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Backgrounder – January 7, 2025

The History of Steam Generator Damage at the Holtec Palisades Nuclear Reactor

Introduction

The integrity of Steam Generators (SG) in Pressurized Water Nuclear Reactors (PWR), like the Palisades reactor, and the subsequent uncontrolled release of radioactivity from Steam Generator failures have always been the Achilles Heel of the PWR design. Indeed, the initial SGs at Palisades lasted only 19 years before being replaced in 1990. The two previous owners of Palisades (Consumers Energy and Entergy) recognized that the 1990 Replacement Steam Generators (RSGs) would fail unless Palisades inspected them frequently and always maintained the water chemistry in the RSGs with ultra-pure water to reduce corrosion.

However, when Holtec International[1] bought and assumed responsibility for the Palisades Reactor in late June of 2022, it ignored the significant safety precautions required to prolong the life of its RSGs. Expressly, in May 2023, Holtec renounced Entergy's previously endorsed license requirements designed initially to prolong the useful life of the Palisades RSGs in its proposed license change to the Nuclear Regulatory Commission (NRC) for Palisades. Based on this May 20, 2023, submittal to the NRC, Holtec had no reason to maintain the RSGs with proper chemical controls against corrosion.

When Holtec acquired Palisades on June 22, 2022, it never stated its intention to restart the shuddered reactor. However, Governor Whitmer first floated the trial balloon to continue to operate Palisades instead of shutting it down for good on April 20, 2022. Even after Entergy closed the Palisades reactor on May 20, 2022, and Holtec took over on June 28, 2023, the

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

possibility of restarting Palisades lingered. On September 9, 2022, Governor Witmer and Holtec went public, and it became clear that Holtec, albeit completely inexperienced, would attempt to resurrect the derelict Palisades Nuclear Power Plant. By March 2023, Holtec had already met with the NRC to urge it to approve the restart scheme. The NRC held the first public regulatory pathway to restart meeting between the NRC and Holtec on March 20, 2023.

Even though it had acquired Palisades and was aware of the possibility of restarting it, Holtec made no effort to protect its vital systems from attack by corrosive chemicals in 2022 and into 2023. Now, in early 2025, Holtec comes before the NRC seeking approval and forgiveness for the damage its safety lapses have inflicted on the Palisades Steam Generators. Make no mistake: these safety flaws, and many others in additional equipment, were caused by Holtec's gaffs and management blunders in 2022 and 2023.

The public and the NRC must reflect upon, scrutinize, and analyze the extent of damage caused to the Steam Generators (SGs). If Holtec were experienced in engineering and operating nuclear power plants, as it should be, it would have had the knowledge to put critical operating components in a unique layup condition mandatory to protect Palisades' major steel and other essential equipment placed in hiatus for an extended period. Now, after Holtec allowed the damage and deterioration to crucial operating systems, Holtec belatedly identified it in 2024 and desires permission from the NRC to make flawed repairs in 2025.

The extensive SG tube failures identified by Holtec in September 2024 were foreseeable and foreseen[2] and entirely of Holtec's making. Yet Holtec seeks permission from the Nuclear Regulatory Commission (NRC) to move forward unequivocally without replacing the severely damaged Palisades SGs. Due to its lack of nuclear operating experience, Holtec damaged the Steam Generators (SGs) and bungled the Palisades' restart.

No nuclear power plant operator has proposed the magnitude of repairs proposed by Holtec to its deteriorated SGs as it identified in September 2024. Moreover, no U.S. nuclear power plant has

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

implemented the sheer number of repairs Holtec proposes to alleviate the extensive new damage. Therefore, the NRC should reject Holtec's repair requests and require the installation of new steam generators at Palisades. The enormous increase in the number of damaged tubes uncovered in 2024 implies Palisades' unsafe and unreliable operation under any circumstances. Regulations created by the NRC elucidate that it should never allow Holtec Palisades and Holtec International to implement its poorly proposed Band-Aid fix.

Fairewinds notes that Holtec has never operated a nuclear power plant. Consequently, the lax conditions that Holtec created have damaged the Palisades Steam Generators (SGs). Holtec's lack of nuclear or atomic operating experience created damage that could be considered a rookie error. Disastrously, any rookie errors at a nuclear power plant could have serious public health consequences, including a nuclear *meltdown*.

