



Environmental Assessment and Finding of No Significant Impact for the Palisades Nuclear Plant Reauthorization of Power Operations Project

Final Environmental Assessment and Finding
of No Significant Impact

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Environmental Center of Expertise
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Office of Nuclear Material Safety and Safeguards

ABSTRACT

The Palisades Nuclear Plant (Palisades), located along the shoreline of Lake Michigan in Covert Township, Van Buren County, Michigan, consists of a single unit pressurized water nuclear reactor. Palisades permanently ceased operations on May 20, 2022. In accordance with the Title 10 of the *Code of Federal Regulations* (10 CFR), paragraph 50.82(a)(1) (TN249), Entergy Nuclear Operations, Inc., as the licensee who operated the facility prior to entering decommissioning, on June 13, 2022, submitted certifications to the U.S. Nuclear Regulatory Commission (NRC or Commission) for the permanent cessation of operations (May 20, 2022) and the permanent removal of fuel from the reactor vessel (June 10, 2022). As part of the transition from an operating reactor to a reactor in a decommissioned state, the NRC-issued Amendments 266, 267, and 272 to the Palisades Renewed Facility Operating License (Palisades RFOL) to reflect the permanently defueled status (NRC 2018-TN10957, NRC 2018-TN10958, NRC 2022-TN10543). The current licensing status of Palisades is such that the Palisades RFOL exists and specifically affords authorization for decommissioning and associated activities, but not power operations.

Prior to submitting the Palisades 10 CFR 50.82(a)(1) certifications, Entergy submitted a license transfer request to make Holtec Palisades, LLC (Holtec Palisades) the licensed owner and to transfer licensed operational authority from Entergy to Holtec Decommissioning International, LLC (HDI) (Entergy 2020-TN10832). This transfer request was approved by the NRC staff, and the conforming license amendments were issued on June 28, 2022 (NRC 2022-TN10545). Subsequent to the cessation of power operations and the commencement of decommissioning at Palisades, HDI, the licensing authority during decommissioning, began to pursue a path to resume power operations. Throughout 2023, 2024, and 2025, HDI submitted a set of licensing and regulatory requests for NRC approval—the proposed actions before the NRC—to support reauthorizing power operations of Palisades through March 24, 2031, the end of the current operating license term under the Palisades RFOL.

This environmental assessment (EA) describes the environmental review conducted by the NRC staff for the set of licensing and regulatory requests submitted by HDI in support of the reauthorization of power operations of Palisades through March 24, 2031, the end of the current operating license term under the Palisades RFOL No. DPR-20. In addition to the set of licensing and regulatory requests related to the potential reauthorization of power operations of Palisades, Holtec submitted an application for a loan from the U.S. Department of Energy's (DOE's) Loan Program Office to finance refueling and resumption of power generation activities of the Palisades' 800 megawatts electric (MWe) nuclear generating station. As such, DOE Loan Program Office is a cooperating agency for this environmental review.

This EA follows procedures specified in 10 CFR 51.30 (TN10253), "Environmental Assessment," and 10 CFR 51.31, "Determinations Based on Environmental Assessment," which are the NRC's regulations for preparing EAs to implement the National Environmental Policy Act of 1969 (TN661), as amended. The NRC staff conclude that the potential direct, indirect, and cumulative environmental impacts from the reauthorization of power operations of Palisades would not be significant and has determined that a Finding of No Significant Impact is warranted.

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ABBREVIATIONS AND ACRONYMS

°C	degree(s) Celsius
°F	degree(s) Fahrenheit
µg/L	microgram(s) per liter
ac	acre(s)
ACHP	Advisory Council on Historic Preservation
ADAMS	Agencywide Documents Access and Management System
AEA	Atomic Energy Act of 1954, as amended
APE	area of potential effect
AST	above ground storage tank
BCE	Before Common Era
bhp	brake horsepower
BMP	best management practice
BRE	blast resistant enclosure
CAA	Clean Air Act
CatEX	categorical exclusion
CCW	component cooling water
CDA	critical dune area
CDF	core damage frequency
CE	Common Era
CFR	<i>Code of Federal Regulations</i>
Ci	Curie(s)
cm	centimeter(s)
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
COL	combined license
CWA	Clean Water Act
CWIS	cooling-water intake structures
CZMA	Coastal Zone Management Act
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior

