



PNP 2026-057

10 CFR 50.90

10 CFR 50.91

October 12, 2026

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Palisades Nuclear Plant
NRC Docket No. 50-255
Renewed Facility Operating License No. DPR-20

Subject: Response to Third Request for Additional Information Regarding Emergency License Amendment Request: One-Time-Use Amendment to Allow Alternative Fuel Handling Method for the Recovery of Fuel Assembly DD41

By letter dated September 30, 2026 (Reference 1), in accordance with Title 10 of the Code of Federal Regulations (10 CFR) 50.90, *Application for amendment of license, construction permit, or early site permit* and 10 CFR 50.91, *Notice for public comment; State consultation*, Palisades Energy, LLC (Palisades Energy) requested U.S. Nuclear Regulatory Commission (NRC) approval of a one-time emergency change to the Renewed Facility Operating License (RFOL) for Palisades Nuclear Plant (PNP). The proposed License Amendment Request (LAR) would revise UFSAR Sections 9.11 *Fuel Handling and Storage Systems*, and 14.19 *Fuel Handling Accident*, to facilitate transport of fuel assembly DD41 from the reactor utilizing different plant equipment and following a different travel path than is described in the Updated Final Safety Analysis Report (UFSAR).

On October 1, 2026, the NRC and Palisades Energy conducted a conference call in which the NRC staff verbally and visually requested information in the form of questions related to the proposed LAR. On October 2, 2026, a follow-up conference call was conducted between the NRC and Palisades Energy. The purpose of the call was to provide verbal responses to the questions raised and to identify responses required to be docketed. Palisades Energy provided the responses to the request for additional information (RAI) in a letter dated October 2, 2026 (Reference 2).

By electronic mail (email) received on October 7, 2026, the NRC provided a second RAI regarding the LAR. Palisades Energy provided the responses to the second request for additional information (RAI) in a letter dated October 8, 2026 (Reference 3).

By email received on October 9, 2026, the NRC provided a third RAI regarding the LAR.

The enclosure to this letter provides Palisades Energy's responses to the third RAI received by email on October 9, 2026.

This letter contains no new regulatory commitments and no revisions to existing regulatory commitments.

In accordance with 10 CFR 50.91(b), State consultation, Palisades Energy is notifying the State of Michigan of the RAI response by transmitting a copy of this letter, with Enclosure, to the designated State of Michigan official.

If you have any questions regarding this submittal, please contact Kyle Steffic, Regulatory Assurance Manager, at (269) 290-8915.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 12, 2026.

Respectfully,

Michael Schultheis
Digitally signed by Michael Schultheis
DN: C=US, CN=Michael Schultheis,
O=Holtec - Palisades, OU=Site Vice
President, E=m.schultheis@holtec.com
Reason: I am approving this document
Date: 2026.10.12 16:43:44 -0400

Michael Schultheis
Site Vice President
Holtec Palisades

- References:
1. Holtec Palisades, LLC (Holtec Palisades) letter to U.S. Nuclear Regulatory Commission (NRC), *Emergency License Amendment Request: One-Time-Use Amendment to Allow Alternative Fuel Handling Method for the Recovery of Fuel Assembly DD41*, dated September 30, 2026 (ADAMS Accession No. ML26273A469)
 2. Holtec Palisades letter to NRC, Response to Request for Additional Information Regarding Emergency License Amendment Request: One-Time-Use Amendment to Allow Alternative Fuel Handling Method for the Recovery of Fuel Assembly DD41, dated October 2, 2026 (ADAMS Accession No. ML26275A214)
 3. Holtec Palisades letter to NRC, Response to Second Request for Additional Information Regarding Emergency License Amendment Request: One-Time-Use Amendment to Allow Alternative Fuel Handling Method for the Recovery of Fuel Assembly DD41, dated October 8, 2026 (ADAMS Accession No. ML26281A333)

Enclosure: Response to Request for Information

cc: NRC Region III Regional Administrator
NRC Senior Resident Inspector - Palisades Nuclear Plant
NRC Project Manager - Palisades Nuclear Plant
Designated Michigan State Official

Enclosure

PNP 2026-057

Response to Request for Information

Response to Request for Information

Background:

By letter dated September 30, 2026 (Reference 1 of cover letter), in accordance with Title 10 of the Code of Federal Regulations (10 CFR) 50.90, *Application for amendment of license, construction permit, or early site permit* and 10 CFR 50.91, *Notice for public comment; State consultation*, Palisades Energy, LLC (Palisades Energy) requested U.S. Nuclear Regulatory Commission (NRC) approval of a one-time emergency change to the Renewed Facility Operating License (RFOL) for Palisades Nuclear Plant (PNP). The proposed License Amendment Request (LAR) would revise UFSAR Sections 9.11 *Fuel Handling and Storage Systems*, and 14.19 *Fuel Handling Accident*, to facilitate transport of fuel assembly DD41 (DD41) from the reactor utilizing different plant equipment and following a different travel path than is described in the Updated Final Safety Analysis Report (UFSAR).

