted that applying to relicense and resurrect the shuttered and degraded nuclear plant at Palisades has never been attempted in U.S. nuclear power. Moreover, speaking to the NRC at its March 20, 2023, public hearing, Kelly Trice, President of Holtec Decommissioning International, said,

> *"And I think, you know, the concept of reauthorizing reauthorizing (sic) power operation is a is a (sic)* ***new concept*** *..."*[1]

[1] Statement at NRC Public Hearing, March 20, 2023

Qualifications of the Owner

24. Before Holtec bought Palisades to decommission and demolish it, Entergy was its previous owner. While Entergy had not invested heavily or upgraded its reactors responsibly, it still was a large nuclear power operations corporation that was an experienced owner of 10 nuclear power plants licensed and regulated by the Nuclear Regulatory Commission (NRC). The other nine reactors Entergy owned when it acquired Palisades in 2007 were Pilgrim, located near Boston, Massachusetts; Vermont Yankee; Indian Point Units 2&3 outside New York City; FitzPatrick, located in upstate New York near Oswego; Arkansas Nuclear One Units 1&2, and River Bend and Waterford in Louisiana.

25. Since acquiring Palisades, Entergy closed six out of its ten reactors because they were unprofitable and needed extensive upgrades and repairs. Pilgrim, Vermont Yankee, Indian Point 2&3, and Fitzpatrick (as well as Palisades) were all abandoned by Entergy because the electricity they generated was too costly compared to renewable sources produced by wind and solar. No firms have expressed interest in restarting any other former Entergy reactors.

26. Entergy's nuclear organization once totaled more than 4000 individuals[2], including hundreds of operations personnel at each of its operating reactors. Additionally, Entergy maintained a separate home office staff headquartered in Jackson, Mississippi. More than 500 professional staff in Jackson supported the operations staff in the Entergy fleet of reactors with specialized engineering, design, and upgrading expertise that is usually not part of any on-site nuclear operations skill set. According to the State of Mississippi in 2019:

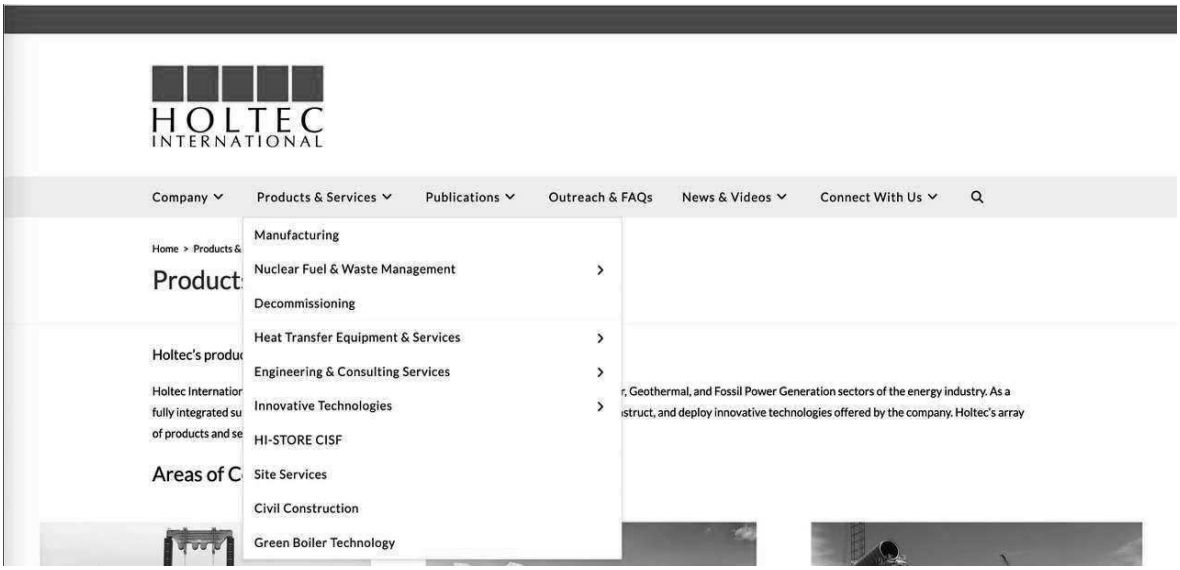
> *The addition of more than 250 new jobs at Entergy Nuclear's Jackson headquarters will double its workforce, which is comprised of professionals who work in a variety of capacities to support Entergy's nuclear plants… "Our Nuclear Strategic Plan is*

[2]https://jobs.entergy.com/go/Nuclear/4350700/?_gl=1*ncuz90*_ga*MTgwODA2OTgzNC4xNzAxNDUzMTc4*_ga_HK6YSZ6LT0*MTcwMTQ1NTU5My4yLjEuMTcwMTQ1NTYwOC40NS4wLjA.

> *a five-year business strategy to provide robust governance, oversight and support of the fleet and to achieve excellence in all nuclear operations," said Chris Bakken, Entergy Nuclear executive vice president. "The expansion of the headquarters building at Echelon allows our growing nuclear team to work in a single location, fostering unity, collaboration and team effectiveness."* [3]

27. Contrary to Entergy's "*robust nuclear team*," Holtec and its subsidiaries have never designed, constructed, or operated a single nuclear plant anywhere in the world. Moreover, Holtec Palisades has begun staffing its efforts with nuclear mercenaries– who have not previously worked together as a team and do not understand the totality of the pitfalls of managing and operating an atomic reactor.

28. Holtec has admitted on its corporate website that it has no nuclear design, construction, or atomic operation product or service experience.[4]



29. My concern is that Holtec may have an ulterior profit motive to pursue the restart of the aged, fragile, and vulnerable Palisades atomic reactor. It surprised many in the

[3] https://mississippi.org/news/entergy-nuclear-expanding-operations-workforce-in-mississippi/
[4] https://holtecinternational.com/company/corporate-overview/

nuclear power industry when Holtec issued a 2022 press release stating that installing its original design for Small Modular Reactors at the Palisades site is viable. However, Holtec has no prior engineering and design background, has not built any such operating reactors, and has not presented anything upon which it based such an out-of-scope analysis. In a roundabout way, keeping the Palisades site viable may create an unorthodox and poorly configured effort by Holtec to commercialize its own SMR design.

30. In a Holtec Press Release dated 12/4/2023, Holtec acknowledges that it will be building two new "Small Modular Reactors" at the Palisades site,

> *"Buoyed by the State of Michigan's commitment to expand in-state carbon-free generation as well as by the broad-based federal, state, and community support for repowering the Palisades Nuclear Power Plant, we have started the program to build our first two SMR-300 reactor units at the Palisades site."*

31. Holtec's additional construction of two new reactors at Holtec Palisades will make the site one of Michigan's largest major construction sites. Not only will approximately 1,000 contractors reconstruct the aging Palisades reactor, but thousands of additional construction personnel will build these two new reactors simultaneously.

EXPERT OPINION: Conclusion #1 — Holtec Has No Corporate Experience To Resurrect The Palisades Reactor

32. Holtec applied to the NRC requesting a license exemption for Holtec Palisades to resurrect the previously shuttered atomic reactor carcass. To undertake this unprecedented project, Holtec Palisades will not spend any of its own funds and will spend billions of state and federal funds to refurbish, construct, partly reconstruct, and restart the Palisades Nuclear Power Plant. Holtec has no demonstrated financial or management capability to achieve this alleged goal.

33. Relicensing and resuscitating a shuttered, aged, and defunct atomic reactor by a corporation with no nuclear operations or engineering experience while relying on a

workforce of miscellaneous workers without corporate nuclear operation and management knowledge is a recipe for an atomic disaster.

34. Most importantly, whether any competent nuclear energy operating organization could restart the degraded Palisades facility is questionable. Entergy, the previous owner of Palisades, controlled ten atomic power plants, most of which were more than 40 years old when it recognized that resurrecting Palisades was well beyond its corporate experience and engineering capabilities. Quite obviously, Holtec lacks the requisite atomic power engineering and operational skills.

Degraded Condition of Palisades Atomic Reactor

35. What are the financial risks to the limited liability corporation (Holtec Palisades LLC) and the community where this degraded and shuttered energy generator is located? Fact: the viability of a principal nuclear corporation's capital improvements is determined by the time the energy generator recoups its investments. *This financial term is known as the investment horizon*. While the NRC had licensed Palisades to operate until 2031, Entergy knew its Power Purchase Agreement (PPA) would end in 2022, which subsidized Entergy to produce power that was more expensive than other power producers on the grid.

36. Therefore, closing the costly Palisades nuclear generator in 2022 made economic sense to Entergy's financial portfolio and stockholders. Closing Palisades also significantly reduced the overall electric rates in Michigan by eliminating the PPA subsidized costs that the State of Michigan Public Service Commission had approved ratepayers paying Entergy for the PPA. On the other hand, Holtec Palisades LLC did not use its own funds; instead, it funded the resurrection of the Palisades nuclear reactor with the Michigan Ratepayers Decommissioning Trust Fund for Palisades.

37. As Holtec moves forward in this untoward process, it uses DOE (Department of Energy) grants and loans. On July 5, 2022, one week after assuming control of the site from Entergy, Holtec Palisades LLC applied to the DOE for a massive cash infusion while it continued its unauthorized raid on the ratepayer Decommissioning

Trust Fund to underwrite its efforts to resuscitate the defunct reactor. Still, Holtec is not investing its own funds in this vast financial venture. It has no investment horizon as it has made no corporate investment.

38. I am familiar with Entergy's investment horizon as an energy expert witness in the State of Vermont, where Entergy's now-shuttered Vermont Yankee (VY) atomic reactor was located. I served the State of Vermont as the first Chair of the State's Public Oversight Panel (POP) for Entergy's Vermont Yankee (VY) nuclear power plant. Vermont's State Legislature authorized the Public Oversight Panel (POP) to evaluate Entergy's ability to maintain the VY atomic reactor as a reliable energy production source as it aged. In my role as Chair of the POP, I was able to analyze Entergy's short-term investment horizon philosophy. Vermont's Public Oversight Panel determined that Vermont Yankee's (VY's) outdated and outmoded condition would significantly impact its ability to generate reliable power as it aged.

39. I also reviewed Entergy's investment horizon for a civil case in Arkansas Nuclear One, representing the plaintiffs retained by the Bailey & Oliver Law Firm. I identified that Entergy took shortcuts to reduce outage duration, which resulted in the death of one employee and the disfigurement of others.

40. Similar malfeasance existed at Entergy Palisades before its closure. Entergy's corporate laser-like focus on minimizing costs became apparent as Palisades approached 2022. Because Entergy couldn't profit at Palisades without the Michigan ratepayer-funded subsidy created by the Power Purchase Agreement, Entergy stopped investing in essential nuclear power plant repairs and upgrades made at other nuclear electrical generators during the years leading up to 2022. Simply put, Entergy risked the safety of the Palisades community and the atomic reactor's capacity to operate again in its pursuit of corporate profits. By not making essential repairs and upgrades, Entergy drove Palisades into the ground before closing it in 2022 and selling it for scrap to the decommissioning entity Holtec Decommissioning International (HDI).

