

10 CFR 2.206 Petition

**Request for Enforcement Action Against Palisades Nuclear Plant for
Violation of Technical Specification 3.4.17 Prior to Certified Shutdown,
and for NRC to Require Compliance with This Condition Action**

Statement Before Restart

Submitted by:

Alan Blind

1000 West Shawnee Road

Baroda, Michigan 49101

a.alan.blind@gmail.com

**Summary of 10 CFR 2.206 Petition Regarding Palisades Steam
Generator Integrity Violations**

This petition is submitted pursuant to 10 CFR 2.206 and seeks NRC enforcement action for a clear and well-documented violation of Technical Specification 3.4.17 and the applicable licensing basis at the Palisades Nuclear Plant during its final operating cycle under Entergy Nuclear Operations, Inc. (ENO). Specifically, Entergy failed to perform and submit a required operational assessment following its 2020 Steam Generator Tube

Inspection Report, despite nearing the cumulative plugging limits defined in the plant's safety analysis. This failure prevented identification of a safe operating interval and allowed significant, undetected tube degradation to develop, including flaws later found by Holtec to exceed 90% through-wall.

The omitted operational assessment violated both Technical Specification 5.5.8 and the commitments made to resolve Generic Safety Issue 163, as outlined in NRC correspondence and license amendment approvals.

These requirements were adopted into the Palisades license through the 2007 RAI response (ML070640058), which explicitly bound Entergy to the SG Program guidelines of NEI 97-06.

In 2024, Holtec's inspection data confirmed widespread SG tube degradation—including 1,417 flaw indications and 949 tubes requiring evaluation—raising substantial concerns about prior cycle safety margins.

The absence of timely assessment and mitigation by Entergy constitutes more than a minor violation under the NRC's own Significance Determination Process (SDP), especially when viewed in light of precedent cases such as the Indian Point 2 SG year 2000 tube failure.

Because Holtec now seeks to reinstate the Palisades Operating Technical Specifications as part of its restart plan, and because the reactor continues to use outdated and highly susceptible mill-annealed Alloy 600 tubing, this petition further requests that the NRC require Holtec to complete a full operational assessment based on current inspection data. This assessment must be reviewed and publicly documented in an NRC-issued Safety Evaluation Report (SER) prior to allowing Palisades to enter Mode 4.

The petition concludes with a list of specific requested actions, including NRC investigation of Entergy's compliance, enforcement of the full licensing basis, and the establishment of transparent public processes to ensure that future operations are founded on validated steam generator integrity.

I. Petitioner's Request

Pursuant to 10 CFR 2.206, I respectfully petition the U.S. Nuclear Regulatory Commission (NRC) to initiate enforcement action against the former licensee of the Palisades Nuclear Plant, Entergy Nuclear Operations, Inc. (ENO), for failure to comply with its renewed license and

Technical Specification requirements in force during its ownership and operation of the reactor above Mode 4, and in particular its last operating cycle number 28.

Under Palisades Renewed License No. DPR-20, the Commission stated:

“The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission.”

And...

“There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission’s regulations.”

Additionally, Technical Specification 5.5.8 requires that:

“SG tube integrity shall be maintained.”

- ***Condition:*** *One or more SG tubes satisfy the tube repair criteria and are not plugged in accordance with the Steam Generator Program.*

- **Required Action:** *Verify that the tube integrity of the affected tube(s) is maintained until the next refueling outage or SG tube inspection.*
- **Completion Time:** *Prior to entering Mode 4 following the next refueling outage or SG tube inspection.*

As further defined in the Palisades Steam Generator Program:

“All in-service SG tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cooldown, and all anticipated transients included in the design specification) and design basis accidents...”

This violation occurred prior to Palisades’ certified shutdown and decommissioning under 10 CFR 50.82, during the period when Entergy was the licensee and operating the reactor under its NRC-issued license. Entergy’s 2020 Steam Generator Tube Inspection Report (ML21084A077) failed to include a required operational assessment and, as a result, failed to identify the point during the operating cycle at which steam generator (SG) tube integrity would be ensured.

