



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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May 2, 2023

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SUBJECT: PALISADES NUCLEAR PLANT – REVIEW OF THE POST-SHUTDOWN
DECOMMISSIONING ACTIVITIES REPORT (EPID L-2022-LRO-0073)

Dear Jean Fleming:

The purpose of this letter is to inform you that the U.S. Nuclear Regulatory Commission (NRC, the Commission) staff has completed its review of the post-shutdown decommissioning activities report (PSDAR), and the Site-Specific Decommissioning Cost Estimate (DCE) for the Palisades Nuclear Plant (Palisades) and finds that it contains the information required by Section 50.82(a)(4)(i) of Title 10 of the *Code of Federal Regulations* (10 CFR).

By letters dated September 28, 2017, and October 19, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. [ML17271A233](#) and [ML17292A032](#), respectively), in accordance with 10 CFR 50.4(b)(8) and 10 CFR 50.82(a)(1)(i), Entergy Nuclear Operations, Inc. (Entergy), which was the licensee at that time, notified the NRC it they had decided to permanently cease power operations at Palisades by May 31, 2022.

Pursuant to 10 CFR 50.82(a)(1)(ii), by letter dated June 13, 2022 ([ML22164A067](#)), Entergy certified to the NRC that the fuel had been permanently removed from the Palisades reactor vessel and placed in the spent fuel pool. Upon the docketing of these certifications, in accordance with 10 CFR 50.82(a)(2), the Palisades license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel. The spent fuel from Palisades is stored in the spent fuel pool and in dry cask storage at the onsite independent spent fuel storage installation, where it will remain until it is shipped offsite.

By Order dated December 13, 2021 ([ML21292A155](#)), the NRC approved the transfer of the Palisades Renewed Facility Operating License (No. DPR-20) from Entergy and Entergy Nuclear Palisades, LLC, to Holtec International (Holtec) and Holtec Decommissioning International, LLC. This transfer was executed on June 28, 2022 ([ML22173A179](#)), such that Holtec Palisades, LLC and Holtec Decommissioning International, LLC became the licensees for Palisades, hereafter referred to as the licensee. The execution of the Palisades license transfer transaction allowed the NRC staff to begin the review of the licensee's PSDAR and DCE for Palisades, submitted by letter dated December 23, 2020 ([ML20358A232](#)), as supplemented by letter dated March 1, 2023 ([ML23060A039](#)) under 10 CFR 50.82.(a)(4)(i).

The purposes of a PSDAR and DCE are to: (1) inform the public of the licensees' planned decommissioning activities, (2) assist in the scheduling of NRC resources necessary for the appropriate oversight activities during decommissioning, (3) ensure that the licensee has

considered all of the costs for the planned decommissioning activities and has considered the funding necessary for the dismantlement process, and (4) ensure that the environmental impacts of the planned decommissioning activities are bounded by those considered in existing environmental impact statements for the site.

Pursuant to 10 CFR 50.82(a)(4)(i), the PSDAR must contain a description of the planned decommissioning activities along with a schedule for their accomplishment, a discussion that provides the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate previously issued environmental impact statements, and a site-specific DCE, including the projected cost of managing irradiated fuel. Additionally, pursuant to 10 CFR 50.82(a)(3), decommissioning is to be completed within 60 years of permanent cessation of operations. The associated decommissioning regulations do not require the NRC to approve a licensee's PSDAR; rather, NRC approval is required later in the decommissioning process, with regard to NRC review and approval of the licensee's license termination plan, in accordance with 10 CFR 50.82(a)(9)-(10).

In a request for additional information (RAI) dated February 14, 2023 ([ML23055A152](#)), the NRC transmitted to the licensee two RAIs in order to support the determination that the site-specific environmental impacts of decommissioning are adequately addressed in the licensee's PSDAR. The licensee stated in its RAI response dated March 1, 2023 ([ML23060A039](#)), that Palisades will be implementing an incremental active decommissioning (DECON) method as described in NUREG-0586, Supplement 1, "Generic Environmental Impact Statement [GEIS] on Decommissioning of Nuclear Facilities," dated November 2002, Volumes 1 and 2 ([ML023470327](#) and [ML023500228](#), respectively). This will give the licensee the opportunity to perform some incremental decontamination and dismantlement activities before or during the storage period of SAFSTOR. Under the current regulations, unless the licensee receives permission to the contrary, the site must be decommissioned within 60 years (i.e., May 2082).