41. If one of the seasoned owners/operators in the nuclear industry had planned to restart Palisades after its shutdown in 2022, the new owner would have spent funds to place the secondary system in a wet layup status to prevent further degradation of the steam generators. The new owner also would have paid funds to maintain pumps and valves properly through preventive maintenance practices. For example, the main plant turbine generator weighs more than one million pounds and is about 100 feet long. If left idle for extended periods, the weight of the turbine will cause the main shaft to bend, and the bearings will develop flat spots. Flat spots on the main turbine shaft can cause vibration, leading to a mechanical explosion of the turbine that has the potential to hurl large shrapnel into the control room or the nuclear containment building.

42. Hence, if Entergy or a new owner had planned to restart Palisades, it would have placed the turbine on a turning gear to keep it slowly rotating while it was shut down. It is pretty simple: No such precautions were necessary for a restart because Palisades was sold to the decommissioning firm Holtec to be dismantled and sold for scrap. When any nuclear or atomic facility is decommissioned, no wet layup or preventive maintenance operation protocols are required as the reactor is permanently closed and becomes non-functioning scrap. Holtec knew it bought a non-functioning scrap reactor from Entergy that was meant to be entirely dismantled. Holtec was given the Palisades Decommissioning Trust Fund, which belongs to the Palisades area community and its ratepayers, to decommission the power plant and not use it for unauthorized activities.

43. Let's be clear: Holtec said it would buy the Palisades facility to decommission and demolish the uneconomical Palisades atomic reactor and create a greenfield. Yet only five days after Holtec Decommissioning International purchased it, the DOE was informed of Holtec's newly unveiled corporate strategy of acquiring previously licensed sites and utilizing them to build Small Modular Reactors.

44. Even during these early planning stages, Holtec has admitted that at least $2 billion will be required to reconstruct key components, make the necessary upgrades, and repair essential parts of Palisades' infrastructure ignored by the Entergy Corporation during its final years. Remember, Entergy determined that the Palisades atomic power facility was so degraded that it would be unsafe and unprofitable to operate again after it stopped receiving subsidies from the State of Michigan via the Power Purchase Agreement (PPA).

45. Unfortunately, in its thoroughly aged and degraded condition, the Palisades reactor will never be fit to operate. It will place the nearby populated areas of Palisades Park and Lake Michigan's fragile aquatic environment at extreme risk. A reactor disaster at Palisades would have consequences far beyond Palisades Park, downwind, downstream, up the food chain, and across many generations. Along with Lake Superior, Lake Michigan is a critical headwater for the rest of the Great Lakes downstream, so the drinking water supply for more than 40 million people in eight U.S. states, two Canadian provinces, and many Indigenous Nations would be at risk. The Great Lakes hold 21% of the world's surface freshwater, 84% of North America's surface freshwater, and 95% of that in the United States.

Untenable Defects Requiring New Construction at Palisades Atomic Reactor — List Created by Holtec

46. A partial list of defects delineated by Holtec in 2022 requires new construction at Palisades[5].

*NOTE: Holtec prepared the following tables and summarized the significant areas of its assessment of the estimated construction cost to restart Palisades and achieve full power operation.

Table 1: Replacement Fuel Budget Support [*no new fuel currently available, and this is a specialty item that takes about two years to create]

[5] Page 6 and following from the 7/5/22 Holtec application to DOE for CNC bailout funding.

Item #1
New fuel for 2/3 Reactor Core due to excessive burn on the final operating cycle.
Includes core physics design. — Estimated Cost: $240M

Table 2: Operating Budget Support

Item # 1
Labor for two years (Phase 1 staff retention) — Estimated Cost: $77M

Item #2
Additional labor to recover and restart the plant ~ 400 people
Estimated Cost: $155M

Item # 2a
Partner utility management contract — Estimated Cost: $28M

Item # 3
Physically restore qualify simulator
Estimated Cost: $2M

Item # 4
Operator and Technical Training programs recovery, recertification
Estimated Cost: $6M

Item # 4a
Licensed Operator Training Programs
Estimated Cost: $27M

Item # 4b
Technical Training Programs
Estimated Cost: $18M

Item # 5
Engineering system configuration restoration
Estimated Cost: $9M

Item #5a
Update Reactor Vessel Fluence and disposition embrittlement results
Estimated Cost: $7M

Item # 5b
Flow Accelerated Corrosion and Alloy-600 testing
Estimated Cost: $4M

Item #6
Chemical cleaning for long-term ALARA
Estimated Cost: $25M

Item #7
Licensing Basis Recovery
Estimated Cost: $6M

Item #8
CRDM and Incore Detector and cable replacement
Estimated Cost: $16M

Item # 8a
Reactor Vessel Head Penetration leak testing and repair/peening
Estimated Cost: $90M

Item #8b
Steam Generator 100% eddy current testing and secondary side chemical cleaning
Estimated Cost: $12M

Item #8c
Reactor Coolant Pumps: Motor, pump and seal maintenance and/or replacement
Estimated Cost: $22M

Item #9
Software License Recovery
Estimated Cost: $3M

Item #10
Quality Program/controls restoration and materials requalification
Estimated Cost: $5M

Item #10a
Reestablish Q inventory (restock quality components)
Estimated Cost: $18M

Item #11
NRC Costs (Two years)
Estimated Cost: $45M

Item #12
Real Estate Tax (One-year following restart)
Estimated Cost: $7M
Total Table 2 Operating Support Budget: $582M

Table 3: Capital Projects

Item #1
System Configuration major overhauls, equipment replacements
Estimated Cost: $34M

Item #2
Switchyard upgrades (Tie-in, Open Phase)
Estimated Cost: $7M

Item #3
S/G design, fabrication, replacement (includes reactor coolant system redesign, cold-hot-fuel testing)
Estimated Cost: $510M

Item #4
Spent fuel offload (dry storage) and new spent fuel racks
Estimated Cost: $195M

Item #5
Required Modifications: Fire Protection (NFPA-805), Cyber Security, Plant Process Computer
Estimated Cost: $42M

Total (w/out contingency): $788M
Contingency: $325M

Table 4: Proposed Total Investment

Item #1
Total Investment (w/out contingency)
Estimated Cost: $1.61B

Item #1a
Total Investment (w/contingency)
Estimated Cost: $1.935B

EXPERT OPINION: Conclusion #2 Holtec Lacks Experience in Operating Nuclear Power Plants

47. As noted in Conclusion #1 above, Holtec lacks any nuclear reactor design, construction, or operation experience. In light of that lack of expertise, Holtec's "*estimate" of at least $2 Billion* in construction costs to return the Palisades plant to operation must be viewed as merely a low-ball guess.

48. The list of construction problems that Holtec identifies is extraordinary and shows that the physical condition of the Palisades Plant deteriorated terribly while Entergy was the owner. There are many examples of this degradation, including but not limited to:
    - The steam generators must be manufactured and constructed for the second time.
    - The reactor is dangerously embrittled because the wrong welding material was used in 1969 during manufacture.
    - The reactor head has needed replacement since at least 2009. Additionally, it has experienced repeated Control Rod Drive module seal leaks dating back to 1972.
    - The interior piping has become excessively radioactive and needs to be cleaned with caustic chemicals to reduce radiation exposure. (Item #6, $25 Million).
    - Physical improvements to the switchyard are also identified (Table 3, Item #2) and require new construction.
    - Entergy appears to have sold its inventory of safety-related replacement parts, forcing Holtec to spend at least $18 Million to find NOS (New Old Stock) replacement parts on eBay!
    - The Flow Accelerated Corrosion Program, similar to the failed program at the Surry reactor in Virginia that caused the death of four staff members at the Surry reactor when a pipe ruptured, must be recreated (Item# 5b Table 2, $ 4 million).
    - The safety-related wires operating the Control Rod Drives and Incore instrumentation have degraded and require construction (Item# 8, $16 Million).

49. The net effect of all this safety-related physical degradation is that the required upgrade and rehabilitation construction at Palisades is extraordinarily complicated and time-consuming and cannot be funded by the Decommissioning Trust Fund because these are not Decommissioning Activities.

- The lack of remaining human infrastructure is just as critical to operations as any physical degradation. Therefore, the knowledge base of how Palisades operated must be recreated entirely.
- Holtec Palisades acquired some trained and licensed operators, however, its reactor simulator, used to train those operators, needs significant repairs before any training can begin (Table 2—Items 3, 4,4a, $35 Million).
- Training new mechanics and other new staff will cost an additional $18 Million. (Table 2 – Item #5)

50. Two essential and primary safety programs (Quality Assurance and Configuration Management) must be implemented to ensure all safety-related equipment meets federal codes.

50.1. Holtec identified that the quality assurance program (QA) needs "restoration" (Table 2—Item# 10, $5 Million). 10CFR50 Appendix B requires the *licensee* (Holtec) to have a QA program, yet Holtec has admitted that it fails to meet this legal requirement.

50.2. Holtec has acknowledged losing control of the Configuration Management Program and that *Licensing Basis Recovery* will cost at least $15 million (see Items 5 and 7, Holtec Table 2 above).

51. These two programs would ensure engineers knew how the structures were designed and constructed so that consistent improvements would be made moving forward.

51.1. For example, Entergy has previously committed to improving the strainers[6] on safety-related pumps, and unfortunately, those commitments were never implemented.

51.2. Entergy also committed to inspecting the impellers on the reactor coolant pumps, as some impellers failed. Their broken impeller parts remain at the bottom of the Palisades reactor.

[6] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML062080468

51.3. Neither of these Entergy commitments was ever implemented, and Holtec likely is unaware that these serious safety issues were previously ignored.

EXPERT OPINION: Conclusion #3 Holtec Lacks the Experience and Has No Qualifications to Perform the Necessary Activities

52. It is questionable whether any competent nuclear organization, let alone the inexperienced freelance hirelings employed by an unseasoned decommissioning firm like Holtec (HDI), could resurrect the Palisades reactor. Before the Holtec Palisades atomic reactor can be restarted, all the previously destroyed QA (Quality Assurance) records must be recreated to ensure each part meets nuclear integrity standards, all safety programs must be reconstructed and implemented, and any missing or damaged equipment and parts must be re-engineered and newly fabricated to meet American Society of Mechanical Engineers (ASME) standards.

52.1. First, there is a genuine danger and risk from Holtec attempting to bring Palisades back to life for two reasons. The long-standing equipment problems at Holtec Palisades are substantial and extensive. Additionally, Holtec's entire proposal completely underestimates the extreme costs of these repairs and equipment fabrication in its whole proposal. Furthermore, the duration for making said repairs is grotesquely underestimated and minimized by years.

52.2. Second, the institutional memory required to operate the old and outmoded atomic reactor was a skill belonging to the senior staff members, who no longer exist since Entergy terminated its operating employees and its license to operate the Palisades reactor. New and untrained hired hands running an ancient plant create yet another recipe for disaster.

52.3. Third, the formidable changes identified by Holtec are likely only a fraction of the true extent of problems that will be determined because critical records were destroyed by Entergy when the plant was closed. Thus, the construction and

repair of parts require copious amounts of construction, transpiring over many years.