DOT	U.S. Department of Transportation
EA	environmental assessment
EF	Enhanced Fujita
EFH	essential fish habitat
EIS	environmental impact statement
Entergy	Entergy Nuclear Operations, Inc.
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act of 1973, as amended
FES	final environmental statement
FONSI	Finding of No Significant Impact
fps	foot/feet per second
ft	foot (feet)
ft ³	cubic foot/feet
FWS	U.S. Fish and Wildlife Service
GEIS	generic environmental impact statement
GHG	greenhouse gas
GPI	Groundwater Protection Initiative
gpm	gallon(s) per minute
GWd	gigawatt-day(s)
ha	hectare(s)
HAP	hazardous air pollutant
HDI	Holtec Decommissioning International, LLC
Holtec	Holtec Decommissioning International, LLC; Holtec Palisades, LLC; Palisades Energy, LLC
in.	inch(es)
IPaC	Information for Planning and Consultation
ISFSI	independent spent fuel storage installation
KBB	Karner blue butterfly
kg	kilogram(s)
kg/ha	kilogram(s) per hectare

km	kilometer(s)
km ³	cubic kilometer(s)
LAR	License Amendment Request
lb	pound(s)
lb/ac	pound(s) per acre
LLRW	low-level radioactive waste
LPO	Loan Program Office
LR	license renewal
m	meter(s)
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
MDNR	Michigan Department of Natural Resources
mi	mile(s)
mi ³	cubic mile(s)
Michigan EGLE	Michigan Department of Environment, Great Lakes, and Energy
Michigan SHPO	Michigan State Historic Preservation Office
MMBtu	million British thermal unit(s)
mph	mile(s) per hour
mrem	millirem(s)
MSA	Magnuson–Stevens Fishery Conservation and Management Act of 1996
MSB	Mitchell’s satyr butterfly
MSL	mean sea level
mSv	millisievert(s)
MT	metric ton(s)
MTu	metric ton(s) uranium
MW	megawatt(s)
MWe	megawatt(s) electric
N&S Report	New and Significant Report (from Holtec Decommissioning International, LLC)]
NEPA	National Environmental Policy Act of 1969, as amended
NH ₃	anhydrous ammonia
NHPA	National Historic Preservation Act of 1966, as amended
NLAA	not likely to adversely affect
NMFS	National Marine Fisheries Service

NMSA	National Marine Sanctuaries Act
NOAA	National Oceanic and Atmospheric Administration
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC or Commission	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OSHA	Occupational Safety and Health Administration
Palisades	Palisades Nuclear Plant
Palisades RFOL	Palisades Renewed Facility Operating License
pCi/L	picoCurie(s) per liter
PFAS	polyfluoroalkyl substances
PM	particulate matter
PPA	power purchase agreement
PSDAR	Post-Shutdown Decommissioning Activities Report
RAIs	requests for additional information
RCIs	requests for confirmatory information
rem	roentgen equivalent(s) man
REMP	radiological environmental monitoring program
ROI	region(s) of influence
SAMA	Severe Accident Mitigation Alternatives
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act of 1974
SEIS	supplemental environmental impact statement
SLR	subsequent license renewal
SMR	small modular reactor
SNF	spent nuclear fuel
SO ₂	sulfur dioxide
SPCC-PIPP	spill prevention, control, and countermeasures and pollution incident prevention plan
SWPPP	stormwater pollution prevention plan
TEDE	total effective dose equivalent

TPY	ton(s) per year
TRO	total residual oxidant
TSCA	Toxic Substances Control Act
UFSAR	Updated Final Safety Analysis Report
U.S.C.	<i>United States Code</i>
USACE	U.S. Army Corps of Engineers
USGCRP	U.S. Global Change Research Program
VOC	volatile organic compound
yd ³	cubic yard(s)

1 INTRODUCTION

The Palisades Nuclear Plant (Palisades), located along the shoreline of Lake Michigan in Covert Township, Van Buren County, Michigan, consists of a single unit pressurized water nuclear reactor designed by Combustion Engineering (with a turbine generator designed by Westinghouse Electric Corporation). The U.S. Atomic Energy Commission originally granted Palisades a provisional operating license for operation on March 24, 1971, with the U.S. Nuclear Regulatory Commission (NRC or Commission) granting a full-term operating license on February 21, 1991, (NRC 1991-TN11017) and subsequently issuing a Palisades Renewed Facility Operating License (Palisades RFOL) No. DPR-20, on January 17, 2007, with the term expiring on March 24, 2031 (NRC 2007-TN11052).

