



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 3, 2025

**PALISADES NUCLEAR PLANT – AUTHORIZATION AND SAFETY EVALUATION FOR
ALTERNATIVE RR 5-10, (EPID: L-2025-LLR-0073)**

LICENSEE INFORMATION

Recipient's Name and Address: Site Vice President
Palisades Energy, LLC
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

Licensee: Holtec Palisades, LLC

Plant Name and Unit: Palisades Nuclear Plant

Docket Nos.: 50-255

APPLICATION INFORMATION

Submittal Date: July 31, 2025

Submittal Agencywide Documents Access and Management System (ADAMS) Accession No.: ML25212A032

Supplement Date: October 22, 2025

Supplement ADAMS Accession No.: ML25295A537

Applicable Inservice Inspection (ISI) Program Interval and Interval Start/End Dates: The fifth ISI interval began on December 13, 2015, and is scheduled to end on December 12, 2025.

Alternative Provision: The licensee requested an alternative under Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2).

ISI Requirement: The American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) requirements applicable to this alternative request originate in Code Case N-729-6, "Alternative Examination Requirements for PWR Reactor Vessel Upper Heads With Nozzles Having Pressure-Retaining Partial-Penetration Welds Section XI, Division 1," as mandated by 10 CFR 50.55a(g)(6)(ii)(D) with conditions.

Paragraph -2220 of ASME Code Case N-729-6 states that prior to return to service, the applicable volumetric and surface examinations listed in Table 1 shall be performed on items affected by the repair/replacement activity.

Note 9 of Table 1 of ASME Code Case N-729-6 states that the applicable volumetric and surface examinations listed in Table 1 shall include essentially 100 percent of the examination surface or volume identified in Figure 2.

Figure 2 of ASME Code Case N-729-6 defines extent of surface examination zone “G-F,” a ¼- inch from the theoretical point “F” in accordance with the design drawings, including tolerances, unless the point “F” can be physically determined.

Figure 2 of ASME Code Case N-729-6 defines extent of surface examination zone “G- F- E” for the J-groove weld (filler metal and buttering).

Applicable Code Edition and Addenda: The Palisades code of record for the fifth ISI interval is the 2007 Edition with 2008 addenda of the ASME Code, Section XI.

The 2019 Edition of the ASME Code, Section III, is the Palisades current code of construction. The Palisades original construction code was the 1955 Edition through Winter 1966 Addenda of the ASME Code, Section III.

Brief Description of the Proposed Alternative: The reactor vessel closure head (RVCH) vent line Alloy 600/82/182 nozzle and J-groove weld modified by repair/replacement activities is affected. The modification involved removal of a portion of the existing Alloy 600/82/182 nozzle and J-groove weld, and installation of the Alloy 52M/152 weld metals on the removed portion.

In the original submittal dated July 31, 2025, the licensee proposed an alternative surface examination area and coverage using a remote eddy current testing (ECT) method for the preservice inspection (PSI) and the ISI of the modified RVCH vent line penetration weld in lieu of a manual liquid penetrant testing (PT). To obtain detailed information and clarify the information provided, the NRC staff issued request for clarification of information (RCI) and request for additional information (RAI).

By letter dated October 22, 2025, in response to the NRC staff RCI and RAI, the licensee revised its original submittal to propose only an alternative surface examination requirement using the remote ECT method for the ISI of the modified RVCH vent line penetration weld in lieu of the manual PT, based on a hardship. Specifically, the licensee’s proposed alternative is for the inservice surface examination requirement to be changed from being, required to examine ¼-inch beyond the Alloy 52M/152 weld-to-cladding interface shown in Figure 2 of ASME Code Case N-729-6, to instead only extend to point “c” shown in Figure 2 of RR 5-10.