52.4. Fourth, Holtec does not own or make financial investments since its whole corporate model is its private use of public funds —the ratepayer Decommissioning Trust Fund, U.S. Department of Agriculture, State of Michigan, Department of Energy (DOE), and ratepayer funding for energy investment, no matter how expensive.

53. Ultimately, attempting to resurrect the 50+-year-old Palisades atomic reactor using poorly trained roustabouts, coupled with Entergy's years of neglect followed by a long hiatus in reactor operations, missing vital documents, and an improperly layup-stored reactor, present an enormous risk to the public health and safety of the entire local community as well as to a significantly populated area of Michigan and beyond.

EXPERT OPINION: Conclusion #4, the NRC Said Any Palisades Restart Attempt Must Begin with a New Design Basis By Reviewing All Prior Design Assumptions in Light of 21st Century Criteria

54. The overall design of the Palisades reactor is not licensable to the 21st century standards. Palisades was allowed to continue operations by the NRC between 1971 and 2031 due to the approval of its original Atomic Energy Commission (AEC) license. And, had the terms of its original AEC license been maintained by Entergy, the nuclear reactor might have continued its operational standing via a program that is called "Grandfathering." The old Palisades design was allowed to continue because the original AEC Operating License had been granted. But in 2022, Entergy renounced the ongoing operation of the old Grandfathered design. Holtec seeks to recreate the old Grandfathered conditions in the expired license because it is evident that Palisades cannot meet the current licensing criteria.

55. Indeed, the new Small Modular Reactors Holtec may propose to build on the Palisades site will not be designed to the same 1960s standards as the existing Palisades reactor.

55.1. As discussed later in the Declaration, environmental conditions due to climate change have changed dramatically since Palisades was first licensed almost 60 years ago. A new design basis reflecting damaging climate change must be incorporated into any licensing approval for resurrecting Holtec Palisades.

55.2. One glaring example is the design of the turbine hall and its position adjacent to the Nuclear Reactor and Control Room.

55.3. The turbine is tangential to the existing Palisades reactor's Control Room and Nuclear Reactor. If, as sometimes happens, the turbine was to disintegrate destructively, the shrapnel could hit the reactor and the control room, potentially creating a meltdown. Turbine disintegration is not an academic concept but has occurred several times at other operating reactors, including Fermi 2 near Detroit. Fortunately, the type of shrapnel generated did not have the kinetic energy to puncture safety-related components at Fermi 2. However, it did result in the discharge of Two Million gallons of radioactively-contaminated wastewater into Lake Erie.

55.4. When Palisades was built, Engineers were not aware of this design flaw. While the NRC was well aware of the danger to the Palisades reactor, it allowed Palisades to continue to operate with this horrendous design flaw.

55.5. However, the new Holtec SMR design's turbine is located radially outward, allowing the shrapnel to avoid impacting safety-related structures.

56. NRC Commissioner Crowell has recognized that Entergy terminated the old Palisades operating license and that the permit cannot be reissued to Holtec without Palisades meeting the new, more stringent safety criteria of the 21st Century. He said,

Holtec Palisades needs to "start from scratch". Furthermore, NRC Commissioner Crowell[7] added,

> "*Certainly, the entire operation of the plant needs to be reassessed," Crowell said. "It's not the same as a refueling outage, and it's not the same as a license renewal… "I feel like it's difficult to get our ducks in a row for that because it changes almost on a monthly basis… "I understand they [Holtec] are in a posture of wanting to find a buyer to do it… but I think at this stage of the game, you're gonna have to start from scratch.*"

EXPERT OPINION: Conclusion #5 Holtec Has Violated IRS Regulations Regarding Allowing Expenditures From the Decommissioning Trust Fund

57. Holtec has made differing financial disclosures to the NRC concerning its use of Palisades' Decommissioning Trust Fund (DTF). My records analysis indicates that Holtec has used the DTF to simply maintain the Palisades staff in hopes of receiving funds to resurrect the reactor.

58. As the March 20, 2023 Holtec-NRC meeting began, Kelly Trice, president of Holtec Decommissioning International ("HDI"), was asked by Jean Fleming, Holtec International's vice-president, to provide an overview of Palisades' status:

> Speaker [Kelly Trice] [00:09:53] *So Palisades, I think everybody knows, was shut down roughly May last year, has been shut down ever since.* ***Generally, we've maintained the plant in its current status. Not a lot of decommissioning has started at this point.***[8]

59. Yet in Holtec's 2022 financial filing to the NRC, filed in March 2023, outlining expenditures from the DTF in just the first six months of its ownership, Holtec claims that it spent $44 Million of the Decommissioning Trust Fund to decommission the Palisades reactor.

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[7] February 07, 2023, *Exchange Monitor* **To restart the shuttered Palisades plant, Holtec would need to start 'from scratch,' NRC commissioner Crowell says.**

[8] Kelly Trice at Holtec Presentation

60. These two Holtec positions (and others made to the Department of Energy) are incompatible. The Effective Full-Time Hours (EFT) to dismantle the Palisades reactor, as outlined in the Palisades Post Shutdown Decommissioning Activities Report (PSDAR), are dramatically different from the actual Palisades EFT hours stated by Holtec in its 2023 NRC filing, suggesting that Holtec is using the DTF to maintain the remaining Palisades professional staff to restart Palisades and not to dismantle it. Under federal law, such usage is not legally allowed by any federally regulated Decommissioning Trust Fund. Finally, a full forensic audit by the IRS and/or the U.S. Treasury Department is appropriate to assess if Holtec has amassed a tax liability using the DTF for non-approved expenditures as well as the misuse of a federally regulated financial trust with money that belongs to the ratepayers for Palisades electricity production for 40-years — and before the plant begins a new process, the funds must be returned to the ratepayers in an ongoing Decommissioning Trust Fund as federally mandated throughout the U.S.

EXPERT OPINION: Conclusion #6 — Cessation and Reissuance of an NRC License Has No Historical Precedence

61. I have reviewed the meeting notes from a December 5, 2023, meeting between Holtec and the NRC. The second Holtec PPT slide is incorrect and likely a Materially False Statement. On Slide 2 of the PowerPoint Presentation Slide, Holtec makes an erroneous claim in saying,

> *"Present proposed changes to the Palisades Nuclear Plant (PNP) operating license:*
> *• Renewed Facility Operating License (RFOL)"*

62. Holtec has created a brand-new term called a *renewed facility operating license*. The historical record indicates that there is no precedent for renewal once an operating license has been surrendered. Please note that Entergy closed Palisades and notified the NRC that it had permanently ceased its license to operate. The cessation of its operating license allowed Entergy to close the plant and sell it for decommissioning. Thus, Holtec knows that the *original Operating License for*

Palisades was formally closed. Yet, Holtec obfuscates the truth by claiming restarting the defunct and unlicensed reactor is possible.

63. All nuclear reactors designed to produce electricity in the US have been licensed by the Nuclear Regulatory Commission (NRC) or its predecessor, the Atomic Energy Commission (AEC). Vogtle Units 3 & 4 in Georgia are the only two reactors out of the United States (U.S.) nuclear fleet that are exceptions to the original NRC and AEC Nuclear Licensing Protocols. Georgia Power's Vogtle Units 3 & 4 were a brand-new design licensed under the rules of an abbreviated 10 CFR Part 52 process rather than the more thorough 10 CFR Part 50. In the late 1960s, nearly 250 reactors applied for construction permits (CPs) and operating licenses (OLs). Palisades received its Part 50 License in 1971 to operate until it voluntarily surrendered that Operating License in May of 2022.

64. First, each nuclear power plant must undergo a rigorous two-part license review to be licensed under 10 CFR Part 50.

64.1. The first review is an application to the NRC/AEC for a Construction Permit or CP. The NRC/AEC review and potential approval for the CP typically take at least one year and include Public Hearings where outside experts voice concerns. If/when approved, the construction of structures on site may commence.

64.2. Near the plant's construction's end, a separate licensing process begins called the Operating License (OL) review. This OL process took approximately two years and included docket review and public hearings with outside expert testimony so that any untimely technical issues or construction issues could be resolved.

64.3. Once the Operating License (OL) review and hearing proceedings were completed and finalized, the NRC allowed the power reactor to load nuclear fuel and finally begin its operation.

65. Palisades first applied to the Atomic Energy Commission for a Construction Permit in June 1966 under 10 CFR50 and received its Construction Permit in March 1967.

Five years later, Palisades received a provisional Full Power Operating license in October 1972[9]. Beginning in 1971, the courts ordered the AEC to evaluate the environmental impact of every nuclear power plant's operating license through a thorough review of all ecological effects caused by the power plant. A final Environmental Impact Statement for Palisades was issued in June 1972.

66. Of the 250 atomic reactors that initially applied for AEC/NRC licenses, about 120 never generated any power and voluntarily removed themselves from the NRC license process. These changes came either before the issuance of a CP or during construction, as utility corporations found their costs skyrocketing and construction schedules were significantly delayed. Finally, approximately 120 atomic reactors received an Operating License in the U.S.

66.1. Some of these reactors initially receiving their OLs were unfit to operate. For example, Michigan's Fermi 1 and Pennsylvania's Three Mile Island (TMI) had actual meltdowns, which are the worst nuclear catastrophes that an atomic reactor can have. Other nuclear reactors had equipment failures, such as those at San Onofre 2 & 3 and Crystal River 3. Some had gross management failures like that at Northeast Utilities Millstone Unit 1, and others simply could not produce financially viable electricity for customers and ratepayers.

66.2. Today, fewer than 95 reactors retain their Operating Licenses (OLs). In other words, *only 38% (94/250) of all attempts to license an atomic reactor successfully are still viable*. More disturbingly, the power output from almost all old nukes is subsidized by State and Federal entities, costing taxpayers and ratepayers to pay exorbitant amounts of unanticipated charges.

67. As of today, only one single reactor out of the original 250 proposed reactors voluntarily gave up its Construction Permit and then asked for its license back, which is Bellefonte in Hollywood, Alabama. According to the U.S. nuclear power plant

[9] NUREG 1424, Safety Evaluation Report related to the full-term operating license for Palisades Nuclear Plant https://www.osti.gov/servlets/purl/7793070

historical records, no atomic reactor that renounced its Operating License ever entered the Decommissioning Process and then tried to get the NRC to restart operations under its old Operating License.

68. In June 2022, Entergy Corporation, the Palisades Nuclear Power Plant owner in Michigan, closed Palisades because it was no longer profitable and sold the now-defunct reactor to the Holtec Corporation to be scrapped and dismantled. Entergy terminated the Palisades Operating license. Holtec, a company whose only experience was dismantling nuclear facilities, was responsible for destroying the Palisades reactor facility. The NRC accepted the Palisades reactor in decommissioning mode, as documents in ADAMS substantiate and are referenced here. All nuclear fuel had been removed from the reactor. Then, the NRC accepted the Palisades reactor in decommissioning mode. The historical record for all Part 50 reactors shows that no matter who owns it, the Palisades reactor is no longer authorized to operate[10]:

> "Once Entergy certifies that it has permanently defueled the PNP reactor vessel and placed the fuel in the spent fuel pool (SFP), pursuant to Section 50.82(a)(2) of Title 10 of the Code of Federal Regulations (10 CFR), the PNP renewed facility operating license will no longer authorize operation of the reactor or emplacement or retention of fuel in the reactor vessel".