Consistent with 10 CFR 50.82(a)(4)(ii), the public was offered an opportunity to comment on the Palisades PSDAR and DCE. A notice of receipt of the Palisades PSDAR and DCE was published in the *Federal Register* (FR) on August 26, 2022 (87 FR 52598). The NRC staff requested that all comments be submitted by December 27, 2022. There were 18 comments submitted to the docket related to the Palisades PSDAR and DCE. Comments that were submitted electronically can be viewed at www.regulations.gov by searching for Docket ID NRC-2022-0158 and selecting "Open Docket Folder."

Additionally, pursuant to 10 CFR 50.82(a)(4)(ii), the NRC staff held a public meeting at the South Haven campus of Lake Michigan College in South Haven, Michigan, on September 22, 2022, to describe the decommissioning process, receive comments, and answer questions regarding both the Palisades PSDAR and DCE. A meeting summary dated October 31, 2022, can be found at ADAMS Accession No. [ML22292A261](#). A press release was issued on September 9, 2022 (NRC News Release No. 22-037). Public questions and comments on the PSDAR, DCE, and other matters related to the site's decommissioning, including the NRC staff's responses, are available for review in the transcript of the meeting ([ML22292A263](#)).

The NRC reviewed every comment to ensure that the information did not identify any immediate radiological health and safety matters within the regulatory purview of the NRC and incorporated this information into the PSDAR review as appropriate. NRC staff's review of the PSDAR consists of determining if the licensee's PSDAR meets the requirements of 10 CFR 50.82(a)(4)(i).

The NRC staff notes that PSDAR comments generally fall into two categories: (1) questions and comments that are within the regulatory purview of the NRC staff's review of a PSDAR, which were considered by the NRC staff during its review of the associated PSDAR, and (2) questions and comments that, upon review, were found to be outside the regulatory authority of the NRC, or were not relevant to the NRC staff review performed (i.e., whether the licensee's PSDAR meets the requirements of 10 CFR 50.82(a)(4)(i)) and thus were not considered. The NRC staff's review of a PSDAR does not require a response to each of the comments submitted.

However, the NRC staff acknowledges the comments and typically attempts to address the more significant comments. Specifically, the NRC staff has identified a number of similar in-scope comments that pertain to the same topic, where a single response may be provided. The NRC staff's response to these comments can be found in the enclosure to this letter.

The NRC staff reviewed the Palisades PSDAR and accompanying DCE against the requirements in 10 CFR 50.82(a). In addition, the NRC staff used the guidance in Regulatory Guide (RG) 1.185, Revision 1, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report," dated June 2013 ([ML13140A038](#)), in conducting its review. Based on its review, the NRC staff concludes as follows.

1. Section 2 of the Palisades PSDAR, "Description of Planned Decommissioning Activities," and the DCE provided most of the applicable information identified in Section C.1 of RG 1.185, Revision 1. The NRC staff's review determined that the licensee needed to respond to RAIs to ensure the licensee adequately described the activities associated with the major periods or milestones related to decommissioning, as required by 10 CFR 50.82(a)(4)(i) and consistent with RG 1.185, Revision 1. The licensee's RAI responses related to this area were found to be acceptable.
2. Section 3 of the Palisades PSDAR, "Schedule of Planned Decommissioning Activities," and the DCE provide the estimated dates for initiation and completion of major decommissioning activities, as required by 10 CFR 50.82(a)(4)(i) and consistent with Section C.2 of RG 1.185, Revision 1. The NRC staff finds that the schedule for decommissioning activities is adequate to achieve Palisades license termination within 60 years of permanent cessation of operations, as required by 10 CFR 50.82(a)(3).
3. Section 4 of the Palisades PSDAR, "Estimate of Expected Decommissioning and Spent Fuel Management Costs," and the DCE provide an estimate of approximately \$644 million for the expected decommissioning costs for Palisades. The decommissioning costs presented in the Palisades PSDAR report are reported in 2020 dollars. Escalation of future decommissioning costs over the remaining decommissioning project life cycle are excluded.