This omission is contrary to the Palisades licensing basis, including commitments made in response to the Resolution of Generic Safety Issue 163: “Multiple Steam Generator Tube Leakage,” Entergy’s February 15, 2006 submittal (ML060480440), “Application for Technical Specification Improvement Regarding Steam Generator Tube Integrity,” and the February 27, 2007 RAI response from Nuclear Management Company (ML070640058), which committed Palisades to conduct SG condition monitoring and operational assessments in accordance with NEI 97-06 and applicable EPRI guidelines.

That RAI response formed part of the basis for the NRC’s acceptance of Palisades’ revised Technical Specifications and became an enforceable license condition, as reflected in ML053200310, “Palisades Plant — Evaluation of the Response to Generic Letter (GL) 2004-01, ‘Requirements for Steam Generator Tube Inspections’ (TAC NO. MC4836).”

While it is understood that 40% through-wall is the Technical Specification plugging limit, the sudden and significant increase in the number of flawed tubes—many of which approached or exceeded 90% through-wall—clearly demonstrates that the lack of any assessment was safety significant. Holtec’s subsequent inspections revealed extensive stress corrosion cracking and wear that exceeded the structural integrity

thresholds established in the license. The presence of such severe degradation indicates that Entergy's 2020 Steam Generator Tube Inspection Report was flawed in omitting the required operational assessment and consequential in allowing so many tubes to degrade severely before the end of the operating cycle—potentially resulting in a design basis steam generator tube rupture. The 2020 report did not meet the requirements of the facility's license, license basis, or Technical Specification 5.5.8.

While this enforcement request is directed at Entergy's past non-compliance, this petition also recognizes that Holtec Decommissioning International, LLC (Holtec), as the current licensee seeking to resume operations, would inherit all applicable licensing obligations flowing from GSI-163, if the NRC approves the reinstatement of the Palisades operating Technical Specifications. Therefore, I respectfully request that the NRC ensure Holtec fully satisfies all applicable license conditions—particularly TS 3.4.17 and the requirements in TS 5.5.8 and 5.6.8 and all license basis conditions from GSI-163, "Multiple Steam Generator Tube Leakage"—before any restart of power operations is authorized and before Palisades is allowed to enter Mode 4.

II. Absence of a Valid Operational Assessment and Post-Cycle Evidence of Technical Specification Violation

The NRC's regulatory framework and NEI 96-07 require licensees to perform:

- A condition monitoring assessment confirming SG tube integrity during the previous cycle
- A forward-looking operational assessment projecting integrity through the upcoming cycle

NEI-96-07 was the industry commitment adopted by NRC to resolve GSI-163.

Entergy's 2020 SG inspection report (ML21084A077) following Refueling Outage 27 included only a condition monitoring assessment. Entergy then operated for a full cycle without submitting the required forward-looking operational assessment for Cycle 28—violating its license basis, TS 5.5.8 and NEI 97-06.

A. Holtec's Inspection Results Reveal the Assessment Would Have Failed

Holtec's 2024 inspection (ML24267A296) revealed:

- 1,417 flaw indications across 1,032 tubes
- ODSCC depths up to 91% through-wall
- Axial cracking increased from 4 in 1R27 to 1,163 in 1D28
- 949 tubes required plugging or evaluation

Had Entergy submitted an operational assessment, it may have identified the need to limit the length of Cycle 28—its final operating cycle—thereby precluding the safety-significant tube integrity issues that were later discovered by Holtec. This is particularly concerning because Entergy was fully aware that it was approaching the plugging limits established in the plant's safety analysis. In fact, Entergy explicitly acknowledged this in its 2020 Steam Generator Tube Inspection Report (ML21084A077) submitted to the NRC, where it stated that steam generator performance was trending toward the 10% cumulative plugging limit. A proper operational assessment would have evaluated whether continued operation would result in exceeding the structural integrity thresholds defined in the Steam Generator Program and would have demonstrated compliance with Technical Specification 5.5.8, which requires assurance that all in-service tubes maintain integrity under normal operating conditions and design

basis accidents. But because no such assessment was performed, we will never know whether timely corrective actions—such as earlier tube plugging, limited cycle extension, or even early shutdown—could have prevented the extent of degradation that ultimately occurred.