69. No legal precedent exists for the NRC/AEC to reissue an operating license (OL) after a reactor owner officially terminates its OL. Moreover, the one attempt to reissue a Construction Permit to the former licensee was a complete failure. The Tennessee Valley Authority (TVA) Bellefonte Unit 1 & 2 reactors in Hollywood, Alabama, rescinded its Construction Permit and reapplied for the CP, hoping to have only the first part of the two-part license process restarted. TVA was the original owner, operator, and licensee of the two Bellefonte Units, terminated that permit, and then wanted its construction permit reissued. The CP was reissued, but the process of

[10] ML21195A367 - Exemption-Palisades Nuclear Plant (PNP) Record Retention-L-2021-LLE-0033 (13 page(s), 11/23/2021)

restarting Bellefonte was a complete failure, and it proved that a reissued license is dangerous, futile, and doomed to failure.

70. A brief history of the Tennessee Valley Authority (TVA) Bellefonte reactors' 45-year licensing history is illustrative: According to Commissioner Peter Bradford, who was a commissioner of the Nuclear Regulatory Commission[11] during the Three Mile Island Meltdown:
    - TVA ordered Bellefonte Units 1 & 2 in 1970
    - TVA was issued an AEC Construction Permit in 1974
    - TVA retained its construction permit but ceased construction and mothballed the reactors in 1988. [In engineering terms, mothballing ensures that systems are correctly maintained with complete Quality Assurance (QA) records until work begins anew.]
    - TVA finally terminated its Construction Permit in 2006.
    - Then TVA changed its mind and applied to the NRC to reinstate its Construction Permit, which was granted in 2008.
    - In 2009, TVA terminated its CP for Unit 2 for a second time.
    - In 2015, TVA terminated its Construction Permit for Unit 1 for a second time.

71. The legal and historical record of the Bellefonte Construction Permit Renewal attempts show that the Holtec proposal for the NRC to reinstate the Palisades Operating License is dangerous and will result in a colossal failure for five reasons:

    71.1. Entergy owned Palisades and chose to terminate its operating license entirely well before *Palisades' license was transferred to Holtec for dismantlement* <u>only</u>. In comparison, Bellefonte was always owned by TVA and only applied for reinstatement of its original Construction Permit. As stated above, Bellefonte had not yet applied for an Operating License, which would have created an additional layer of scrutiny to ensure that the modifications were fully engineered and reviewed by citizen experts and the NRC before implementation at

[11] https://thebulletin.org/2016/06/delivering-the-nuclear-promise-tvas-sale-of-the-bellefonte-nuclear-power-plant-site/

Bellefonte. This process would have induced a formal public hearing with independent experts and a new, wholly updated Environmental Report and Permit reflecting physical plant changes and an environmental review of the 45 years of Bellefonte's long construction process.

71.2. Unlike Palisades, which operated for 50-years before closure, Bellefonte's piping and electrical systems were brand new and had never been used. Bellefonte also never had nuclear fuel in the reactor, so the constant exposure to radioactivity did not degrade the metallurgy.

71.3. Tennessee Valley Authority has operated seven nuclear reactors, some for more than four decades. Despite this extensive record of nuclear operations experience, TVA failed miserably at Bellefonte. Furthermore, Entergy owned ten reactors, most of which were at least 40 years old, and it recognized that the hurdles to restarting the Palisades reactor were insurmountable. Holtec has never operated a nuclear reactor, yet attempts to do what Entergy found daunting and TVA was unsuccessful.

71.4. The Bellefonte reactors never received their operating licenses, as they never operated after the construction licenses were rescinded and later reissued, only to be terminated a second time. Since Bellefonte never operated after CP license issuance, there is no way to determine through a public Operating License hearing record if supposedly refurbishing a closed reactor could be completed without endangering public safety.

71.5. Reissuance of the Bellefonte license was hotly contested within the NRC before the Construction Permit was reissued. The Bellefonte Project Manager opposed the reissuance of its license and filed a Differing Professional Opinion. Commissioner Jaczko, the NRC Chair, wrote a scathing rebuke as well. Attached to this expert report as background on the contentious Bellefonte Construction Permit renewal are two reports I previously wrote about the license termination process at Bellefonte.

71.6. Bellefonte was a colossal failure after it regained its CP and was forced to terminate its CP for a second time. The degraded condition of the facility made it impossible to move forward for safety and financial reasons. *The systems were simply too degraded to return to service safely*. Commissioner Jaczko and the DPO of the NRC Bellefonte Project Manager were correct: QA Records, once lost, are impossible to recover. The Bellefonte facility was given a new lease on life and failed miserably to meet even the NRC's and its owner's basic safety expectations.

72. Hence, the historical and legal record of attempting the resurrection of an atomic reactor after it had voluntarily terminated its licenses and after its systems became degraded led to an expensive and complete failure of the entire process at Bellefonte. There is no reason to believe that Holtec's current attempts to obtain a reissuance of Palisades license after dismantlement has begun will have a different outcome than that of the complete failure experienced by Bellefonte.

EXPERT OPINION: Conclusion #7 — Climate Change: The extreme burden is deepening worldwide.

73. The design of the Palisades reactor began sixty years ago, during the mid-1960s. As part of the Palisades design process under its first owner, Consumer Power, the federal government required the utilities to evaluate the historical weather conditions that Palisades might reasonably be expected to experience and design the facility so it could withstand various climate-related events. These climate conditions then become the design basis for the atomic reactor facility. Engineers typically look back in history for 100 years for the worst weather conditions and then design the facility accordingly. Items such as storm intensity, water temperature in Lake Michigan, snow accumulation, maximum rainfall, and maximum wind speed are only a few of the factors that engineers considered during the original design of the Palisades nuclear power plant.

74. Holtec itself has acknowledged that the changing climate is adversely affecting the Palisades reactor's original design and, therefore, requires significant modifications to the nuclear power facility. As just one example in an August 2024 Holtec Press Release entitled "**Palisades Cooling System Upgraded to Counter the Continuing Threat of Global Warming,"**[12] Holtec said,

> "… the temperature of Lake Michigan, which supplies cooling water to Holtec Palisades nuclear plant …has been ticking up like the rest of the world's water reservoirs and is expected to continue rising in the coming decades during its projected service life … To meet the projected rising lake water temperature, the new unit needed to be more than twice as large in heat transfer surface area as the existing unit….
>
> "We are pleased to report this technical achievement to the industry to make other plant developers aware of what is possible to combat the adverse effect of global warming on nuclear and other power plants," said Joy Russell, Holtec's Chief Communications Officer." **[Emphasis Added]**

75. Holtec's new heat condenser replacement, often referred to as a heat exchanger in the energy industry, is a significant engineering and construction project on its own. As previously reviewed, the environmental impact of a change of this magnitude would be addressed during the conversion of the Construction Permit into an Operating License. If the NRC required Holtec to apply for an Operating License permit, as is necessary for the Palisades nuclear facility under a 10 CFR Part 50 License, it would be necessary for Holtec to file an Environmental Impact Statement evaluating the effects of climate change since the 1960s when the engineering design for Palisades was finalized.

76. Yet, Holtec acknowledges that it is a well-established fact that the climate in Michigan is changing and that the Palisades reactor can no longer operate without significant modifications. Unfortunately, although climate-induced events are apparent, the NRC is not following its federal regulations to determine the updated

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[12] Holtec Document: HH #39.14 | August 15, 2024. https://holtecinternational.com/wp-content/uploads/2024/08/39.14-1.pdf

climate change evaluation requirements for this old decommissioned reactor facility. According to an April 2024 Government Accountability Office Report (GAO Report)[13],

> "Climate change is likely to exacerbate natural hazards—such as floods and drought. The risks to nuclear power plants from such hazards include damage to systems and equipment that ensure safe operation.
> The Nuclear Regulatory Commission's oversight process includes addressing safety risks at these plants. However, NRC doesn't fully consider potential increases in risk from climate change. For example, NRC mostly uses historical data to identify and assess safety risks, rather than data from future climate projections.
> We recommended that NRC fully address climate risks to nuclear power plants."

77. According to the Government Accountability Office (GAO), the NRC is responsible for addressing the impacts of worldwide climate change at any federal nuclear power plant license. At Holtec Palisades, these responsibilities include creating new and detailed analyses of any environmental and safety issues that may be caused by climate change. For example, higher lake temperatures and cooling tower blowdown discharges at Holtec Palisades adversely affect the aquatic communities crucial to Lake Michigan.

78. Significant climate-related issues affect the safety systems at Holtec Palisades and must be addressed before the facility receives a new operating license. However, Holtec Palisades Corp continues to ignore them. For example, ultimate heat sink temperatures, wind forces, snow loads, and rain accumulation are some climate-related changes that could adversely affect the safe operation of Holtec Palisades. They have yet to be addressed by either Holtec or the NRC.

79. Holtec Palisades states that its new, state-of-the-art condenser (procured at great expense from its wholly-owned subsidiary) will have twice the heat transfer surface

[13] NUCLEAR POWER PLANTS: NRC Should Take Actions to Fully Consider the Potential Effects of Climate Change: Report to Congressional Requesters, April 2024, GAO-24-10632, United States Government Accountability Office. https://www.gao.gov/assets/gao-24-106326.pdf

as the old condenser [heat exchanger] it is replacing. This new modified condenser seems to be a solution in search of a problem. Let me explain.

80. Beginning three years after its initial construction by Consumers Power, Palisades was cooled by two large banks of mechanical draft cooling towers. Heated water from the condenser is sent to the cooling towers. The cooling towers transfer heat from the heated water to cooler air by evaporating the water into the air, making the air warmer, and reducing the water temperature. Now, at a lower temperature, this water is returned to the plant, where it is heated yet again, and the cycle is repeated throughout plant operation.

81. Climate change is increasing the atmospheric temperature, especially in the summer. As the summer air becomes hotter, cooling tower evaporation is reduced, and the water leaving the cooling tower and returning to the plant is cooled less than when the plant was designed in 1965. As a result, the warmer water returning from the cooling towers is not as cool as needed for optimal plant performance, so back pressure on the turbine increases, and electric power output is reduced.

82. While it is gratifying that Holtec Palisades acknowledges that global climate change is adversely affecting the 60-year-old design of its Palisades reactor, the remainder of their claim is dubious at best.

83. Holtec Palisades states that, because of increasing temperatures of water from Lake Michigan caused by global climate change, the old condenser at Palisades was inadequate for removing heat from the nuclear chain reaction. Based on this assertion of inadequacy, Holtec Palisades replaced the old condenser with an entirely new, unproven product designed and constructed by a Holtec International subsidiary. Holtec Palisades now states that this new condenser will have twice the heat transfer surface to remove excessive heat necessitated by the warming of Lake Michigan.