In the October 22, 2025, supplement, the licensee also stated that the PSI of the modified RVCH vent line penetration weld was successfully performed by the manual PT method and the required surface examination area and coverage shown in Figure 2 of ASME Code Case N- 729-6 were met. Therefore, no alternative was needed for the PSI of the modified RVCH vent line penetration weld.

The licensee discussed the basis for hardship or unusual difficulty associated with use of the manual PT for ISI. The licensee stated that the Palisades RVCH is unique in that the nozzle extension assemblies attach to the control rod drive mechanism (CRDM) nozzles and extend down to a plane just above the mating surface between the closure head and the reactor vessel. The nozzle extension assemblies consist of a nozzle extension with a concentric reducer welded to the bottom of the extension. The CRDM nozzle extension assemblies are interconnected by a grid plate that is welded to each CRDM extension assembly. The available

distance between the grid structures for personnel to pass through is approximately 13 inches. The performance of manual PT is not feasible without some disassembly of the grid in this highly congested area because it would expose personnel to increased safety hazards. This highly congested area is also subject to high radiation levels. Due to increased safety hazards and excessive dose rates to personnel, compliance with the ASME Code, Section XI requirements for ISI of the RVCH vent line Alloy 52M/152 weld would not meet the intent of the site's as low as reasonably achievable (ALARA) radiological control program and presents a hardship without a compensating increase in the level of quality and safety.

For additional details on alternative RR 5-10, please refer to the documents located at the ADAMS Accession Nos. identified above.

STAFF EVALUATION

The NRC staff evaluated alternative RR 5-10 pursuant to 10 CFR 50.55a(z)(2). The NRC staff focused on whether compliance with the ASME Code requirements would result in hardship or unusual difficulty, without a compensating increase in the level of quality and safety.

Hardship Justification

In its evaluation, the NRC staff assessed whether the licensee provided adequate description and technical information to support the basis for hardship or unusual difficulty if it were required to comply with the ASME Code requirement. The licensee described its basis for hardship as personnel exposure to increased safety hazards and radiation dose rates if the manual PT method would be used to perform the ISI of the modified RVCH vent line penetration weld and achieve the Code-required examination coverage. The location of the vent line and the unique design of the Palisades RVCH grid and extension structures create congestion in the vent line location, and do not provide an adequate work area for personnel to perform the manual PT without some disassembly of the grid structures and risk of safety hazards. This congested area is also subject to high radiation levels. Therefore, the NRC staff has determined that concerns from exposing personnel to unnecessary increased safety hazards and radiation dose and ALARA constitute hardship or unusual difficulty.

Reasonable Assurance of Structural Integrity

The NRC staff considered whether the licensee's proposed alternative inservice surface examination requirement provides reasonable assurance of structural integrity or leak tightness of the modified RVCH vent line penetration weld based on: (1) the surface area "b-a-c" in Figure 2 of RR 5-10 examined by the remote ECT, and essentially 100 percent coverage achieved, and (2) safety significance of unexamined area from point "c" in Figure 2 of RR 5-10 through ¼-inch beyond the Alloy 52M/152 weld-to-cladding interface (i.e., any unacceptable surface-connected flaws left in service and presence or absence of known active degradation mechanisms in the unexamined area). From review of the original submittal and the October 22, 2025, supplement, the NRC staff verified that:

- The licensee confirmed that its proposed inservice surface examination coverage to point "c" in Figure 2 of RR 5-10 bounds the remnant of original Alloy 82/182 weld-to-cladding ¼-inch "G-F" dimension in Figure 2 of ASME Code Case N-729-6. The NRC staff has determined that the proposed ISI coverage provides reasonable assurance that any service-induced flaws either initiated in Alloy 52M/152 weld buildup or grew from original Alloy 82/182 into Alloy 52M/152 to become surface-connected would be

detected prior to compromising the structural integrity, and the licensee would take appropriate actions.