On June 13, 2022, the licensee at the time, Entergy Nuclear Operations, Inc. (Entergy), submitted certifications under Title 10 of the *Code of Federal Regulations* (10 CFR) 50.82(a)(1) (TN249) that operation had permanently ceased on May 20, 2022, and that fuel had been permanently removed from the reactor on June 10, 2022 (Entergy 2022-TN10542). In accordance with 10 CFR 50.82(a)(2), the docketing of these certifications means that “the 10 CFR Part 50 license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel.”

As part of the transition from an operating reactor to a reactor in decommissioning, the NRC-issued amendments changing the operating license, which included technical specifications, to reflect the authorities and requirements for a reactor in decommissioning (NRC 2022-TN10543). Among other things, the amendments removed language from the license regarding the authority to operate the reactor and the technical specifications for an operating reactor that were not relevant to decommissioning. However, even after these amendments became effective during the decommissioning period, the license is still referred to as a Palisades RFOL in the license itself, and it continues to be a 10 CFR Part 50 operating license in accordance with 10 CFR 50.51(b).

About 18 months before submitting the Palisades 10 CFR 50.82(a)(1) certifications, Entergy submitted a license transfer request on behalf of itself, Entergy Nuclear Palisades, LLC, Holtec International, and Holtec Decommissioning International, LLC (HDI), to make Holtec Palisades, LLC (Holtec Palisades) the licensed owner of Palisades and to transfer licensed operational authority for Palisades from Entergy to HDI (Entergy 2020-TN10832). As a result of the transfer (NRC 2022-TN10545), which closed after Palisades had entered decommissioning, HDI (licensed operator) and Holtec Palisades (licensed owner) became the current license holders for Palisades. After the transfer, HDI assumed responsibility for compliance with NRC regulations and the current licensing bases and would implement any changes under applicable regulatory requirements and practices.

Subsequent to the cessation of power operations and the commencement of decommissioning at Palisades, HDI began to pursue a path to resume power operations. On February 1, 2023 (updated on March 13, 2023), HDI (on behalf of Holtec Palisades) submitted a letter to the NRC outlining a proposed regulatory path for the reauthorization of power operations of Palisades (HDI 2023-TN10549, HDI 2023-TN10595). Throughout 2023, 2024, and 2025, HDI engaged with the NRC and submitted a set of requests for NRC approval to support the reauthorization of power operations of Palisades through March 24, 2031, the end of the current Palisades RFOL. The set of requests include:

- The September 28, 2023, request for an exemption (HDI 2023-TN10538) from the 10 CFR 50.82(a)(2) (TN249) restriction that prohibits reactor power operations and emplacement or retention of fuel in the reactor vessel to allow for a one-time rescission of the docketed 10 CFR 50.82(a)(1) certifications.
- The December 6, 2023, license transfer request (HDI 2023-TN10838) for Palisades, which seeks NRC consent to, and a conforming amendment for, a transfer of operating authority from HDI to Palisades Energy, LLC under the Palisades RFOL No. DPR-20 and the general license for the Palisades Independent Spent Fuel Storage Installation.
- Approval of requisite license amendment requests (LARs) to the Palisades RFOL—the identified requisite LARs are listed in Table 1-1 (see Section 1.1.1 of this environmental assessment [EA]).

Hereinafter, Holtec Palisades (licensed owner), HDI (current licensed operator), and Palisades Energy, LLC (planned licensed operator upon approval of December 6, 2023 transfer request) are collectively referred to as Holtec. This EA will generally refer to Holtec without specifying which company, unless necessary.