84. The basis for the claim by Holtec Palisades that a new condenser (provided by a subsidiary of Holtec International) was needed is undoubtedly questionable. Simply put, the water from Lake Michigan does not cool Holtec Palisades; instead, it is

cooled by water circulating through two banks of cooling towers. Water from the cooling towers cools the condenser, NOT water from Lake Michigan. The cooling tower water temperature depends on the wet-bulb evaporative temperature of the atmosphere[14], not on the water temperature in Lake Michigan. The standard solution if heat dissipation is inadequate is to add additional cooling towers, not to replace the condenser.

85. For three years after Palisades originally started, it was cooled by lake water. However, cooling towers replaced direct lake withdrawals because of damage to the lake's aquatic environment. Perhaps Holtec Palisades plans to withdraw and discharge water directly into Lake Michigan at some later date and is using public funds to accommodate that future plan. However, Holtec Palisades' assertion that the increasing lake temperature is the cause for installing a new condenser is false because atmospheric heat transfer from the cooling towers is what cools the condenser.

86. Building a larger condenser without other significant plant improvements fails to address the underlying climate change issue. With the current increases in summer temperatures, the cooling tower performance is simply inadequate on hot summer days. Building more cooling towers and increasing their water flow would be the appropriate climate change solution to improve plant performance during summer.

87. Instead of adding cooling towers and increasing the water flow at Palisades, Holtec's proposal to modify the plant condenser will have minimal effect on plant output without other major costly modifications. However, it will create six new technical

[14] https://www.britannica.com/science/wet-bulb-temperature **Wet-bulb temperature (WBT)** is the lowest temperature to which a person or an object can be cooled solely by the evaporation of water, given a constant barometric pressure. It is so named because its approximate value is obtained from a wet-bulb thermometer. Whereas a normal, dry-bulb thermometer measures the temperature of ambient air, a wet-bulb thermometer measures the temperature of a surface from which water has evaporated into a stream of ambient air. The bulb of a wet-bulb thermometer is covered in cloth, usually muslin, that has been soaked in water at ambient temperature and then subjected to a source of moving air.

and additional ecological and environmental obstacles that must be addressed well before a restart is approved.

87.1. Evaporative losses from Palisades, as evidenced by *more steam and smoke*, will be increased, creating more ground fog for extended periods. How will this impact the surrounding community by creating more extensive fog? Are there highways or traffic patterns that may be affected significantly?

87.2. Increased Drift particles containing biocides and other chemicals will fall into the environment within a few miles of the plant. How will this impact farms and farm products, schools and children attending, and any nearby highways, agriculture, state or county park systems, recreational activities, and tourism, to name a few?

87.3. Increased cooling tower blowdown containing biocides and other chemicals will also be released directly into Lake Michigan. How will that impact the overall aquatic health of the Lake, including and not limited to the Lake's fisheries, marine species, commerce, tourism, recreation, etc.? Four miles north, South Haven draws its drinking supply from Lake Michigan. If so, how must it be treated differently to protect the lake's fragile ecological systems and human consumption?

87.4. With the increased requirements for more cooling water, more water will be drawn from the lake, with the death of accompanying fish larvae and mature fish.

87.5. Most likely, the existing pumps used to withdraw water from the lake to supply water to the cooling towers are inadequate for the additional heavy use of such old equipment. Therefore, the older outdated pumps would require replacement with larger pumps and associated piping well before reactor restart. Such piping expansion and the implementation of new pumps would require significant redesign and implementation of the lake draw-down area and redesign to protect fish and other aquatic species.

87.6. Additionally, circulating water flow through the condenser and to the cooling towers would dramatically increase, requiring even larger pumps.

88. It is incredibly disconcerting that such environmentally consequential and ecologically sensitive areas would be burdened without environmental and ecological studies to minimize harm. Furthermore, it is disturbing that Holtec applauds this solution to the occasional summer reduction in electric output as the solution to a tremendous increase in profit to a wholly owned subsidiary. The State of Michigan, county, and surrounding city areas should have their environment protected rather than burdening the local area to make more corporate profits. With these proposed changes, Holtec will increase the condenser surface area two-fold without modifying the cooling towers or ancillary systems.

EXPERT OPINION: Conclusion #8 — Decommissioning, Layup, and Steam Generator Integrity

89. When a facility is temporarily taken out of operational service with the anticipation that it will restart, the nuclear facility and its components, including the entire piping, electrical, and other systems, are specially maintained to ensure that all equipment will not be damaged or degrade while the reactor is shut down. *This process is called layup*. Without proper layup, rust, and corrosion can accelerate, idled rotating equipment will develop flat spots, rubber gaskets deteriorate, and myriad other types of severe degradation rapidly advance, sometimes making the equipment or entire system unusable.

90. Competent owners of nuclear facilities with Operating Licenses know that when a nuclear plant closes temporarily for repair or refueling, all of its systems need to be placed in a layup to prevent degradation and ensure that every system can safely return to service when the facility reestablishes the conditions outlined in its Operating License. The NRC[15] acknowledges that improper layup can accelerate the

[15] ML20216K115

degradation of a nuclear power plant's safety systems and essential operational equipment.

Effectiveness of Storage Practices in Mitigating Aging Degradation During Reactor Layup

One of the issues identified in the U.S. Nuclear Regulatory Commission's Nuclear Plant Aging Research program plan is the need to understand the state of "mothballed" or other out-of-service equipment to ensure subsequent safe operation. **Programs for proper storage and preservation of materials and components are required by NRC regulations (10 CFR 50, Appendix B). However, materials and components have been seriously degraded due to improper storage, protection, or layup, at facilities under construction as well as those with operating licenses.** Pacific Northwest Laboratory has evaluated management of aging for unstarted or mothballed nuclear power plants. The investigations revealed that no uniform guidance in the industry addresses reactor layup. In each case investigated, **layup was not initiated in a timely manner, primarily because of schedule uncertainty. Hence, it is reasonable to assume that this delay resulted in accelerated aging of some safety-significant structures, systems, and components (SSCs).** The applicable layup process is site-specific. The reactor type, climatic setting, operational status, and materials of construction are factors that strongly dictate the layup method to be used. The adequacy of current layup practices, and hence their impact on safety-significant SSCs, is not fully understood." **[Emphasis Added]**

The NRC further acknowledged[16] the safety dangers of not placing a nuclear plant in a layup, when it wrote:

Licensee event reports, 10 CFR 50.55(e) reports, and NRC inspection reports contain many instances where materials and **components have been seriously degraded due to improper storage, protection, or lay up,** both at facilities under construction and facilities without operating licenses... The cases cited above are a small sample of the wide variety of instances where **improper storage or layup has resulted in significant damage** and extended plant outages. **[Emphasis Added]**

[16] IE INFORMATION NOTICE NO.85-56: INADEQUATE ENVIRONMENT CONTROL FOR COMPONENTS AND SYSTEMS IN EXTENDED STORAGE OR LAYUP

The NRC and the Electric Power Research Institute (EPRI) were concerned about the degradation of components and systems from inadequate layup when a facility with an Operating License temporarily stops operating. According to EPRI[17]:

> Utilities perceive several benefits from implementing layup during plant outages. These benefits include shorter cleanup periods during plant startups, less corrosion product fouling of condensate polishers, reduced frequency of steam generator sludge lancing, and **fewer premature failures of plant components**. **[Emphasis Added]**

91. Placing a nuclear plant with an Operating License into layup is expensive and requires continuous monitoring by a full-time staff. A decommissioned nuclear power plant does not meet NRC or EPRI recommendations for the layup of any components, as the facility is shut down permanently and is never anticipated to reactivate any components or equipment. After fifty years, Palisades ceased operations in 2022 and rescinded its Operating License. When it permanently shut down the atomic power plant, Entergy, Palisades' former owner, took no steps to place its systems in a layup. Rather, Entergy expected Palisades to be dismantled. Thus, Entergy identified all the decommissioning protocols in its PSDAR for Palisades.

92. Furthermore, Entergy prepared a Post Shutdown Decommissioning Activities Report (PSDAR), and Holtec was well aware of Palisades' complete status when it assumed responsibility to dismantle Palisades in 2022. This PSDAR is the planning document for dismantling Palisades as well as the basis for allocating the funds set aside in the Palisades Decommissioning Trust Fund. Nowhere in this Palisades' PSDAR is there any discussion of any layup plans or procedures or any method to provide funds to layup Palisades components and systems for a possible resurrection of one of the oldest reactors in the world.

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[17] Sourcebook for Plant Layup and Equipment Preservation, EPRI NP-5106, Revision 1, Project 2495-15, May 1992

93. Entergy closed Palisades because it was uneconomical to operate with the intention that Palisades would never operate again. The Palisades atomic power plant was outmoded and needed massive funds to bring the aged reactor up to any operating standards. Going into its purchase to allegedly decommission Palisades, Holtec was aware that the Palisades facility was shut down specifically to be decommissioned. Moreover, Holtec filed the necessary papers during its purchase of the site and took charge of the multi-million-dollar decommissioning trust fund when it bought Palisades with the written intention of dismantling the entire Palisades facility.

94. Neither party planned to place systems and components into a wet layup to maintain their operating integrity since these integral procedures were never identified in any portion of the PSDAR protocols. Hence, it is clear that Palisades systems and components were not placed in wet layup after the facility was permanently closed.

95. Now Holtec is claiming it will restart the decrepit Palisades atomic power reactor in 2025, even though there are three primary legal flaws with this premise:

95.1. First, Palisades' safety and reliability have been diminished because systems and components were never placed in a layup. There is no record acknowledging the proper protocols of wet layup to protect the integrity of Palisades' operating and safety equipment and systems. Restarting a reactor after such a lengthy shutdown requires a layup and an updated engineered design for the entire reactor facility to assure its integrity and operational safety.

95.2. Secondly, under IRS regulations, Holtec has no right to the Decommissioning Trust Fund since Decommissioning is no longer occurring. Instead, the decommissioning funds are being used to reactivate a dead reactor.

95.3. If that is even technically feasible, such a resurrection will require massive funding to make the old-fashioned atomic power plant operational again. And at what cost? The cost per KW for Michigan ratepayers will be astronomical. How will they pay for their electricity?

95.4. Most importantly, Decommissioning Trust Funds for every U.S. nuclear power plant are addressed in both the NRC and IRS Regulations. These decommissioning funds were also set aside in a trust fund with specific use restrictions. Therefore, this ratepayer-owned Decommissioning Trust Fund should undergo an IRS forensic audit. Throughout the U.S., decommissioning trust funds were created by and for ratepayers and were set aside in trust only for use in decommissioning reactors. The use of these funds for any other actions is unauthorized.

96. Published reports in the media and by Holtec itself are very confusing. Still, at some point, Holtec changed its mind and decided it had the right to restart the decrepit Palisades Reactor, even though its systems and components were never placed in a layup.