B. The NRC Must Not Overlook This Violation

The omission was not harmless. It denied both the NRC and the public the opportunity to validate the future safe performance of the steam generator (SG) tubes. If Holtec intends to return Palisades to operation above Mode 4, it must be compelled to remedy this deficiency by completing an operational assessment that is reviewed and approved by the NRC. The NRC must now require Holtec to prepare a new operational assessment based on current inspection data and issue a Safety Evaluation Report (SER) confirming compliance with applicable Technical Specifications before authorizing entry into Mode 4.

III. Petition Admissibility Under 10 CFR 2.206

This petition meets the admissibility criteria in 10 CFR 2.206 by:

- Identifying a specific violation of TS 3.4.17 and 5.5.8 and license basis commitments to resolve GSI-063, ""
- Presenting inspection-based evidence
- Requesting specific NRC action related to enforcement and future licensing decisions

IV. Significance of Entergy's Failure to Submit a Valid Operational Assessment: Lessons from Indian Point 2

The NRC has established precedent that the failure to detect and appropriately respond to long-standing steam generator (SG) tube degradation is a **more than minor violation** under the Significance Determination Process (SDP). In its Indian Point 2 Lessons-Learned Report (ML003762242), the NRC Task Group concluded that the 2000 SG tube failure resulted from "degraded conditions allowed to exist in the SGs during the operating cycle," and that this degradation presented a **risk-significant reduction in safety margin** due to the increased risk of tube rupture. This finding was used to elevate the significance of the violation under the SDP framework.

At Palisades, the situation is directly analogous. Entergy's 2020 Steam Generator Tube Inspection Report failed to include an operational assessment, as required by its licensing basis, and the resulting degradation was only discovered after the fact. It is reasonable to conclude that the tubes exhibiting through-wall cracks approaching 100% must have exceeded the 40% plugging threshold well before the end of Cycle 28. As a result, Entergy failed to identify an appropriate operating cycle duration necessary to ensure steam generator tube integrity and to maintain compliance with the plant's structural integrity safety margins.

The late 2024 inspections, conducted after the certified shutdown and layup period, revealed **extensive stress corrosion cracking and wall thinning**, with some tubes approaching or exceeding **90% through-wall**.

These results confirm that **long-standing degradation** was present during the last operating cycle—degradation that went **undetected and unaddressed** due to the absence of a valid operational assessment.

As was true at Indian Point 2, the NRC must now acknowledge that this is not a documentation error but a failure with real safety consequences: it allowed Palisades to operate with degraded SG tube conditions that

violated the license requirement to maintain tube integrity (Technical Specification 5.5.8). Under the SDP, such failures—especially when they involve conditions previously linked to risk-significant tube rupture events—must be evaluated as more than minor.

The Palisades case is further strengthened by the NRC's own analysis from Indian Point: the degraded condition at Indian Point was considered sufficient to increase the risk of core damage with large early release to $1E-4$ /year, due to the missed indications and mischaracterization of tube integrity. Palisades now presents a comparable, if not more severe, example of failure to detect, assess, and respond to SG tube degradation.

Therefore, we submit that Entergy's failure to prepare and submit a valid operational assessment in 2020 must be deemed a more than minor violation under the SDP. The NRC should not rely on hindsight explanations offered by Holtec but must hold Entergy accountable for its obligations under the license, consistent with the NRC's treatment of similarly situated licensees.

V. NRC Statements Underscoring the Importance of Enforcing All Prior License Conditions for Steam Generator Integrity

The NRC's own statements and historical guidance support the importance of strict enforcement of SG tube integrity:

- GSI-163:

“The licensee’s plant TS require the implementation of SG tube surveillance programs to ensure that tubes are repaired, or removed from service by plugging the tube ends, before the structural or leakage integrity of the tubes is impaired.”

And...

“The NRC gave the issue a HIGH priority ranking in 1997.”

- RAI Response (ML070640058), NRC Request:

“Please confirm that structural and leakage integrity will be assessed if significant indications are found...”

“However, such an approach cannot ensure it with certainty.”

- Indian Point 2 SG Failure – NRC Lessons Learned (ML003762242):

“The staff found that the SG tube condition during Cycle 14 was risk significant due to degradation of safety margin... SG tube failures and ruptures have occurred before and will likely occur again.”