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

Nuclear Steam Generators[3] are massive steel tanks designed to keep the hot radioactive water produced inside the nuclear core separate from the non-radioactive steam that spins the turbine, generating electricity. Radioactive water flows through the inside of thousands of U-shaped tubes within the steam generators. This radioactive water within the tubes heats non-radioactive water on the outside of the tubes. If the Steam Generator tubes develop cracks, radioactive water can leak into non-radioactive steam, which will be released into the environment. If cracking is severe, a nuclear meltdown can ensue. A typical steam generator schematic drawing (not Palisades) is immediately below.

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

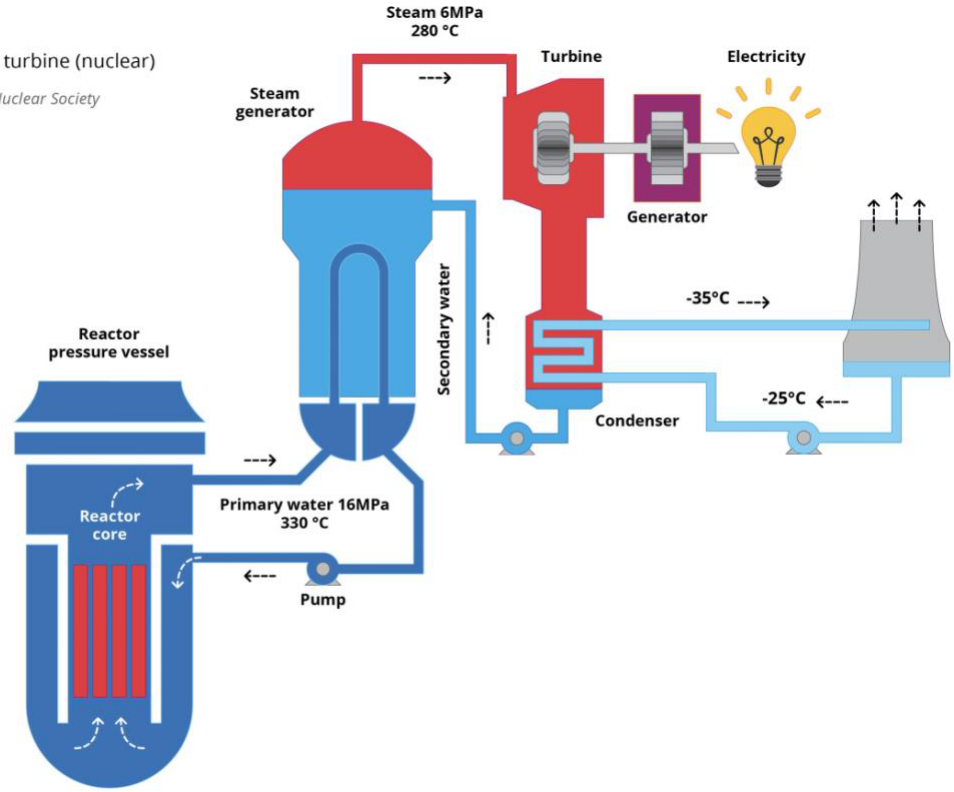

Figure 3. Steam turbine (nuclear)

Source: European Nuclear Society

Palisades Steam Generators Before Holtec Acquisition

Consumers Energy and Entergy, the two previous owners of Palisades and experienced nuclear power plant operators, submitted and were bound by the conditions of Palisades' license extension to operate from 2011 until 2031 *Summary Report of License Renewal Review Questions for: AMP* Audit*[4]. (*Note – The AMP (Aging Management Plan) is necessary for all older nuclear power plants as equipment, pipes, rubber, and many other items age and simply rust or wear out.)

As such, Palisades' former owners recognized that

> "…good chemistry control and 100% tube inspections are some of the ways that the existing steam generators are managed to maximize their life."

The owners were also aware that the 2011 license extension acknowledged that the SGs contained the following:

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

> "308 tubes in steam generator "A" and 309 tubes in steam generator "B" were plugged as a preventative measure".

Therefore, the renewed 2011 Palisades license required *that more than 600 tubes be prophylactically plugged as a safety measure to prevent tube wear and failure,* which could release radioactivity into the environment.