97. Holtec told the Department of Energy that it stopped decommissioning activities at Palisades only five days after acquiring the plant carcass. Likewise, Holtec told the NRC that it spent $44,000,000 on decommissioning Palisades during the last six months of 2022, following its acquisition of the remains of Holtec Palisades.

98. These two statements are mutually exclusive. Therefore, Holtec's statements demand an immediate IRS and Treasury Department investigation.

99. The IRS or Treasury Department should conduct a forensic audit to determine whether or not these funds are applied as delineated in federal statute. Such an investigation should begin when Holtec took control of the Palisades reactor. Auditors should compare Holtec's actual expenditures to those planned in the PSDAR and those delineated as acceptable under the national Decommissioning Trust Fund regulations.

100. The Palisades steam generators are the most critical components that can rapidly degrade when not correctly placed in a wet layup. Although Consumers Energy identified the Palisades' steam generators as degraded in the spring of 2006, nearly two decades ago, Entergy decided not to replace them because the plant was

approaching the end of its useful life. In May 2022, Entergy did not place the failing steam generators into wet layup upon the facility's sale to Holtec since these massive components were scheduled to be destroyed.

101. Now, Holtec is attempting to restart the Palisades facility, knowing since at least its acquisition in 2022 that these critical components are no longer in usable condition and that Entergy did not place them in a wet layup. In August and early September 2024, Holtec claims to have inspected these steam generators and shared the results with the NRC. On October 1, 2024, a new report[18] was issued by the Nuclear Regulatory Commission (NRC) that identifies severe damage in the two massive steam generators at the Michigan Holtec Palisades Nuclear Power Plant. If the plant were allowed to restart, it would put one of the oldest U.S. nukes at risk of a meltdown.

102. Permanently shut down by Entergy Corp in May 2022, the outdated Palisades nuke was sold to Holtec International as scrap to be entirely dismantled. Holtec abruptly decided to attempt its reactivation and, in August 2024, began an inspection of the Palisades steam generators to achieve its restart goal. Federal regulators from the NRC identified four key problem areas. [**NRC quotes in bold**]:

102.1. When Entergy sold Palisades for scrap, it did not place plant systems in *"wet layup"* with appropriate chemicals to prevent corrosion. "***The site [Holtec] placed the SGs in wet layup once it was determined they would be attempting to recommence normal operation,"*** according to the NRC.

102.2. The inspection uncovered ***at least 700 additional tubes that must be plugged*** due to metal corrosion. These were as many tubes as had been plugged during the previous 20 years of operating the aged Palisades reactor designed in 1965.

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

102.3. Even worse, the NRC said, was that Stress Corrosion Cracking (SCC) under Holtec **"far exceeded"** what occurred under Entergy. *Two hundred fifty times* more tubes were found to be damaged. Stress Corrosion Cracks (SCCs) in a nuke are severe and cause significant damage to sensitive vital safety equipment. Because the system was not placed in a proper wet layup, extensive corrosion was discovered on the outside diameter of the steam generator tubes.

102.4. Avoiding Stress Corrosion Cracking is critical to prevent a meltdown at Holtec Palisades. ***The NRC staff notes that stress corrosion crack indications must be appropriately addressed to maintain the generator's pressure boundary.***

103. Holtec Palisades portrays these new flaws identified in the latest steam generator inspections as a mere bump in the road as it pushes to restart the Palisades reactor. According to a Holtec Press Release,[19] issued September 18, 2024:

> "Most recently, we have completed detailed inspections of the plant's steam generators. During these inspections, the need for additional maintenance activities was identified. Thorough and early inspections have allowed us to proactively identify and implement the needed refurbishments before Palisades returns to service. Palisades's owner's engineer, Nuclear Consultants International (NCI, an autonomous Holtec affiliate), is working with experienced on-site and external experts to devise and implement industry-proven solutions.

104. The damage to the Palisades steam generators seems more severe than Holtec will admit. Coincidentally, on September 18, 2024, the same day that Holtec issued the aforementioned rosy assessment, the NRC issued a rarely used but serious Preliminary Notice of Occurrence[20] about Holtec and Palisades, saying that a "large number" of steam generator tubes were significantly damaged.

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[19] https://holtecinternational.com/2024/09/18/hh-39-16/

[20] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML24262A092

> "During Holtec's analysis of the inspection data, preliminary results identified a large number of SG tubes with indications that require further analysis and repair. …NRC is aware of the preliminary findings and will inspect further Holtec activities related to the SGs as they are conducted. The NRC has assembled a team of subject matter experts who are evaluating the data and assessing Holtec's plans to correct the conditions."

105. In a *Reuters News* article published on October 2, 2024, Holtec Palisades admitted that it had previously expected that the Palisades reactor's steam generators would be damaged by improper layup when Entergy permanently closed the facility in May 2022.

> "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."[21]

106. The *Reuters News* article also identified Holtec Palisades Corporation's willingness to ignore the safety implications of stress corrosion cracking and focus instead on unplugging 600 previously damaged old tubes plugged twenty years earlier. Holtec states:

> "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.

107. As I delineated earlier in my Declaration, Holtec Palisades informed the Department of Energy that the Holtec Palisades Steam Generators were degraded and

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[21] **"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/

must be replaced in 2022. Instead of addressing the underlying damage from decades of operation under previous owners and new stress corrosion cracking in the steam generators caused by an improper wet layup, Holtec Palisades said it would unplug the 600 tubes plugged about thirty years ago. Now, the firm claims the aged and rundown steam generators will last for 30 more years. During my 53 years of professional experience, I am unaware of any steam generator, with so many previously known and newly identified flaws, that has not been replaced.

108. Robust steam generators are vital to the safe operation of a nuclear power plant. Yet, the NRC and Holtec Palisades completely ignore the root cause of these highly degraded components at the Palisades reactor. The Holtec Palisades steam generators are now severely degraded due to the lack of wet layup of their steam generators, which Entergy should have performed before Holtec considered any planned restart. Due to the recently identified stress corrosion cracking (SCC), complete steam generator replacement will be required, an obvious need that Holtec foresaw fully two years ago in its 2022 filing requesting financial assistance from the Department of Energy to purchase such expensive and safety-related equipment.

109. The six worst steam generators in the U.S. are part of three different Combustion Engineering reactors. These include the San Onofre 2 and 3 reactors, which are already closed due to steam generator failures, and St. Lucie 2, which must repair their steam generators yearly with new plugs in additional tubes. All six SGs have failures due to high vibrations in the center region of each steam generator. Consumer Power Palisades anticipated damage from high vibration in the center of its two Combustion Engineering-supplied steam generators. Therefore, in 1992, Consumers Energy [aka Consumers Power] preemptively plugged more than six hundred tubes at the center of the two Palisades steam generators.

> "STEAM GENERATOR INSPECTION SCOPE FOR 2004 REFUELING OUTAGE"[22]:
> "Prior to the installation of these steam generators CE advised

[22] ML050560010, *STEAM GENERATOR INSPECTION SCOPE FOR 2004 REFUELING OUTAGE*

> Consumers Energy [aka Consumers Power] that the area around the center stay cylinder region was potentially susceptible to fretting wear at the bat wing locations. This region was preventatively plugged. A total of 308 tubes were preventatively plugged in Steam Generator A and 309 tubes were preventatively plugged in Steam Generator B." [Emphasis Added]

110. Now, Holtec Palisades has decided it would be appropriate to unplug the tubes that Consumers Power preemptively plugged two decades ago. Yet six other Combustion Engineering steam generators have already experienced the internal vibration problems that the plugged tubes were intended to prevent. Since the Holtec Palisades tubes are also experiencing stress corrosion cracking, unplugging additional tubes will create more unforeseen problems.

111. Given that the Holtec Palisades Nuclear Power Plant was not initially placed in a layup or wet layup as necessary for such essential equipment and as required technically for any type of restart, *using the Palisades Trust Fund and Department of Energy (DOE) funding for this scheme is an unauthorized use of the Decommissioning Trust Fund*.

112. Ironically, the Holtec Palisades press release identifying the steam generator tube damage is entitled "***Palisades Restart Program – Now in the Inspections and Maintenance Phase – Remains on Schedule for Repowering*.**" Instead, the overall management philosophy to restart Holtec Palisades mirrors the words of Union Admiral David Farragut as he commanded his fleet to enter Mobile Bay. "*Damn the torpedoes. Full speed ahead*."

EXPERT OPINION: Conclusion #9 — QA (Quality Assurance) Records

113. Each nuclear power plant and atomic reactor is more than a combination of pipes, pumps, wires, and concrete. Equally crucial to the safe operation of these nuclear reactors are the design calculations, purchasing records, radiographs, equipment maintenance, replacement data and dates, owner manuals, and numerous other

documents that support the ongoing operation of an atomic facility generating electricity. Retention of these Quality Assurance (QA) records is not a static requirement. It is dynamic and critically important to understand each nuclear plant's design basis adequately, as each plant is modified during its lifetime. Retention of these QA Records is mandatory under 10 CFR 50 Appendix B as they comprise a critical part of every nuclear plant's Quality Assurance (QA) Program.

114. With the understanding that Palisades would be decommissioned and dismantled after Entergy closed the reactor in 2022, Entergy formally requested permission to destroy these indispensable records in this document registered with and accepted by the NRC[23] according to the NRC ADAMS Database.

> By letter dated June 15, 2021 (ADAMS Accession No. ML21167A108), Entergy submitted a partial exemption request for NRC approval from the record retention requirements of: (1) 10 CFR Part 50, Appendix B, Criterion XVII, "Quality Assurance Records,"… The licensee requested the partial exemptions because it wants to eliminate: (1) records equipment abandonment will obviate the regulatory and business needs for maintenance of most records. As the SSCs are removed from the licensing basis, Entergy asserts that the need for their records is, on a practical basis, eliminated associated with structures, systems, and components (SSCs) and activities that were applicable to the nuclear unit, which are no longer required by the 10 CFR Part 50 licensing basis because the SSCs and activities have been removed from the Updated Final Safety Analysis Report (UFSAR) or TSs by appropriate change mechanism… In its June 15, 2021, partial exemption request, the licensee stated that the basis for eliminating records associated with reactor facility SSCs and activities is that these SSCs have been or will be removed from service per regulatory change processes, dismantled or demolished, and **released from any function regulated by the NRC**… Because these records contain information about SSCs associated with reactor operation and contain no information needed to maintain the facility in a safe condition when the facility is permanently defueled and the SSCs are dismantled, the elimination of these

[23] ML21195A367 - Exemption-Palisades Nuclear Plant (PNP) Record Retention-L-2021-LLE-0033 (13 page(s), 11/23/2021)

> records on an advanced timetable will have no reasonable possibility of presenting any undue risk to public health and safety.
>
> The records identified for removal in this partial exemption request are associated with SSCs that had been important to safety during power operation or operation of the SFP, but are no longer capable of causing an event, incident, or condition that would adversely impact public health and safety, as evidenced by their appropriate removal from the licensing basis documents. Therefore, because the SSCs no longer have the potential to cause an event, incident, or condition that would adversely impact public health and safety, the records associated with these SSCs would not reasonably be necessary to assist the NRC in determining compliance and noncompliance, taking action on possible noncompliance, and examining facts following an incident. Therefore, their retention would not serve the underlying purpose of the rule. In addition, **once removed from the licensing basis documents (e.g., UFSAR or TS), SSCs are no longer governed by the NRC's regulations, and therefore, are not subject to compliance with the safety and health requirements that apply to the nuclear environment [Emphasis Added].**

115. The NRC's analysis of Entergy's proposed destruction of Palisades' QA (Quality Assurance) records for its 2022 closure of the Palisades reactor made its continued operation utterly impossible. Indeed, the NRC and Entergy agreed that once the Palisades Operating License was terminated with the NRC, the Nuclear Regulatory Commission no longer had any regulatory control over safety systems. [24]

> "…the licensee stated that the basis for eliminating records associated with reactor facility SSCs and activities is that these SSCs have been or will be removed from service per regulatory change processes, dismantled or demolished, and **released from any function regulated by the NRC" [Emphasis Added]**

[24] Ibid

EXPERT OPINION: Conclusion #10 — Alan Blind, former Palisades Senior Manager, technical submittal to the NRC

116. During my research and review of the current Palisades files in ADAMS, I became aware that Alan Blind, former Palisades manager, sent detailed documents[25] to the NRC transmitting his specific professional concerns regarding the proposed restart of the Palisades Atomic Power Reactor under the ownership of Holtec.