The exemption to 10 CFR 50.82(a)(2) would allow rescission of the 10 CFR 50.82(a)(1) certifications on the same date that the operating authority license transfer and the requisite LARs would be implemented, if approved. It is on that date that Palisades would transition from a facility in decommissioning to a facility authorized for reactor power operations under Palisades' RFOL.

Collectively, the requested NRC approvals identified above and in Table 1-1 (see Section 1.1.1 of this EA), including any revisions or supplements thereto or other regulatory or licensing requests submitted to the NRC that are necessary to reauthorize power operations at Palisades, define the scope of the proposed NRC Federal actions for the potential reauthorization of power operations under Palisades' RFOL.

For the NRC staff, evaluation of the exemption, transfer, and LARs occurs simultaneously for both safety and environmental reviews through the Office of Nuclear Reactor Regulation and the Office of Nuclear Material Safety and Safeguards, respectively. In parallel with this environmental review, the NRC staff in the Office of Nuclear Reactor Regulation are conducting a detailed safety evaluation of the exemption, transfer, and amendment requests.

1.1 Proposed Federal Actions

In addition to the set of licensing and regulatory requests Holtec submitted to the NRC related to the potential reauthorization of power operations at Palisades, Holtec submitted an application for an approximate \$1.52 billion loan from the U.S. Department of Energy's (DOE) Loan Program Office (LPO), and on March 27, 2024, DOE's LPO announced a conditional commitment of up to \$1.52 billion for a loan guarantee to Holtec to finance the restoration and resumption of service of the Palisades 800 megawatts electric (MWe) nuclear generating station.

Given that the two agencies' Federal actions are related and both require an environmental review under the National Environmental Policy Act of 1969, as amended (NEPA) (42 *United States Code* [U.S.C.] 4321 et seq. [TN661])—among other requirements—the NRC and DOE LPO have signed a joint Memorandum of Understanding reflecting the lead and cooperating roles of the agencies (DOE/NRC 2024-TN10597). The NRC is the lead agency. The DOE LPO

is a NEPA cooperating agency with the NRC for the environmental review for the exemption request, a license transfer request, and the LARs (DOE 2024-TN10598). At the conclusion of the NRC environmental review, DOE would publish a separate Record of Decision or Finding of No Significant Impact (FONSI), as appropriate. The following section describes the separate, but related, proposed agency actions.

1.1.1 Proposed Actions of the NRC

The NRC's proposed actions are decisions on whether to grant or deny Holtec's interdependent, connected licensing and regulatory requests (see Table 1-1 below), including any revisions or supplements thereto or other regulatory or licensing requests submitted to the NRC that are necessary to reauthorize power operations at Palisades, that if approved, would collectively support the reauthorizing of power operations at Palisades and refueling of the Palisades reactor.

Table 1-1 Licensing and Regulatory Actions for Palisades Nuclear Plant Post Decommissioning

Document Description	ADAMS Accession No.
Request for Exemption from Certain Termination of License Requirements of 10 CFR 50.82, dated September 28, 2023.	ML23271A140
Application for Order Consenting to Transfer of Control of License and Conforming License Amendments, dated December 6, 2023.	ML23340A161
Request to Revise Operating License and Technical Specifications to Support Resumption of Power Operations, dated December 14, 2023.	ML23348A148
Request to Revise the Administrative Technical Specifications to Support Resumption of Power Operations, dated February 9, 2024.	ML24040A089
Request to Reinstate the Palisades Emergency Plan to Support Resumption of Power Operations, dated May 1, 2024.	ML24122C666
Request to Update the Main Steam Line Break Analysis Methodology, dated May 24, 2024.	ML24145A145
Request to Include Leak Before Break Methodology for Primary Coolant System Hot and Cold Leg Piping in Palisades Licensing Basis, dated February 5, 2025.	ML25035A216
Request to Revise Selected Permanently Defueled Technical Specifications to Support Repairing of Steam Generator Tubes by Sleeving, dated February 11, 2025.	ML25043A348

ADAMS = Agencywide Documents Access and Management System; CFR = *Code of Federal Regulations*; Palisades = Palisades Nuclear Plant.