The site-specific DCE is based on regulatory requirements, site conditions, Basis of Estimate assumptions, low-level radioactive waste disposal standards, high-level radioactive waste management options, and site restoration requirements. The methods utilized to estimate decommissioning costs were based on the professional judgment of experienced personnel at the Palisades site, considering the nature of the work, degree of scope definition, availability of quantifiable cost and pricing data, among other factors.

Using the formula in 10 CFR 50.75(c) and the methodology provided in NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors," dated December 2004 ([ML043510113](#)), and NUREG-1307, Revision 18, "Report on Waste Burial Charges: Changes in Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities," dated January 2020 ([ML21027A302](#)), the NRC staff independently calculated the 2020 minimum decommissioning financial assurance formula amount to be \$486 million per unit (2020 dollars).

The licensee opted to provide a site-specific decommissioning cost amount in lieu of using the minimum decommissioning financial assurance amount. As reported in the Palisades DCE, the licensee's 2020 site-specific decommissioning cost estimate is approximately \$644 million. This amount includes the revised estimate for license termination expenses of \$443 million, the current separate estimate of spent fuel management costs of \$166 million and the current separate estimate for site restoration costs of \$35 million. The NRC staff noted that the site-specific cost estimate relies on estimated Palisades site-specific radiological decommissioning costs of \$443 million, which is lower than the 10 CFR 50.75(c) minimum formula amount of \$486 million. During the license transfer application process, the licensee provided their justification for using a total site-specific radiological decommissioning cost estimate value that is less than the minimum formula amount. The NRC staff reviewed the licensee's justification and agreed with the assessment. As such, the NRC staff found the justification for a decommissioning cost estimate less than the generic formula reasonable. Therefore, the NRC staff finds that the Palisades DCE amount conforms to the guidance in NUREG-1713 and meets the regulations in 10 CFR 50.75.

The NRC staff considered the adequacy of available funding to safely decommission Palisades. In the licensee Decommissioning Funding Status Report dated March 31, 2023 ([ML23090A140](#)), the licensee stated that the trust fund balance for Palisades as of December 31, 2022, was \$547 million. The trust fund amount is the total available for decommissioning including costs of license termination, spent fuel management, and site restoration activities. The total is provided because the licensee received an exemption ([ML21286A294](#)) from 10 CFR 50.82(a)(8)(i)(A) to allow the Palisades trust fund to be used for site irradiated fuel management and site restoration costs. In order to determine that adequate funds would be available for radiological decommissioning, the NRC staff performed a cash flow analysis using the costs listed by year in the DCE and the balances in the trust fund as of December 31, 2022. This analysis also assumed a conservative 2% return on the decommissioning trust fund balances, as prescribed by 10 CFR 50.75(e)(1)(ii). Based on this analysis, the NRC staff concluded that a positive ending balance in the trust fund is achieved in the last year of spent fuel management assumed in the PDSAR and DCE (2041), indicating that sufficient funding is available to decommission Palisades.

Based on its review of the Palisades DCE, the NRC staff finds that the licensee has demonstrated reasonable assurance that funding will be available to decommission Palisades pursuant to the DECON and SAFSTOR methods as described in the PSDAR. The NRC staff verified that the DCE amount was more than the decommissioning financial assurance formula amount required by 10 CFR 50.75(c). The DCE included an up-to-date listing of major factors that could affect the cost to decommission Palisades, and these factors were assessed by the licensee as required by 10 CFR 50.75(f)(3). The DCE also provided plans to adjust the level of funding and costs as required by 10 CFR 50.75(c)(2), 10 CFR 50.75(f)(5), and 10 CFR 50.82(a)(8)(iv).

Based on the above, the NRC staff reviewed the cost estimates against the guidance in Section C.3 of RG 1.185, Revision 1, and found that the site-specific DCE for decommissioning Palisades demonstrates that adequate funding is available in the Nuclear Decommissioning Trust fund to complete the planned decommissioning activities and pursue license termination. Therefore, the NRC staff concludes that the licensee provided sufficient details associated with the funding mechanisms for decommissioning Palisades, which meets the requirements of 10 CFR 50.82(a)(4)(i).