117. Following my review of Mr. Blind's documents, I concur that some of his analysis pertains to these proceedings and, therefore, incorporate those portions of his concerns by referencing those aspects of his analysis in this Declaration.

118. Quality Assurance: I identify records critical to the Palisades Quality Assurance Program under Entergy in this Declaration. Those records appear to have been wholly destroyed when Palisades was permanently shut down.

119. On top of that, the NRC was the first entity in the U.S. informed by Entergy that Entergy-Palisades would be destroying those records entirely, so the defunct and troubled reactor would be decommissioned and dismantled. Holtec International was fully aware of this fact when it purchased the defunct Palisades facility to decommission and entirely demolish it. Furthermore, when the NRC accepted Entergy's decision to formally give up its Palisades operating license, Holtec and the NRC both understood that legally, Palisades no longer had its operating permit and could never again be considered an operating nuclear power plant after the destruction of its essential QA records. More than that, I identified that Holtec was aware of this lack of Palisades QA Program. No methodology exists to resurrect the destroyed QA Program.

[25] Letter from Mr. Blind to NRC, September 9, 2024, Docket No. 50-255; NRC-2024-0130, Pages 55-65, Quality Assurance

120. In his letter to the NRC[26], Mr. Blind identifies similar QA concerns, and I support his analysis. In part, Mr. Blind said,

> "Basis: Entergy submitted 10 CFR 50.82(a)(1) certifications of the permanent cessation of power operations, and therefore, the Entergy operating QAPD no longer exists. Holtec assumed ownership of a plant in decommissioning status and a PDTS, pertaining only to decommissioning activities.
>
> On June 13, 2022, Entergy submitted to the NRC the 10 CFR 50.82(a)(1) certifications of the permanent cessation of power operations at PNP and the permanent removal of fuel from the PNP reactor vessel. On this same date, the NRC informed Entergy that the reactor oversight process at PNP had been terminated and that the NRC decommissioning inspection program was now applicable to PNP (Reference 9). This is the date when PNP transitioned from a power operations plant to a facility in decommissioning.
>
> On June 15, 2022, Entergy implemented the PDTS and supporting RFOL amendments and exemptions that modified the regulatory requirements to reflect a facility in decommissioning.
>
> On June 28, 2022, Holtec acquired PNP from Entergy, and the NRC issued PNP RFOL amendments to reflect this change in ownership and name change, and the transfer of Entergy Nuclear Operations, Inc. operating September 9, 2024 Docket No. 50-255; NRC-2024-0130 of 57 85 authority to Holtec Decommissioning International, LLC (Reference 10).
>
> Note, at the time of license transfer, PNP was a facility in decommissioning, and HDI was given operating authority by the NRC for the purpose of decommissioning the PNP site.
>
> Basis: Holtec still does not have an NRC-approved "Operations" or period of system restoration QAPD, despite its belief that it can simply "update the HDI decommissioning QAPD currently in effect, with the appropriate quality assurance controls to cover the activities being performed at the plant during the restoration period." The NRC has not publicly stated whether it approves of this Holtec proposal. Nonetheless, Holtec is proceeding based on the assumption that the NRC's lack of response constitutes implicit approval, a rationale it has relied on in several of its submittals regarding its proposed regulatory path for returning to service.

[26] IBID

Petitioners challenge the use of "implicit approval" as a regulatory basis."

121. Mr. Blind's concerns regarding QA at Palisades agree with my findings and analysis. Palisades does not have the Quality Assurance Infrastructure to be considered for operation.

EXPERT OPINION: Conclusion #11 – Holtec Palisades Violates 10 CFR 50.59

122. Resurrecting Holtec's Palisades reactor as presently envisioned and implemented by the NRC and Holtec is a blatant violation of 10 CFR 50.59, which is entitled "*Changes, tests and experiments*". The Code of Federal Regulations 10 CFR 50.59 requires that Holtec petition the NRC before significant actions are taken at an NRC-licensed reactor. What exactly is the definition of a *change or experiment* defined by the NRC? The NRC defines changes and experiments[27] for 10 CFR 50.59 as:

> " ***Definition - Test or Experiments***
>
> • Tests or experiments not described in the final safety analysis report (as updated) means any activity where any structure, system, or component is utilized or controlled in a manner which is either:
>
> – (i) Outside the reference bounds of the design bases as described in the final safety analysis report (as updated) or
>
> – (ii) Inconsistent with the analyses or descriptions in the final safety analysis report (as updated).
>
> • As stated in NEI 96-07: 10 CFR 50.59 is applied to tests or experiments not described in the UFSAR.

123. Of particular interest to Holtec Palisades in this definition is the NRC statement:

> **"The intent of the definition is to ensure that tests or experiments that put the facility in a situation that has not previously been evaluated…or that could affect the capability of SSCs [Systems, Structures, and Components] to perform their intended design**

[27] https://www.trtr.org/wp-content/uploads/2022/09/006-Eads_50_59_Overview.pdf

> **functions … are evaluated before they are conducted to determine if prior NRC approval is required." [Emphasis Added]**

124. Holtec Palisades' attempt to resurrect the wrecked and obsolete Palisades reactor *has not been previously evaluated*. The Director of the Division of Operating Reactor Safety for the NRC's Midwest Region and co-chairman of the Palisades Nuclear Plant Restart Panel, Jason W. Kozal, was quoted as in acknowledging the uniqueness of the attempted resurrection of Holtec Palisades in the *Toledo Blade*[28] when he said:

> "Here's what is taking the world into uncharted territory: No plant has gone back into service after entering its decommissioning phase. That's certainly true across the United States and believed to be true globally, according to Jason W. Kozal, director of the Division of Operating Reactor Safety for the NRC's Midwest region in Lisle, Ill., which is in charge of plant oversight. Mr. Kozal also is co-chairman of the Palisades Nuclear Plant Restart Panel. **"This is a precedent-setting activity. As far as we know, no plant worldwide that has gone into decommissioning has requested to go back online," Mr. Kozal said. "It's the first time in America, and we're pretty sure it's the first time in the world."**

125. When Jason Kozal told the *Toledo Blade*, that what Holtec Decommissioning International is attempting at Holtec Palisades is "**a precedent-setting activity… we're pretty sure it's the first time in the world",** he acknowledges that Holtec's proposed rebirth of Holtec Palisades will "**put the facility in a situation that has not previously been evaluated**". **[Emphasis Added]**

126. As the NRC said in its section: **10 CFR 50.59 that is entitled "*Changes, tests and experiments*,"**

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[28] **Palisades restart could be a first in history | The Blade**
Palisades restart could be a first in history | The Bladehttps://www.toledoblade.com/business/energy/2024/06/09/palisades-restart-could-be-a-first-in-history/stories/20240601001

• Tests or experiments not described in the final safety analysis report (as updated) means any activity where any structure, system, or component is utilized or controlled in a manner which is either:

– (i) Outside the reference bounds of the design bases as described in the final safety analysis report (as updated) or

– (ii) Inconsistent with the analyses or descriptions in the final safety analysis report (as updated).

127. Based solely on the NRC experiment definition, Holtec Palisades violates 10 CFR 50.59. As I highlighted earlier in this Declaration, more pointedly, 10 CFR 50.59 identifies eight unique situations when Systems, Structures, and Components (SSCs) were no longer within the parameters of the original 1971 startup NRC Palisades License. Therefore, Holtec Palisades must seek to formally amend its license before it can implement any resurrection attempt at the Palisades reactor. For that matter, it is explicitly stated in 10 CFR 50.59[29]:

"(2) A licensee shall obtain a license amendment pursuant to Sec. 50.90 prior to implementing a proposed change, test, or experiment if the change, test, or experiment would:

(i) Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the final safety analysis report (as updated);

(ii) Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the final safety analysis report (as updated);

(iii) Result in more than a minimal increase in the consequences of an accident previously evaluated in the final safety analysis report (as updated);

(iv) Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the final safety analysis report (as updated);

(v) Create a possibility for an accident of a different type than any previously evaluated in the final safety analysis report (as updated);

[29] https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0059.html

> (vi) Create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the final safety analysis report (as updated);
>
> (vii) Result in a design basis limit for a fission product barrier as described in the FSAR (as updated) being exceeded or altered; or
>
> (viii) Result in a departure from a method of evaluation described in the FSAR (as updated) used in establishing the design bases or in the safety analyses."

128. Earlier in this Declaration, I identified an extensive list of safety, reliability, and environmental hurdles that Holtec (HDI and Holtec Palisades) must overcome to reinvent Holtec Palisades. Fortunately, this process alerts the public and the NRC to Holtec Palisades' bungled attempts that have already created at least four specific violations of 10 CFR 50.59.

129. **Layup at Holtec Palisades**

129.1. Entergy removed the fuel from the Palisades core for the last time and transferred it to the storage pool on June 10, 2022. This fuel transfer occurred after the permanent shutdown of the reactor on May 20, 2022, 11 days earlier than planned, due to repeatedly recurring leaks in the Control Rod Drive Module seal. Entergy then certified the permanent cessation of reactor operations and permanent fuel removal from the core on June 13, 2022.

129.2. Holtec did not take over ownership of the Palisades facility until June 28, 2022. Holtec Palisades inherited a terminated operating license—that is, its license is for decommissioning and spent nuclear fuel management purposes only. When it bought the Palisades facility, Holtec [HDI and Holtec-Palisades] knew Entergy had sold it as scrap and that none of the systems were placed in a layup, so the facility is utterly unfit for any restart of its operating capabilities.