1.1.2 Proposed Action of the DOE

The DOE LPO's Federal action is a decision on providing Federal financial assistance for refueling and resumption of power generation activities at Palisades pursuant to Holtec's loan guarantee agreement with DOE that was issued pursuant to the Energy Policy Act of 2005.

1.2 Purpose and Need

1.2.1 Purpose and Need Statement for NRC Actions

The purpose and need for approval of the proposed NRC Federal actions (identified in Table 1-1 above), collectively supporting the reauthorization of power operations and refueling

of the reactor under the existing Palisades' RFOL, is to provide an option that allows for baseload clean energy power generation capability within the term of the Palisades' RFOL to meet current system generating needs (HDI 2024-TN10670: RAI-GEN-2).

1.2.2 Purpose and Need Statement for DOE Action

The purpose and need for DOE's proposed action (Federal financial assistance in the form of a loan guarantee), is to implement DOE's authority under Title XVII of Energy Policy Act of 2005, which was reauthorized, amended and revised by the Inflation Reduction Act of 2022 to create the Energy Infrastructure Reinvestment Program (Section 1706). The purpose of the Energy Infrastructure Reinvestment Program is to finance projects and facilities in the United States that retool, repower, repurpose, or replace energy infrastructure that has ceased operations or enable operating energy infrastructure to avoid, reduce, utilize, or sequester air pollutants or anthropogenic emissions of greenhouse gases (GHGs) (42 U.S.C. 16517(a)(2)-TN10779).

1.2.3 Need for the Project

Regarding the need for clean energy, Holtec cites the State of Michigan's Public Acts of 2023, Act No. 235 (enrolled Senate Bill 271) (State of Michigan 2023-TN10671), which establishes a clean energy standard for electric providers to provide at least 80 percent clean energy by 2035 and 100 percent by 2040. Michigan's Act No. 235 defines clean energy as including a system that "Generates electricity or steam without emitting greenhouse gas, including nuclear generation."

In September 2023, Palisades Energy, LLC, and Wolverine Power Cooperative formalized a power purchase agreement (PPA) under which Wolverine Power Cooperative agreed to purchase up to two-thirds of the output from Palisades and the balance would be purchased by Hoosier Energy for the foreseeable future. This PPA is the economic impetus for Holtec's request to restart Palisades. The PPA also provides the option to include expected power output from the planned small modular reactors (SMRs) at Palisades (Holtec 2023-TN10540).

As opposed to being a regulated supplier providing wholesale power for dispatch by the independent system operator, the PPA would make Palisades a merchant generator and therefore not be directly subject to Michigan's integrated resource planning process or a Certificate of Need ruling by the Michigan Public Service Commission (HDI 2024-TN10670: RAI-GEN-2). Holtec also states that repowering of Palisades will greatly enhance electric reliability by generating consistent and carbon-free energy in Michigan and will decrease Michigan's reliance on energy imports (Holtec 2023-TN10540).

1.3 NEPA Process and NRC Environmental Review

1.3.1 Level of NEPA Review

While Holtec concluded that the proposed NRC actions specified in Table 1-1 of this EA meet the categorical exclusion (CatEX) criteria (HDI 2023-TN10538), the NRC staff, after reviewing the criteria in 10 CFR 51.20, 10 CFR 51.21, and 10 CFR 51.22, and internal guidance, have determined that an EA with scoping, and a draft comment period to ensure public participation to the greatest extent possible, is appropriate. This is based on:

- The licensing and regulatory requests are connected (i.e., interdependent) actions that should be considered together as part of the NEPA review.

- The proposed Federal actions are either not collectively covered by the criteria for using a CatEX in 10 CFR 51.22 or (in the case of the license transfer request) do not fall within the factual basis underlying the corresponding CatEX in 10 CFR 51.22.
- The proposed Federal actions are not specifically covered by the criteria for an environmental impact statement (EIS) as described in 10 CFR 51.20 without knowing the significance of potential impacts from the proposed Federal actions.