Note, The Indian Point Steam Generators used the failure susceptible mill annealed low 600 tube material, same as Palisades.

VI. Why Steam Generator Integrity Is Important

Steam generator tubes serve dual safety roles:

- They form a part of the reactor coolant pressure boundary (RCPB)
- They serve a radioactive containment function by separating primary and secondary systems

Degraded tubes increase the risk of:

- Tube rupture during accidents
- Unmonitored radioactive release
- Reduced confidence in design basis accident assumptions

TS 3.4.17 and 5.5.8 are not aspirational—they are legally enforceable commitments made to the NRC and public.

VII. Licensing Summary and Transition to Holtec, Timeline of Ownership

- April 6, 2007: NRC approved transfer of Renewed Facility Operating License DPR-20 to Entergy
- April 11, 2007: Amendment No. 224 issued
- TS 3.4.17 states:
“SG tube integrity shall be maintained”
- TS 5.5.8 requires:
 - Plugging of tubes with $\geq 40\%$ through-wall
 - Structural integrity assessments per NEI 97-06 and NEI 96-07
 - Compliance throughout full cycle

Holtec’s restart effort will reinstate these obligations.

VIII. Timeline of Regulatory and Steam Generator Related Technical Events

- **1997** – NRC assigns GSI-163 high priority
- **April 14, 2005** – NRC approves TSTF-449
- **February 15, 2006** – NMC submits SG Program amendment
- **February 27, 2007** – RAI response affirms NEI 97-06 use
- **April 11, 2007** – Amendment 224 issued to Entergy
- **June 10, 2022** – Entergy certifies shutdown
- **December 2022** – NRC approves Holtec DSAR
- **September 3, 2024** – Holtec inspection:
 - 949 tubes flagged
 - Flaws up to 91% through-wall
 - 1,417 indications found

IX. Violation of Technical Specification 3.4.17

TS 3.4.17 requires maintaining SG tube integrity. Inspection results in 2024 show:

- Multiple flaws exceeding 40% through-wall
- No justification or operational assessment was submitted by Entergy
- Structural criteria violated during operation and discovered by Holtec

This constitutes a breach of the license and NRC oversight must follow.

X. Material Susceptibility of Palisades' Mill-Annealed Alloy 600 Tubes Warrants Heightened NRC Oversight

The NRC must give additional weight to the fact that Palisades' steam generators contain **mill-annealed Alloy 600 (MA600)** tubing—an outdated material known for its susceptibility to stress corrosion cracking. Most of the nuclear industry has transitioned to using thermally treated Alloy 690, a significantly more corrosion-resistant material. Palisades remains among a small and diminishing group of reactors still relying on MA600 tubing, making it uniquely vulnerable and justifying a higher level of scrutiny.

According to NUREG-1771, *U.S. Operating Experience With Thermally Treated Alloy 600 Steam Generator Tubes*, MA600 tubes are particularly prone to two major degradation mechanisms:

1. **Primary Water Stress Corrosion Cracking (PWSCC):**

Initiates on the **inner diameter (ID)** due to exposure to high-temperature primary coolant in normal operating conditions.

2. **Outside Diameter Stress Corrosion Cracking (ODSCC):**

Initiates on the **outer diameter (OD)**, typically driven by **corrosive species or deposits** on the secondary side, especially under elevated oxygen, chloride, or sulfate conditions.

MA600 tubing is **especially vulnerable to ODSCC** when subjected to poor water chemistry or improper shutdown and layup conditions.

Despite decades of industry effort to mitigate these issues through improved water chemistry controls, inspection techniques, and aggressive plugging and repair programs, MA600 tubing has continued to pose reliability and safety challenges. The fact that Palisades was operating with MA600 tubing, near its **10% plugging limit** at the end of Cycle 28, should have already triggered concern. However, what is most striking is that in just one operating cycle, Holtec's 2024 inspections have now revealed:

- A significant increase in flaw indications
- PWSCC and ODSCC depths reaching up to **91% through-wall**

- A dramatic rise in axial and circumferential cracking not previously identified
- **949 tubes** identified for plugging or further evaluation

This rapid onset of degradation—after more than three decades of relatively stable SG tube condition—indicates that a new phase of material vulnerability has emerged, likely accelerated by either the aging of the MA600 alloy, cumulative environmental stressors, or changes in layup or chemistry management following shutdown.