On October 1, 2026, the NRC and Palisades Energy conducted a conference call in which the NRC staff verbally and visually requested information in the form of questions related to the proposed LAR. On October 2, 2026, a follow-up conference call was conducted between the NRC and Palisades Energy. The purpose of the call was to provide verbal responses to the questions raised and to identify responses required to be docketed. Palisades Energy provided the responses to the request for additional information (RAI) in a letter dated October 2, 2026 (Reference 2 of cover letter).

By electronic mail (email) received on October 7, 2026, the NRC provided a second RAI regarding the LAR. Palisades Energy provided the responses to the second request for additional information (RAI) in a letter dated October 8, 2026 (Reference 3 of cover letter).

By email received on October 9, 2026, the NRC provided a third RAI regarding the LAR. Each RAI is presented below in bold type and is followed by the Palisades Energy response.

RAI-1a

In response to RAI 3 in the October 8, 2026, supplement, it was stated that “Once DD41 is placed on the FTC pedestals, the extent of plastic deformation and overall assembly alignment will be confirmed using cameras before lowering the canister lid.” Please describe the specific acceptance criteria that will be applied to determine whether the observed residual bowing and deformation are acceptable prior to lid installation. In addition, provide the supporting technical basis, including any engineering analyses, calculations, or vendor evaluations, demonstrating that assemblies meeting these acceptance criteria will not experience fuel rod damage during the subsequent lid-lowering and recovery activities.

Response to RAI-1a:

The specific acceptance criteria for lowering the Fuel Transfer Canister (FTC) lid, as specified in FHSO-19A, *Recovery of FA DD41* [Reference 1], consists of two parts. First, DD41 will be visually confirmed to be within the bounds of the FTC alignment tool to ensure that it does not

sit misaligned on the horizontal plane. After positioning is confirmed, the alignment tool will then be removed before the FTC lid is lowered.

The second acceptance criterion will be that no gap between DD41 and a pedestal shall be greater than 2 inches. Using an underwater camera, DD41 seating on the FTC pedestals will be verified from a horizontal view using markings on the alignment tool that represent 2 inches from the pedestals. Based on an evaluation by the site's fuel vendor, FS1-0088338-1.0, *Estimated impact of cannister lid contacting DD41 based on assembly distortion* [Reference 2], the predicted plastic deformation should not exceed 3 inches from the horizontal and the largest gaps between DD41 and the pedestals are expected to exist at the top end of the assembly. If any gaps are determined to be greater than 2 inches, work will stop and the site will re-evaluate.

RAI-1b:

In addition, the response to RAI 3 states “Based on a review by our fuel vendor, the assembly is expected to straighten out without risk of fuel cladding failure inside the FTC” and “As long as the fuel rods remain within the envelope defined by the inner surface of the FTC lid, there is no potential for fuel rod failure during lowering of the lid.” Given that the full extent of assembly damage may not be completely characterized, on what basis can it be concluded that there is “no potential” for fuel rod failure during installation of the FTC lid? Please describe the analytical, empirical, or vendor-supported justification underlying these two statements.

Response to RAI-1b:

Visual evaluations have not identified any of the fuel rods to have experienced damage from DD41 tilting onto the core shroud, with the impacts absorbed by the non-fuel hardware (upper tie plate, guide bars, and spacer grids). To confirm no fuel rod cladding failure, numerous water chemistry samples have been taken to detect fission product leakage. During lowering of the FTC lid, per FS1-0088338-1.0, [Reference 2], it is expected that the non-fuel hardware will absorb any undesired forces and strain externally placed on the assembly.

RAI-2a:

Provide information, including supporting calculations, characterizing the potential radiological conditions during removal of the cask from the reactor cavity water, to which workers in containment and the fuel handling building may be exposed assuming a fraction of the fuel rods fail when the fuel transfer cask lid is lowered onto the assembly. The response should specifically address the expected airborne contamination conditions associated with this scenario.