1.3.2 Scoping and Public Involvement

To provide concise and informative environmental documents, the NRC scoping process involves (1) defining the proposed action(s); (2) determining the scope of the environmental document and identifying potentially significant issues to be analyzed in depth; and (3) identifying and eliminating from detailed study issues that are expected to have negligible impact or have been covered by prior environmental review(s), thereby narrowing the discussion of these issues to, as applicable, a brief presentation highlighting why they will not have a significant effect on the human environment or summarizing the prior environmental review's coverage of the issue and providing a reference to a source elsewhere for additional information. As part of the scoping process, the NRC seeks public input on the range of issues and alternatives that should be considered for a project. A summary of the Palisades' scoping process is in Appendix B.

1.3.3 Significance Determination

An EA is a decisional document for an action that either is not likely to have a significant effect or for which the significance of the effects is unknown. The EA decisional document is used to support the NRC's determination of whether to issue a FONSI or prepare an EIS. In considering whether an adverse effect of the proposed Federal actions is significant, the NRC staff examined both the context (local versus global) of the action and the intensity (magnitude) of the effect.

Context refers to the characteristics of the geographic area or setting where the potential impact would occur. For example, the effects of a given water withdrawal from a lake or ocean may be different from that of the same quantity of water withdrawal from a smaller body of water. Depending on the scope of the action, the potential global, national, regional, and local contexts are also considered as well as the duration, including short-and long-term effects.

Intensity refers to the impact severity. The analysis of the intensity of effects considers many factors which are outlined in NRC guidance documents (NUREG-1748: Section 3.4.6.3; NRC 2003-TN1983).

Each impacted resource area is therefore evaluated with a rationale provided to explain the determination whether the impact(s) would be "SIGNIFICANT" or would be "NOT SIGNIFICANT." If impacts from the proposed Federal actions are determined to be not significant, a FONSI is prepared, whereas, if the impacts are determined to be significant, an EIS is prepared.

In addition to these impact thresholds under NEPA, there are effects determination definitions that are applicable specifically for the Endangered Species Act of 1973, as amended (ESA) (TN1010) and the National Historic Preservation Act of 1966, as amended (NHPA) (TN4157).

The ESA effects determination for federally listed species are as follows:

- No effect: Federally listed species or critical habitat will not be affected, directly or indirectly.
- May affect but is not likely to adversely affect: All effects on federally listed species or critical habitat are beneficial, insignificant, or discountable.
- May affect and is likely to adversely affect: An adverse effect to listed species or critical habitat may occur as a direct or indirect result of the proposed action and the effect is not: discountable, insignificant, or beneficial.

The implementing regulations for NHPA Section 106 define specific criteria for identifying an adverse effect (36 CFR 800.5 and 36 CFR 800.6 [TN513]) on a historic property:

- No historic properties affected: No historic properties in the project area because they are less than 50 years old or were determined to be not eligible for listing in the National Registry of Historic Places.
- No adverse effect: Historic properties were identified within the project area of potential (APE) effects, but the criteria of adverse effects in 36 CFR 800.5(a)(1) are not met.
- Adverse effect: Historic properties were identified within the project APE, and the criteria of adverse effects in 36 CFR 800.5(a)(1) are met.

1.3.4 Analysis of Environmental Effects Related to the Proposed Agency Actions

The environmental effects of a proposed Federal action(s) are determined by comparing the environmental conditions at the point in time prior to the commencement of the proposed Federal action(s), known as the environmental baseline or affected environment, with those expected environmental conditions following the commencement of the Federal action(s). The affected environment for the potential reauthorization of power operations of Palisades is the current decommissioning state at Palisades prior to implementing any of the activities related to the preparation for the resumption of power operations. The corresponding impact determination analysis for each resource area comprises the impacts in relation to the affected environment from both the activities related to the *preparations for the resumption of power operations* and those related to the *resumption of power operations*. The impact significance determination includes the following evaluations for each analyzed resource area in Section 3:

- *Affected Environment*—provides a brief description of the affected environment.
- *Impacts from the Preparations for the Resumption of Power Operations*—description of the environmental effects related to the preparations for the resumption of power operations.
- *Impacts from Resumption of Power Operations*—description of the environmental effects from the resumption of power operations for the remainder of the term of the Palisades RFOL.
- *Cumulative Effects*—each resource area will describe the incremental effects of the proposed actions when added to the environmental effects of other past, present, and reasonably foreseeable actions.