As required by 10 CFR 50.82(a)(7), the licensee must notify the NRC in writing and send a copy to the State of Michigan before performing any decommissioning activity inconsistent with, or making any significant schedule change from, the planned decommissioning activities and schedules described in the Palisades PSDAR, including changes that significantly increase the decommissioning costs. As required, the licensee will verify that the decommissioning activities meet the requirements of 10 CFR 50.82(a)(6)(i) through 10 CFR 50.82(a)(6)(iii) or seek appropriate regulatory approval if needed before taking an action that is outside these provisions.

Finally, consistent with 10 CFR 50.82(a)(8), the licensee will annually submit to the NRC decommissioning financial assurance status reports, which, among other things, must include a discussion of additional financial assurance to cover any shortfalls, if needed.

4. Section 5 of the Palisades PSDAR, "Environmental Impacts," provides a discussion of the potential environmental impacts associated with the planned decommissioning activities, as required by 10 CFR 50.82(a)(4)(i) and consistent with Section C.4 of RG 1.185, Revision 1. The PSDAR includes a comparison of the potential environmental impacts from the planned Palisades decommissioning activities with impacts from similar activities provided in NUREG-0586, Supplement 1, "Generic Environmental Impact Statement [GEIS] on Decommissioning of Nuclear Facilities," dated November 2002, Volumes 1 and 2 ([ML023470327](#) and [ML023500228](#), respectively) (also called the Decommissioning GEIS). A licensee in decommissioning is required to address the environmental impacts associated with site specific decommissioning activities in both its PSDAR per 10 CFR 50.82(a)(4)(i), as well as before performing the decommissioning activities per 10 CFR 50.82(a)(6).

The environmental impacts associated with decommissioning activities are generically evaluated in the Decommissioning GEIS. In the Decommissioning GEIS, the NRC staff explained the significance of the impacts and whether the environmental impacts of decommissioning activities are considered generic to all nuclear power plants or site-specific to the decommissioning facility. The Decommissioning GEIS also identifies activities that can be bounded by the generic evaluations presented in the Decommissioning GEIS.

The licensee can therefore rely on information in the Decommissioning GEIS as a basis for meeting the bounding impacts requirement in 10 CFR 50.82(a)(4)(i). For environmental impacts that the Decommissioning GEIS classifies as site-specific, or for decommissioning activities that could exceed the generic environmental impacts analyzed by the Decommissioning GEIS, the licensee cannot rely on the Decommissioning GEIS. The environmental impacts that must be evaluated on site-specific basis identified in the Decommissioning GEIS applicable to Palisades decommissioning activities include threatened and endangered species and,

environmental justice. If the impacts of decommissioning activities fall outside the range of impacts considered in the Decommissioning GEIS (i.e., unbounded impacts), then the activity cannot be performed until a site-specific analysis is completed and a license amendment request to perform the unbounded action is submitted to the NRC for approval.

In the Palisades PSDAR, the licensee provided a summary of the reasons for reaching the conclusion that the environmental impacts for generic issues associated with the planned Palisades decommissioning activities are bounded by the Decommissioning GEIS or previously issued environmental impact statements. The NRC staff transmitted an RAI ([ML23055A152](#)) to the licensee to evaluate whether the PSDAR adequately demonstrates that the environmental impacts associated with site-specific decommissioning activities for Palisades will be bounded by appropriate previously issued environmental impact statements for radiation doses, waste management, air quality, water quality, ecological resources, and socioeconomic impacts. The licensee stated in its RAI response ([ML23060A039](#)) that their basis for concluding that the environmental impacts associated with site-specific decommissioning activities for Palisades are bounded is consistent with the considerations in NUREG-0586.

Specifically, the licensee has not identified any planned decommissioning activities for Palisades that are outside those considered in the Decommissioning GEIS. Therefore, the licensee concluded that the potential environmental impacts associated with the planned decommissioning of Palisades are bounded by the Decommissioning GEIS. For generic issues, the NRC staff has concluded that the PSDAR is well reasoned and supports the conclusions reached that the planned impacts are bounded by the Decommissioning GEIS.

Threatened and Endangered Species

Section 5.1.7 of the Palisades PSDAR addresses threatened and endangered species. With respect to federally listed terrestrial species, the PSDAR concludes that decommissioning would not affect the Indiana bat (*Myotis sodalis*), northern long-eared bat (*M. septentrionalis*), piping plover (*Charadrius melodus*), red knot (*Calidrus canutus rufa*), eastern massasauga (*Sistrurus catenatus*), Mitchell's satyr butterfly (*Neonympha mitchelli mitchelli*), and Pitcher's thistle (*Cirsium pitcher*). No critical habitats of federally listed terrestrial species occur on or near the Palisades site.