Response to RAI-2a:

While the FTC lid is being lowered, there will be a minimum of 20 feet of water between DD41 and the water surface. Using staff guidance from Regulatory Guide 1.183 Revision 0, Appendix B, *Assumptions for Evaluating the Radiological Consequences of a Fuel Handling Accident*, to consider the decontamination effects of water from a fuel accident release, workers would be exposed only to the noble gases within DD41. According to the isotopic analysis of DD41, the only remaining noble gas radioisotope is Krypton-85 (Kr-85), which is limited to an activity of 3,734 Curies (Ci) for the entire assembly.

To bound all postulated scenarios during lowering of the FTC lid, the following evaluation assumes a worst-case accident of all 216 fuel rods undergoing complete loss of cladding integrity. In accordance with Regulatory Position 3.2 (Table 3) of Regulatory Guide 1.183, the fractional release of Kr-85 from the gap between the cladding and fuel pellet is assumed to be 10%. Applying the Table 3 release fraction results in a total gaseous activity of 373.4 Ci in containment.

Since this postulated scenario is to quantify immediate local worker dose, assuming a dispersal into the entire containment volume would not be realistic. Therefore, the following dose approximation assumes all activity has been instantaneously dispersed into a local compartment of 20 x 20 x 20 feet where a worker is standing for five minutes (300 seconds). The five-minute duration is based on the conservative assumption that the worker must place work in a safe condition before evacuating the containment building. Since Kr-85 radiological effects are known only to be detrimental by means of external submersion, absorption by means of inhalation is not considered.

$$V = 8,000 \text{ ft}^3 = 226.53 \text{ m}^3$$

Compartment volume

$$A_{Kr85} = 373.4 \text{ Ci}$$

Activity of released Kr-85 (in Ci)

Using the inputs above and the unit conversion factor for becquerels (Bq) to Curies (Ci) below, the concentration of Kr-85 in air is approximated as follows:

$$A_{Kr85} = 373.4 \text{ Ci} * (3.7 * 10^{10}) = 1.382 * 10^{13} \text{ Bq}$$

Activity of released Kr-85 (in Bq)

$$C = \frac{A}{V} = 1.649 \text{ Ci/m}^3 = 6.101 * 10^{10} \text{ Bq/m}^3$$

Concentration of Kr-85 in air

Using the Kr-85 effective dose coefficient from Federal Guidance Report No. 12, *External Exposure to Radionuclides in Air, Water, and Soil*, (FGR-12) Table III.1, the worker's total effective dose equivalent (TEDE) in this postulated scenario would be 218 mrem, which does not encroach the 10 CFR 20.1201, *Occupational dose limits for adults*, occupational TEDE limit of 5 rem.

$$D_E = (6.101 * 10^{10} \text{ Bq/m}^3) \left(1.19 * 10^{-16} \frac{\text{Sv} * \text{m}^3}{\text{Bq} * \text{s}} \right) (300 \text{ s}) \left(\frac{100 \text{ rem}}{1 \text{ Sv}} \right) = 0.2180 \text{ rem TEDE}$$

Using the Kr-85 skin dose coefficient from FGR-12 Table III.1, the worker's total dose received to the skin in this postulated scenario would be 24.16 rem, which does not exceed the 10 CFR 20.1201 shallow-dose equivalent limit of 50 rem.

$$D_{skin} = (6.101 * 10^{10} \text{ Bq/m}^3) \left(1.32 * 10^{-14} \frac{\text{Sv} * \text{m}^3}{\text{Bq} * \text{s}} \right) (300 \text{ s}) \left(\frac{100 \text{ rem}}{1 \text{ Sv}} \right) = 24.160 \text{ rem}$$

In accordance with Derived Air Concentration (DAC) methodology from 10 CFR 20 Appendix B, we may also determine the worker exposure in this postulated scenario with respect to the maximum limit of 2,000 DAC hours. Using the 10 CFR 20 Appendix B DAC value for Kr-85 of 1E-4 $\mu\text{Ci/mL}$, there is significant margin in the five-minute exposure time before occupational dose limits are reached.

$$DAC - exposure = \left(\frac{1.649 \frac{Ci}{m^3}}{1 * 10^{-4} \frac{Ci}{m^3}} \right) (300 s) \left(\frac{1 hour}{3600 s} \right) = 1,375 DAC - hours$$

RAI-2b:

Describe what immediate actions are planned if there are unexpected airborne monitor alarms when the FTC is removed from the reactor cavity water.