Additionally, the environmental effects of decommissioning activities and climate change are discussed for each analyzed resource area in Section 3.15 and Appendix F, respectively, of this EA.

1.3.5 Incorporation by Reference Approach

Incorporation by reference is a tool that Federal agencies can use to improve the efficiency of their environmental review process to aid in the preparation of analytical, concise, and informative environmental documents. Incorporation by reference integrates material that is essential to the NEPA analysis, such as including planning studies, analyses, or other relevant information, into environmental documents by reference. The effect will be to cut down on bulk without impeding agency and public review of the action (10 CFR Part 51-TN10253: Appendix A; NRC 2020-TN6710: Appendix A).

The NRC and other Federal agencies have prepared other NEPA and technical documents that contain information relevant to this environmental review. Table 1-2 of this EA provides a brief description of the related NEPA documents issued by the NRC and other Federal agencies that are being used to support this EA. This table also lists other technical or professional studies and analyses prepared by Federal, State, Tribal, and local agencies or private interests that provide information that is relied upon, in whole or in part, to support this EA. These documents, or portions thereof, are incorporated by reference as appropriate in Sections 2 and 3 of this EA.

To ensure that the EA stands alone and provides sufficient analysis to allow the decision-maker to arrive at a conclusion, the NRC staff adhered to three principles, identified in NRC's regulations and guidance (NRC 2020-TN6710: Appendix A; 10 CFR Part 51-TN10253: Appendix A), when using the incorporation by reference process:

1. *Citation Specificity, Public Availability:* Prior to incorporating by reference any document in this EA, the NRC staff assured that each document is publicly available. The NRC staff provided links to documents incorporated by reference in Table 1-2 (below) and the references section in the EA. In instances where parts of a document are incorporated by reference in the EA, the pertinent section(s), figures, and tables of the document are cited, where applicable.
2. *Summarize and Independently Verify:* Prior to incorporating by reference, the NRC staff independently evaluated and verified the reliability of the information that is incorporated by reference. A brief summary of the content incorporated by reference, in the context of the analysis at hand, along with the NRC staff's independent evaluation, is provided in a manner that does not result in a loss of comprehension to the reader in each resource area evaluated. The NRC does not incorporate by reference conclusions from an applicant's environmental documents.
3. *New Information and Relevance to Proposed Federal Action:* In its evaluation, the NRC staff identify and discuss any new circumstances or information relevant to the environmental analysis and which bears on the proposed Federal actions or its potential impacts that were not considered in the documents being incorporated by reference.

This EA provides a brief summary at the beginning of the resource area in Section 3 that identifies the material subject to incorporation by reference, as well as provides a summary in the discussion of the material and its relevance to the current environmental review that adheres to the three principles.