As indicated in 2005 correspondence with the NRC (cited and extracted below), Consumers Energy and later Entergy acknowledged that the Palisades Steam Generators would remain safe if good water chemistry and extensive inspections were consistently implemented. As detailed later in this Backgrounder, Holtec violated the 2005 license conditions after it acquired the Palisades plant, thus causing extensive damage to the Steam Generators.

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

> **From Page 105: Summary Report of License Renewal Review Questions for: AMP[5] Audit[6]**
> Provide examples of trending results of inspections are documented (evaluation, and comparison with previous inspection results).
> Question B2.1.18-009
> NRC Follow-up Response is acceptable
>
> The best source for information regarding the Palisades Steam generators is found in the following more recent correspondence with the NRC. The 2003 steam generator inspection results were discussed in letters to the

[5] *Note: AMP on the NRC reports stands for Aging Management Plan, a program installed at the older nuclear power plants with physical material wearing out due to the reactor's age. Material includes metal, rubber, piping, electrical wires, and various other types of equipment.
[6] Ibid, 6/30/05. Page 105

NRC dated April 22, 2003 (ML031190626), April 13, (ML041100667), June 28, (ML04890415), and December 1, 2004 (ML043430446). Also **NMC [stands for Nuclear Management Company, which was the operator of Palisades during the later years of Consumers Energy's ownership]** Response for Palisades to Generic Letter 2004-01, "Requirements for Steam Generator Tube Inspections", dated October 24, 2004 contains good information on the history and design of the steam generators.

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

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

<u>From Page 106</u>: Summary Report of License Renewal Review Questions for: AMP Audit[7]

Clarify if the above degradation has been discovered with the replaced SGs. If not, explain the reason why these degradation did not/will not happen with the replaced SGs.
Question B2.1.18-010 NRC Follow-up Response is acceptable

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

The best source for information regarding the palisades steam generators is found in the following more recent correspondence with the NRC. The 2003 steam generator inspection results were discussed in letters to the NRC dated April 22, 2003 (ML031190626), April 13, (ML041100667), June 28, (ML04890415), and December 1,2004 (ML043430446). Also NMC Response for Palisades to Generic Letter 2004-01, "Requirements for Steam Generator Tube Inspections", dated October 24, 2004 contains good information on the history and design of the steam generators.

[7] ML052720250 Summary Report of License Renewal Review Questions for: AMP Audit 9/27/2005, Page 106 of 139

The generic letter response provided a good summary of active and expected degradation in our replacement steam generators.

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

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

After nine cycles of operation, 72 additional tubes in steam generator E-50A have been plugged for a total of 380 tubes plugged. After nine cycles of operation, 54 additional tubes in steam generator E-50B have been plugged, for a total of 363 tubes plugged. Steam Generator E-50A has 7839 active tubes with 4.62% of the tubes plugged. Steam Generator E-50B has 7856 active tubes with 4.42% of the tubes plugged.

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

Palisades Steam Generators After Holtec Acquisition

Palisades was acquired by Holtec on June 28, 2022, with the expectation that the facility would be dismantled and destroyed. Holtec did not attempt to maintain the required and safe water chemistry concentrations in the steam generators—which is part of the wet layup process. Against all requirements for restart and operational approval, Holtec allowed the corrosive chemicals to attack the steam generators' internal structures. Regulators and the local community never expected Holtec to maintain the Palisades equipment's operational status, given that Holtec was allowed to purchase the aged and defunct reactor for its shutdown and decommissioning. Since neither the NRC, the local community, nor Palisades' former employees anticipated a restart, allowing steam generator degradation was deemed reasonable, given the planned decommissioning and subsequent dismantlement of the Palisades Reactor with the proposed sale of outmoded equipment for scrap. However, it became a costly wrong decision when the plan changed to restarting the reactor.

According to records, Holtec International decided to attempt to restart the Palisades Nuclear Power Plant on September 9, 2022. Thereafter, Holtec submitted its application to the NRC for a *Regulatory Path to Reauthorize Power Operations at the Palisades Nuclear Plant*[8] on March 13, 2023. Yet even as it asked for NRC approval in March 2023 to restart Palisades, Holtec informed the NRC in May of 2023[9] that "the Steam Generator Tube Integrity Program No Longer Applies and May Be Eliminated". Likewise, Holtec told the NRC that "Steam Generator Tube Degradation was no longer relevant".