129.3. In September 2024, Holtec Palisades identified *stress corrosion cracking (SCC)* on the outside diameter of the steam generator tubes. Holtec Palisades

would have anticipated this *SCC* as the facility was purchased from Entergy as scrap metal and other radioactive junk to be disposed of. It was obvious to the atomic industry and federal regulators that this former operating reactor was not an adequate power plant for a safe restart. For that matter, the steam generator, which is also seriously degraded, was already identified to be in terrible condition two years earlier in 2022 in a filing Holtec Palisades made to the Department of Energy. The extent of stress corrosion cracking that Holtec recently identified to the NRC is 250 times greater than previously encountered by Entergy. It puts Holtec Palisades at significant risk of a breach of the reactor pressure boundary that would lead to a meltdown.

129.4. The present degraded condition of the steam generators was entirely foreseeable in its purchase of Palisades and indeed foreseen by Holtec in 2022. Yet Holtec proceeded without informing the NRC for two years that it had anticipated steam generator damage beyond that deemed acceptable in the original Palisades license. This degraded condition is a violation of every 10 CFR 50.59 criteria, more specifically subsections (2)(i), (2)(ii), (2)(iii), (2)(iv), (2)(v), (2)(vi), (2)(vii), and (2)(viii), as listed above.

130. **Steam Generator Tubes**

130.1. To recover from the extensive steam generator tube damage that Holtec Palisades discovered in its September 2024 steam generator inspection, Holtec said it plans to extract plugs from about 300 previously plugged tubes in each of the two steam generators at Palisades.

130.2. The current Combustion Engineering (CE) steam generators were installed in 1992, replacing the original CE steam generators that became operational more than 20 years earlier. The 600 plugs Holtec proposes to eliminate were installed prophylactically in 1992 due to vibration issues in the CE-designed and manufactured steam generators. CE identified that if those 600 tubes remained

unplugged, they presented a high likelihood of failure from vibration damage to the "batwing" structure within the steam generator itself.

130.3. During Palisades, original 40-year operating license, Consumers Power placed public safety before additional heat removal capacity from the steam generators by prophylactically plugging those 600 tubes back in 1992 when it replaced its original steam generators with the new ones. In 2011, when the NRC approved Palisades license extension, those 600 plugged tubes were known to the NRC to have been installed to protect public safety. Now, Holtec Palisades wants to remove those 600 plugs to remove more heat, thereby creating more steam power from the reactor. Such an action would simultaneously create a substantial public safety risk. As the NRC knows, installing those 600 plugs was identified as improving public safety. The logical extension to calculations is that Holtec's plan to unplug/uncork/deactivate the plugs will dramatically decrease public safety as it increases radiation risks to the nearby communities and the surrounding region. Considering the effect of the removal of 600 plugs shows a blatant violation of 10 CFR 50.59. Deactivating the Combustion Engineering vendor-advised plugs from 600 tubes is a violation of subsections (2)(i), (2)(ii), (2)(iii), (2)(iv), (2)(v), (2)(vi), (2)(vii), and (2)(viii) of 10 CFR 50.59.

131. **Climate Change**

131.1. It is important to note that when the Palisades atomic reactor was designed almost 60 years ago, global climate conditions were entirely different from today's conditions. In prior correspondence, Holtec Palisades has acknowledged in writing the adverse impact of global climate change upon the original climate parameters the plant was designed to withstand. Holtec is already changing the plant design to accommodate just one of those impacts: the increasing water temperature in Lake Michigan.

131.2. However, global climate change has many other ramifications for the design of the Holtec Palisades reactor. The ***design basis*** of the Palisades facility is dramatically different in 2024 than in the mid-1960s. These climate change impacts on the Palisades licensing basis include and are not limited to lake temperature, air temperature, wet bulb temperature, rainfall/flooding, wind velocity, frequency and intensity of storms, snow loads, ultimate heat sink parameters, and many others.

131.3. Definition of design basis[30]: "The regulatory body establishes the nuclear safety principles and issues regulations on design; it needs [to be able] **to evaluate the safety of the proposed design by reviewing and assessing the safety documentation (e.g., design basis, the safety analysis reports) and verifying the compliance of the design with regulatory requirements**. The design basis is the range of conditions and events explicitly taken into account [considered] in the design of the nuclear installation, according **to established criteria, such that the nuclear installation, through the planned operation of safety systems, can operate under these conditions and events without exceeding authorized limits. [Emphasis Added]**"

131.4. *Without reviewing any design basis or calculational evaluations made for Palisades*, Holtec Palisades has already arbitrarily chosen to uniquely modify only one aspect of the facility's design to accommodate Lake Michigan's considerably changing climate in 2024. Therefore, according to 10 CFR 50.59 and with regulatory and public oversight, Holtec must be compelled to revisit all of the design basis assumptions relied upon during the mid-1960s. Holtec Palisades then must determine if any other climate-related factors can also reasonably be expected to have adversely affected the safety of Palisades in the future.

131.4.1. While the condenser heat exchanger is not a safety-related system or component, Holtec's admission of climate-induced changes, including and not limited to increased water temperature of the water drawn from Lake

[30] https://www.sciencedirect.com/topics/engineering/design-basis-accident Definition of Design Basis

Michigan, has significance for compiling the Holtec Palisades Safety Analysis Report (SAR) assessments, procedures, and calculations.

131.4.2. Climate change assumptions impact dozens of safety-related systems, structures, and components. For instance, building wind loads, building snow loads, ultimate heat sink temperature and atmospheric dew point, peak rainfall, and flooding need new consideration for emergency cooling systems and the safety-related structures and components associated with them.

131.4.3. All these assumptions about climate impacts trickle into dozens of systems and thousands of calculations, which Holtec must revisit. As one recent example of the effect of climate change, the Duane Arnold reactor recently experienced a climate change-induced derecho wind.[31] The derecho wind was so severe that it exceeded the facility's design basis, causing Duane Arnold to retire early. The derecho winds caused the secondary containment to fail, clogged the ultimate heat sink intake, and damaged a safety-related building where emergency response equipment was stored. At Palisades, Holtec will need to consider hundreds of similar scenarios.

131.5. After a thorough evaluation, Holtec Palisades will likely find that Global Climate Change creates unanticipated scenarios outside the reference bounds of the design basis, increases the frequency of occurrence, and increases the likelihood of occurrence. For those reasons, Holtec Palisades violates subsections (2)(i), (2)(ii), (2)(iii), (2)(iv), (2)(v), (2)(vi), (2)(vii), and (2)(viii) of 10 CFR 50.59

[31] https://www.powermag.com/derecho-damage-results-in-early-retirement-of-duane-arnold-nuclear-power-plant/

132. **Quality Assurance**

132.1. Entergy received approval from the Nuclear Regulatory Commission to destroy Quality Assurance Records when it terminated its operating license in May of 2022. According to 10 CFR 50.59. 6.d.3:

> "The records of changes in the facility must be maintained until the termination of an operating license issued under this part…"

132.2. Holtec Palisades is attempting to resurrect the facility without these legal guidelines, which violates the law.

133. **Conclusion to the Section on 10 CFR (Code of Federal) 50.59**

134. The reincarnation of the Palisades atomic power plant by Holtec Decommissioning International as Holtec Palisades violates 10 CFR 50.59. This is not an issue for legal scholars or the NRC (Nuclear Regulatory Commission) but is part of the problem in the NRC's overwhelming desire to operate nuclear plants no matter what the safety and financial costs are to the people of the United States (U.S.). In particular, it is essential to understand that NRC Commissioner Crowell has recognized that Entergy terminated the old Palisades operating license and that the permit cannot be reissued to Holtec without Palisades meeting the new, more stringent safety criteria of the 21st Century. He said, that Holtec Palisades needs to "*start from scratch*".

134.1. Furthermore, NRC Commissioner Crowell added,

> "*Certainly, the entire operation of the plant needs to be reassessed," Crowell said. "It's not the same as a refueling outage, and it's not the same as a license renewal… "I feel like it's difficult to get our ducks in a row for that because it changes almost on a monthly basis… "I understand they [Holtec] are in a posture of wanting to find a buyer to do it… but I think at this stage of the game, you're gonna have to start from scratch.*"[32]

[32] February 07, 2023, Exchange Monitor **To restart shuttered Palisades plant, Holtec would need to start 'from scratch,' NRC commissioner Crowell says**

FINAL SUMMARY

1. Entergy, Palisades' prior owner, gave up the nuclear power plant's operating license because using the dilapidated and ramshackle reactor was unprofitable. Entergy knew the reactor was unprofitable for at least half a decade before plant closure, so the corporation neglected critical repairs and long-term maintenance investments, anticipating closure in 2022.

2. Instead of safeguarding Palisades' valuable components as the facility neared its 2022 closure date, Entergy allowed the plant to deteriorate further. It sold Palisades to Holtec as scrap with useless components meant to be dismantled and destroyed.

3. Holtec Decommissioning International (HDI) is an industrial demolition contractor with no nuclear power plant design, engineering, construction, or operations experience.

4. Holtec Palisades acknowledges that Palisades' reactor's physical condition is severely degraded.

5. Using billions of dollars in Federal and State subsidies and none of its own cash assets, Holtec is attempting to grab funding to resurrect the 53-year-old derelict Palisades atomic reactor.

6. A resurrection like the one planned for the Holtec Palisades facility is a preeminent construction project and a feat that has never been attempted anywhere else.

7. The Holtec Palisades site, reactor, and crucial electric generating components are unsafe and incapable of reuse due to their poor condition and permanent flaws. More importantly, most experienced staff left when the plant closed, and the entire Quality Assurance (QA) program was destroyed, meaning that every component, wire, electric bulb, etc., must be reevaluated and tested. Holtec Palisades claims it will replace all Palisades' staff and operate the defective and decimated reactor facility for 25 years.

8. Furthermore, the degraded condition of every aspect of this nuclear power plant, the lack of a long-term experienced, skilled staff, and the non-existent QA and management oversight programs that should be hallmarks of our country's nuclear safety and licensing process and programs are sadly lacking at Holtec Palisades.

9. Additionally, should this decrepit and defective scrapped reactor somehow achieve licensure, its electricity will be too expensive to compete against renewable power sources. Thus, Holtec will demand additional subsidies from additional federal agencies and the State of Michigan to keep its aged and scrapped Palisades operating unsafely again.

10. Holtec and the NRC's licensing approach violates 10 CFR 50.59. Palisades should not be allowed to restart unless it complies with all the regulations of 10 CFR 50.59, has completed all costly plant modifications, and meets all 21st-century licensing criteria.

~ End ~

Declaration of Arnold Gundersen

I am the Chief Engineer for Fairewinds Associates, Inc, a paralegal services and expert witness firm. My Curriculum Vitae is attached.

I 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),

(Electronically signed)

/S/

Arnold Gundersen, MENE, RO
Fairewinds Associates, Inc
Charleston, SC, and Burlington, VT
Telephone: 802-865-9955
Email: fairewinds@mac.com

Dated: Monday, October 7, 2024

Exhibits and Research
Curriculum Vitae, Arnold Gundersen

Arnold Gundersen, Curriculum Vitae
Chief Engineer, Fairewinds Associates, Inc
October 2024

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: Co-author 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 under-predicting 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 August 11, 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 Fairewinds Associates, 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 Video prepared 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-flaw-addressed-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 high-level 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

End