The licensee states in the PSDAR that when the additional details of decommissioning activities for Palisades have been determined, such as demolition or disturbance of land areas that could potentially affect a protected species, the licensee will perform a review to determine if potential impacts associated with those activities have been adequately addressed by existing environmental impact statements and evaluations. The licensee would address any such impacts through separate and appropriate permit or certification processes, such as through any necessary U.S. Army Corps of Engineers permits, or the licensee would update the site-specific assessment of threatened and endangered species in the PSDAR and request the NRC to initiate Endangered Species Act consultation with the U.S. Fish and Wildlife Service, as appropriate.

With respect to federally listed aquatic species and critical habitats, the PSDAR concludes that no such species or habitats occur on or near the Palisades site and that, therefore, decommissioning would not affect any federally listed aquatic species.

Environmental Justice

In PSDAR Section 5.1.13, Environmental Justice, the licensee examined the geographic distribution of minority and low-income populations within a 50-mile radius of Palisades using American Community Survey (ACS) 2014 – 2018, 5-year estimates. Census block groups containing minority populations were identified and were concentrated in Covert township and Keeler Township in Van Buren County, the urban areas of Kalamazoo, Benton Harbor-Benton Heights-Fair Plain and South Bend-Mishawka-Elkhart, and in Berrian, Van Buren and Cass Counties. The licensee stated, the locations and population characteristics of minority and low-income populations are similar to those evaluated by the NRC in the October 2006, Generic Environmental Impact Statement for License Renewal of Nuclear Plants (NUREG-1437), Supplement 27, Regarding Palisades Nuclear Plant ([ML062710300](#)).

The licensee stated that the site-specific decommissioning impacts to all resource areas would be small. This indicates that the environmental effects of decommissioning activities at Palisades would not be detectable or would be so minor that they would neither destabilize nor noticeably alter any important attribute of the environmental resource. In addition, the licensee concluded because no member of the public will be substantially affected, “there can be no disproportionately high and adverse impacts on minority and low-income populations resulting from the decommissioning of Palisades.”

Based on its review, the NRC staff finds that the Palisades PSDAR, including the DCE, contains the information required by 10 CFR 50.82(a)(4)(i). As required by 10 CFR 50.82(a)(7), the licensee will notify the NRC in writing and send a copy to the State of Michigan before performing any decommissioning activity inconsistent with, or making any significant schedule change from, the planned decommissioning activities and schedules described in the Palisades PSDAR, including changes that significantly increase the decommissioning costs.

In accordance with NRC regulations, the licensee must verify that the decommissioning activities meet the requirements of 10 CFR 50.82(a)(6)(i) through 10 CFR 50.82(a)(6)(iii) or seek regulatory approval if needed. The NRC will continue to conduct inspections at Palisades throughout the decommissioning process in accordance with NRC Inspection Manual Chapter (IMC) 2561, “Decommissioning Power Reactor Inspection Program,” revised in January 2021 ([ML20358A131](#)), to ensure that decommissioning activities are performed safely and in compliance with the Commission’s rules and regulations, and the conditions of the Palisades license.

In accordance with 10 CFR Part 2 of the “Agency Rules of Practice and Procedure,” a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC’s ADAMS. ADAMS is accessible from the NRC Web site at <https://www.nrc.gov/reading-rm/adams.html>.

J. Fleming

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If you have any questions, please contact me at (301) 415-1387 or by e-mail at Tanya.Hood@nrc.gov.

Sincerely,

/RA/

Tanya E. Hood, Project Manager
Reactor Decommissioning Branch
Division of Decommissioning, Uranium Recovery,
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

Docket No. 50-255

Enclosure: Palisades PSDAR Comment Resolution

cc: Listserv

SUBJECT: PALISADES NUCLEAR PLANT – REVIEW OF THE POST-SHUTDOWN
 DECOMMISSIONING ACTIVITIES REPORT (EPID L-2022-LRO-0073)
 DATED: MAY 02,2023

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***via eConcurrence**

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