- The licensee confirmed that the preservice surface examination by manual PT was successfully performed to the extent practical, and the Code-required coverage to point “c” in Figure 2 of RR 5-10 through ¼-inch beyond the Alloy 52M/152 weld-to-cladding interface was achieved. No unacceptable surface-connected flaws were identified in the area examined by manual PT.
- The licensee confirmed that after completion of Alloy 52M/152 weld buildup, the acceptance surface examination by manual PT was successfully performed in accordance with ASME Code, Section III to the extent practical. The acceptance surface examination coverage to point “c” in Figure 2 of RR 5-10 through at least ¼-inch beyond the Alloy 52M/152 weld-to-cladding interface was achieved. No unacceptable surface-connected flaws were found in the area examined by manual PT. The NRC staff determined that the licensee’s acceptance surface examination provides reasonable assurance that no fabrication surface-connected flaws were left in service in Alloy 52M/152 weld buildup and cladding material beyond the Alloy 52M/152 weld-to-cladding interface.
- The licensee confirmed that prior to installing Alloy 52M/152 weld buildup, it performed the manual PT of area “a-b-c-d” in Figure 1 of RR 5-10 and achieved the Code-required coverage. No unacceptable surface-connected flaws were found in the area examined by manual PT.

The NRC staff has determined that it is reasonable to conclude that if service-induced degradation occurs in the unexamined area (i.e., point “c” in Figure 2 of RR 5-10 through at least ¼-inch beyond the Alloy 52M/152 weld-to-cladding interface), fatigue and stress corrosion cracking (SCC) would be of concern. However, the crack growth due to fatigue at this location would not challenge the structural integrity of the RVCH within the Palisades remaining current operating license period.

The NRC staff notes that the Alloy 52M weld buildup in the missed coverage (unexamined) area is a minimum of ¼-inch thickness prior to reaching the remnant of the Alloy 600/82/182 structural weld materials of the original vent line partial penetration J-groove weld. The NRC staff assessed the initiation and growth of the SCC through this material within the remaining Palisades current operating license period, which will end on March 24, 2031. The NRC staff found that the licensee’s alternative examinations would identify any unacceptable surface breaking indication that could grow to challenge the structural integrity during this period. Further, any flaw that initiated and grew through the area of missed coverage (i.e., point “c” in Figure 2 of RR 5-10 through at least ¼-inch beyond the Alloy 52M weld-to-cladding interface) will not challenge the structural integrity of the RVCH at Palisades through the remainder of the current operating license.

In addition, the NRC staff has determined that the required bare metal VE visual examinations of the RVCH upper surface for the boric acid deposit at each refueling outage will provide additional defense-in-depth to identify any potential leaking conditions prior to subsequent volumetric or surface examinations.

Therefore, the NRC staff finds that the alternative inservice examination area and coverage using the remote ECT is adequate to provide reasonable assurance of structural integrity of the

modified RVCH vent line during service. Despite reduced coverage of the required examination surface, the NRC staff finds that the RVCH bare metal VE visual examination and the leak path assessment performed in accordance with ASME Code Case N-729-6 will provide additional assurance that any pattern of degradation, if it were to occur, would be detected and the licensee would take appropriate correction actions. Complying with the Code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

CONCLUSION

As set forth above, the NRC staff has determined that complying with the specified requirements described in the licensee's request referenced above would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The proposed alternative inservice examination provides reasonable assurance of the structural integrity and leak tightness of RVCH vent line. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Therefore, the NRC staff authorizes the use of alternative inservice examination in RR 5-10 at Palisades for the remainder of fifth and sixth ISI intervals (i.e., for the remainder of the current operating license which will end on March 24, 2031).

All other ASME Code, Section XI, requirements for which an alternative was not specifically requested and authorized remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

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Date: December 3, 2025

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cc: Listserv

PALISADES NUCLEAR PLANT – AUTHORIZATION AND SAFETY EVALUATION FOR ALTERNATIVE RR 5-10, (EPID: L-2025-LLR-0073) DATED DECEMBER 3, 2025

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