> **Final Safety Analysis Report Update Revision 36 – May 2023**
> **10 CFR 50.71(e)**
> **10 CFR 50.4(b)(6)**
> In accordance with Title 10 of the Code of Federal Regulations (10 CFR) Sections 50.71, Maintenance of records, making of reports, paragraph (e), 10 CFR 50.71 (e), and 50.4, Written communications, paragraph (b)(6), 10 CFR 50.4(b)(6), Holtec Decommissioning International, LLC (HDI) on behalf of Holtec Palisades, LLC (Holtec Palisades) is providing the Palisades Nuclear Plant (PNP) Final Safety Analysis Report (FSAR) update, Revision 36. Revision 36 -includes changing the FSAR title to Defueled Safety Analysis Report (DSAR) reflecting the transition of PNP to a permanently defueled facility.

[8] ML23072A404 *Regulatory Path to Reauthorize Power Operations at the Palisades Nuclear Plant*
[9] Final Safety Analysis Report Update Revision 36, ML23107A064

Since incorporation of the DSAR changes resulted in a major rewrite of the FSAR, revision bars were not used to denote the changes. All changes, other than those involving typographical corrections, format changes, and removed obsolete information, were made under the provisions of 10 CFR 50 or in accordance with safety evaluations received from the Nuclear Regulatory Commission (NRG). The FSAR update incorporates changes made to the facility or the procedures described in the FSAR, and all other applicable information and analyses submitted to the NRG or prepared pursuant to NRG Requirements, up to October 14, 2022, which is 18 months since the last UFSAR submittal on April 14, 2021. **[Emphasis Added]**

Steam Generator Tube Integrity Program No Longer Applies… and May Be Eliminated [10]

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

Steam Generator Tube Degradation Is No Longer Relevant [11]

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

Holtec-Induced Steam Generator Damage

During routine steam generator inspections required for the continued operation of a nuclear power plant, a small amount of tube degradation is usually due to tube vibration. Following more than two years of ownership of the Palisades reactor and given its request to change its operational status, Holtec assessed the condition and degradation of the Palisades Steam Generators in September 2024. Because Holtec failed to institute a wet layup in 2022 and 2023,

[10] Ibid
[11] Ibid

the operational condition of the steam generators and other critical mechanicals was unprotected from months of corrosive chemical attack due to the lack of chemical water treatment to the steam generator water internal structures.

More alarmingly, during its September 2024 inspection, Holtec uncovered ***at least 700 additional tubes that were newly damaged and must be plugged*** due to metal corrosion owing to its lack of preventive maintenance. Amazingly, Holtec uncovered more new tube failures in 2024 than the total SG tube failures at Palisades, which had almost 35 years of combined operation by Consumers Energy and Entergy.

Disturbingly and according to the NRC, the Stress Corrosion Cracking (SCC) on the SGs, while managed by Holtec, ***"far exceeded"*** any SCC that occurred before Holtec acquired the Palisades Nuclear Power Plant. *SCC now damages two hundred fifty times more tubes*. Stress Corrosion Cracks (SCCs) in a nuclear plant are severe and cause consequential damage to sensitive and vital reactor safety equipment. Because Holtec did not place the system in a proper wet layup, extensive corrosion exists on the outside diameter of the steam generator tubes and between the tubes and tube sheet. Avoiding Stress Corrosion Cracking is critical to preventing a meltdown at Holtec Palisades. ***Furthermore, the NRC staff notes that stress corrosion crack indications also adversely affect the tube sheet and must be appropriately addressed to maintain the generator's pressure boundary.***[12]

In a *Reuters News* article[13] published on October 2, 2024, Holtec Palisades admitted that it had expected damage to the Palisades reactor's steam generators from the chemical attack Holtec created from its improper layup between 2022 and 2024.

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

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

[13] **"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/

The *Reuters News* article also identified that Holtec Palisades was willing to ignore the safety implications of stress corrosion cracking and focus instead on unplugging 600 previously damaged old tubes plugged twenty years earlier for safety reasons. *Reuters News* stated:

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

Six other Combustion Engineering (CE) steam generators experienced substantial internal vibration obstacles during their operational years. Prophylactically plugging the Palisades SG tubes in 1990 was intended to prevent this problem. Holtec Palisades has decided that the quick solution to its technical safety-related dilemma is to unplug the tubes that Consumers Energy preemptively plugged three decades ago. Since the Holtec Palisades tubes are also experiencing Stress Corrosion Cracking (SCC), unplugging extra tubes will create more unforeseen engineering and safety predicaments.