Response to RAI-2b:

The activity-specific ALARA plan and Radiation Work Permit establish radiological controls through the station's existing Radiation Protection (RP) programs and approved procedures. These controls include radiation and airborne-radioactivity monitoring, contamination controls, personnel dosimetry, respiratory protection, restricted access, RP coverage, and radiological hold points. Required radiological surveys and Chemistry sampling evaluations support authorization to proceed with designated phases, including removal of the canister from the water.

Portable continuous air monitors may alarm during the lift phase as the FTC is moved from below the water surface to above the water surface. RP personnel will monitor detector response throughout canister operations and evaluate alarm conditions based on detector behavior. A rapid increase in detector response is expected during the lift due to changing geometry and increasing background dose rates as shielding effects are reduced. In contrast, a sustained gradual increase in detector response that is inconsistent with expected lifting activities may be indicative of airborne radioactivity and would prompt further evaluation by RP personnel. RP will provide continuous oversight of canister operations and direct appropriate actions in accordance with station procedures.

An unexpected portable continuous air monitor alarm would require the work to stop and notification of Operations and RP Management. RP would implement personnel protective actions, including withdrawal or evacuation as required by applicable procedures, while Operations would direct any actions necessary to place DD41 and FTC in a safe condition. RP would evaluate radiological conditions and the adequacy of controls, with Chemistry and Engineering support as appropriate.

Further planned work would remain suspended until the condition is evaluated, necessary changes to controls are implemented, and required authorizations are obtained in accordance with station procedures. Affected personnel are briefed before work resumes.

RAI-3

Describe the FTC design features related to water and air infill, as well as drainage, as these functions are important to ensuring that the 133-hour limit on FTC out-of-pool time adequately protects fuel rod oxidation limits and maintains cladding integrity. Specifically, when the FTC lid is installed while the FTC remains underwater, is there any potential for air to become entrapped within the canister such that portions of the fuel rods may not remain fully submerged? If air entrapment is possible, describe any design

features or operational mechanisms used to remove trapped air and ensure complete water coverage.

Further, if there is any condition under which trapped air could expose fuel rods to air once the lid is placed, clarify whether the 133-hour out-of-water time limit would initiate at that point. Provide technical and procedural basis supporting the response.

Response to RAI-3:

The FTC cover, with the end-mounted shield gate, is designed to be self-venting in both the horizontal and vertical orientation. The shield gate is nominally 9-inches thick and the gate guide plates provide a 9-1/4-inch channel for the gate to slide in. Thus, there is a nominal 1/4-inch gap between the gate and the guide plates that will allow venting via the gate gap. The gate is also provided with a machined groove on the lower portion of the gate (while in the horizontal position) to facilitate drainage of the water contained within the canister when it is raised out of the reactor cavity water to minimize the time spent waiting for water drainage to complete. In the horizontal alignment, the top of the shield gate extends above the top of the fuel assembly cavity, thus the air in the fuel assembly cavity will be vented via the gate-to-gate guide plate gap when the FTC cover is first submerged. After the FTC cover is submerged, per FHSO-19A, [Reference 1], a submersible camera will be used to visually determine the effectiveness of the fuel assembly void venting. If the venting is determined to be insufficient, further action will be taken to complete the venting process as needed.

When the FTC is upended for vertical placement in the Spent Fuel Pool, the machined groove in the gate will ensure the entire fuel assembly is completely and promptly vented as the FTC is lowered under the water. Based on these features, there is no plausible scenario in which trapped air could expose the fuel rods once the FTC lid is placed.

The 133-hour limit per HOLTEC Report HI-2261312 Rev. 0, Thermal Evaluation of Fuel Transfer Operations using Fuel Transfer Canister at Palisades NPP [Reference 3], is built on the assumption that all water has been drained from the FTC by gravity. FHSO-19A, [Reference 1] will start the 133-hour clock when the FTC is removed from the reactor cavity water and stop it when the FTC is fully submerged in the Spent Fuel Pool.

References:

1. FHSO-19A, Recovery of FA DD41
2. FS1-0088338-1.0, *Estimated impact of cannister lid contacting DD41 based on assembly distortion*
3. HOLTEC Report HI-2261312, *Thermal Evaluation of Fuel Transfer Operations using Fuel Transfer Canister at Palisades NPP*