The conclusion is clear: **MA600 tubing is no longer reliable without intensive forward-looking integrity evaluation.** Continued operation of Palisades with MA600 steam generator tubes—without a comprehensive NRC-reviewed operational assessment—would not only violate past industry lessons learned but also depart from current safety expectations applied to similarly situated plants.

Given this material vulnerability, the NRC must **require Holtec to complete a full operational assessment that accounts for:**

- The inherent susceptibility of MA600 to both ID and OD stress corrosion cracking

- The observed rate of flaw development in just one cycle
- The proximity to the regulatory plugging limit prior to shutdown
- Any deviations from optimal chemistry or layup conditions post-shutdown

Such an assessment must be **evaluated through a public Safety**

Evaluation Report (SER) before the plant is authorized to re-enter Mode

4.

XI. Requested NRC Action

This petition does not seek enforcement against Holtec for past Entergy actions. Holtec is currently exempt from operating Technical Specifications under its approved Defueled Safety Analysis Report (DSAR). However, if Holtec's restart plan includes NRC approval of Operating Technical Specifications that reinstate TS 3.4.17, then:

- Holtec must comply with all license conditions associated with TS 3.4.17
- Holtec must complete an Operational Assessment per NEI 97-06

- The NRC must issue a Safety Evaluation Report (SER) affirming compliance and future Steam Generator Tube integrity
- This must occur before Holtec enters Palisades into Mode 4

I respectfully request that the NRC:

1. Investigate whether Entergy violated TS 3.4.17 prior to June 2022
2. Require Holtec to submit a public Operational Assessment demonstrating SG tube integrity
3. Require a Safety Evaluation Report before authorizing entry into Mode 4
4. Provide a public summary of the enforcement outcome
5. At a public meeting, explain how the NRC will verify Holtec's compliance with prior SG license conditions
6. Hold a dedicated public meeting to explain Holtec's NEI 96-07 Operational Assessment and the NRC's review of it
7. Provide a public response—either through a public meeting or published regulatory correspondence—confirming that Palisades must meet all applicable license basis requirements and Technical

Specification conditions, including 5.5.8 and 3.4.17, to ensure the steam generator tubes are qualified for future operation throughout the intended cycle. The next section details all of the licensing basis documents.

XII. References Supporting the License Basis

The following documents and regulatory commitments form the licensing basis for SG tube integrity at the Palisades Nuclear Plant and support the technical foundation of this petition:

1. Renewed Facility Operating License No. DPR-20

– License conditions establishing conformity with the Atomic Energy Act and NRC regulations.

2. Amendment No. 224 to License DPR-20 (April 11, 2007)

– Incorporation of revised Technical Specifications, including Steam Generator TS 3.4.17 and 5.5.8.

3. Technical Specification 3.4.17: Steam Generator Tube Integrity

– Requires that “SG tube integrity shall be maintained” and defines conditions, required actions, and completion times.

4. Technical Specification 5.5.8: Steam Generator Program

– Defines surveillance criteria, repair thresholds ($\geq 40\%$ through-wall), and structural integrity performance factors.

5. Generic Safety Issue 163 (NUREG-0933, Supplement 3)

– Establishes NRC expectations for tube plugging and integrity verification; designated as high priority.

6. NMC Submittal ML060480440 (February 15, 2006)

– “Application for Technical Specification Improvement Regarding Steam Generator Tube Integrity.” Incorporates GSI-163.

7. NMC RAI Response ML070640058 (February 27, 2007)

– Commits Palisades to perform SG condition monitoring and operational assessments in accordance with NEI 97-06 and applicable EPRI guidelines.

8. NEI 97-06, “Steam Generator Program Guidelines”

– Defines requirements for condition monitoring, operational assessments, and tube repair criteria.

XII. Certification

I certify that the information provided in this petition is true and complete to the best of my knowledge, as required by 10 CFR 2.304(d).

Respectfully submitted,

Alan Blind