For example, Holtec suggests that it should "sleeve" the damaged tubes rather than plug them. However, one must remember that the tube damage is due to stress corrosion cracking, and sleeving increases the stress in the tube. According to the Electric Power Research Institute's Steam Generator Sleeving Review Committee:

> **The process of forming a sleeve joint places an additional stress on both the sleeve and the parent tube materials**. The additional stress in the joint area **increases the parent tube susceptibility to environmentally induced cracking**.[14] **[Emphasis Added]**

Holtec's sleeving solution for the Palisades Steam Generator Stress Corrosion Cracking (SCC) damage will increase the stress on the tubes and tube sheet. Increasing the stress on the tubes and tube sheet by sleeving is counterintuitive and counterproductive in eliminating a problem created by SCC. As the Electric Power Research Institute's Steam Generator Sleeving Review Committee noted in the quote above, Holtec's proposed sleeving solution will increase the stress

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

on the tubes and sheet, not lessen the already accelerated rate of Stress Corrosion Cracking (SCC). Further complications arise from the chemical-induced corrosion on both the primary side of the reactor itself as well as in the secondary system of the steam generators that also has been contaminated by chemically corrosive water permeating the reactor water (primary system) and the steam generator (secondary system).

The *Fix* Proposed by Holtec Does Not Address the Underlying SCC Problem

Mature steam generators at nuclear facilities expect to develop damage to their tubes over prolonged periods. Yet, the extent of new damage to the Palisades steam generators under Holtec's management and ownership is astounding. At least 700 tubes developed significant problems in only 18 short months. The only recorded sudden incidence of gross tube failures of which Fairewinds is aware occurred at the San Onofre Units 2 and 3 in California in 2012 and is similar to the number of defects at Palisades. Those gross tube failures at San Onofre resulted in the permanent closure of both reactors at a cost to ratepayers of $4 Billion.

Nevertheless, the tube damage at Palisades is more critical to reactor safety than the steam generator defects uncovered at San Onofre. The damaged tubes at the Combustion Engineering (CE) reactors at San Onofre were due to tube vibration in the center of the tube bundles. Palisades, also a CE design, already prophylactically plugged 609 tubes to avoid this problem. Holtec now proposes to unplug all the prophylactically plugged tubes in the Palisades Steam Generators identified in 1990–almost 35 years ago–to be a real danger to the safe operation of Palisades.

Unlike at San Onofre, Palisades has experienced Stress Corrosion Cracking, which is a chemical attack on the steam generator tubes that is so much worse for reactor safety than what occurred at San Onofre. Why? Holtec never contemplated the restart of the defunct Palisades reactor and completely ignored the steam generator water chemistry inside the shuttered facility between 2022 and 2024. First, these harmful chemicals are concentrated deep in small crevasses next to the tubes and are impossible to eradicate. Second, if the Holtec Palisades is restarted, the chemical stress corrosion cracking will continue because additional heated steam in the steam

generator will accelerate any interior chemical reactions. Additional tubes are in jeopardy of destruction and failure, and the stainless-steel tube sheet inside the steam generator is also subject to cracking.

Conclusion

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

Adding to the fact that there is no existing methodology for safely repairing the safety-compromised steam generators within Palisades, Holtec now proposes to plug 700 additional tubes and unplug the more than 600 tubes plugged 35 years ago. The maneuver of *mass unplugging,* accompanied by plugging other existing tubes, is unprecedented anywhere in the industry. Such *mass unplugging* violates the condition of the 2011 license extension that the NRC granted to allow the Palisades nuclear power plant to continue operating until 2031.

Since public health and safety from nuclear power plant radiation exposure to local communities are paramount in nuclear power operations, it is more than unreasonable to expect a safe restart of Palisades. To begin with, the entire Palisades facility must have the requisite data collection, analysis, and safety review of all safety equipment and outmoded operations procedures. Thus, Holtec must replace all steam generators at an additional cost of at least $500 million, with a startup delay extending into at least 2027. The U.S. Nuclear Regulatory Commission should take reasonable steps to protect the people and communities of Michigan.

~ END ~