Table 1-2 List of Related Environmental Documents

Document	General Applicability	Reference
U.S. Atomic Energy Commission. Final Environmental Statement related to operation of Palisades Nuclear Generating Plant, Docket No. 50-255, June 1972. ADAMS Accession No.: ML18346A120. ^(a)	The FES was prepared by the U.S. Atomic Energy Commission. The action evaluated was the issuance of an operating license for the full power operation of Palisades. On November 20, 1971, the applicant was granted Amendment No. 1 to the Interim Provisional License No. DPR-20 to operate the Palisades at power level of 20% of the rated power level. On March 10, 1972, the applicant was granted Amendment No. 2 to DPR-20 to operate Palisades at 60% of the rated power level. The FES evaluates the environmental impacts of operations of Palisades with some analyses still relevant, such as impingement.	1972 FES AEC 1972-TN10603
NRC. 1996. Generic Environmental Impact Statement for License Renewal of Nuclear Plants. NUREG-1437, Volumes 1 and 2. ADAMS Accession Nos.: ML040690705, ML040690738. ^(a)	The GEIS was prepared to identify and evaluate environmental issues for license renewal and determine which issues could result in the same or similar impact at all nuclear power plants and which issues could result in different levels of impact. Many of the analyses presented in the GEIS may be relevant to proposed Federal actions at Palisades.	1996 LR GEIS NRC 1996-TN288
NRC. 2006. Generic Environmental Impact Statement for Nuclear Plants, Supplement 27, Regarding Palisades Nuclear Plant, Final Report. NUREG-1437, Supplement 27, October 2006. ADAMS Accession No.: ML062710300. ^(a)	The SEIS was prepared in response to an application submitted to the NRC to renew the operating license for Palisades for an additional 20 years. The SEIS includes the NRC staff's analysis that considers and weighs the environmental impacts of the proposed action, the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse impacts. Many of the analyses presented in the SEIS may be relevant to proposed Federal actions at Palisades.	2006 SEIS NRC 2006-TN7346
NRC. 2014. Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel. Final Report, NUREG-2157. ADAMS Package Accession No. ML14198A440. ^(a)	The Continued Storage GEIS was prepared to identify and review environmental issues for the storage of spent nuclear fuel at-reactor and away-from-reactor storage locations. These impacts were determined to be generic between all potential locations.	Continued Storage GEIS NRC 2014-TN4117
NRC. 2024. Generic Environmental Impact Statement for License Renewal of Nuclear Plants. NUREG-1437, Volume 1–3, Revision 2, Washington, D.C. ADAMS Accession No.: ML24087A133. ^(a)	This GEIS was prepared to identify and evaluate environmental issues for license renewal and determine which could result in the same or similar impact at all nuclear power plants and which issues could result in different levels of impact. Many of the analyses presented in the GEIS may be relevant to proposed Federal actions at Palisades.	2024 LR GEIS NRC 2024-TN10161

Table 1-2 List of Related Environmental Documents (Continued)

Document	General Applicability	Reference
NRC. 2024. Environmental Evaluation of Accident Tolerant Fuels with Increased Enrichment and Higher Burnup Levels, Final Report. NUREG-2266. ADAMS Accession No. ML24207A210. ^(a)	NUREG-2266 was prepared to assist reviewers during licensing amendment requests to provide a generic evaluation for accident tolerant fuels and fuels that have higher enrichment or burnup beyond currently licensed limits. The document quantifies impacts for up to enrichment levels of 8 weight percent U-235 and burnup levels to 80 GWd/MTU and demonstrates that 10 CFR Part 51 Tables S-3 and S-4 are still bounding. Although Holtec is not proposing to use accident tolerant fuels or increased enrichment or burnups as part of its requests related to resumption of operations, the staff relied on NUREG-2266 as it contains the latest analysis and also bounds Holtec's proposal.	Evaluation of Accident Tolerant Fuels NRC 2024-TN10333
Entergy. 2021. Updated Final Safety Analysis Report - Revision 35, Palisades Nuclear Plant. ADAMS Accession Package No. ML21125A285. ^(b)	Palisades updated final safety analysis report.	UFSAR Revision 35 Entergy 2021-TN10998
Holtec. 2023. Enclosure 2 of Letter from Holtec to NRC, dated September 28, 2023, regarding "Request for Exemption from Certain Termination of License Requirements of 10 CFR 50.82." ADAMS Accession No.: ML23271A140. ^(b)	The exemption request submittal includes "Enclosure 2," which is the "Environmental New and Significant Review Proposed Resumption of Power Operations Palisades Nuclear Plant." This report provides an update from Holtec on potentially new and significant information since the 2006 SEIS (NRC 2006-TN7346).	N&S Report HDI 2023-TN10538
Holtec. 2024. Letter from Holtec International to NRC, dated October 4, 2024, regarding "Response to Requests for Additional Information Regarding the Proposed Reauthorization of Power Operations of Palisades Nuclear Plant under Renewed Facility Operating License Number DPR-20." ADAMS Accession No. ML24278A027. ^(b)	Responses from Holtec on NRC submitted requests for additional information regarding Palisades.	Holtec RAI response HDI 2024-TN10670
Holtec. 2024. Email from J. Britting, Holtec Palisades, to M. Richmond, NRC, dated September 12, 2024, regarding "Palisades Reauthorization of Power Operations - Environmental Audit Draft RCIs." ADAMS Accession No. ML24260A354. ^(b)	Responses from Holtec on NRC submitted requests for confirmatory information regarding Palisades.	Holtec RCI response HDI 2024-TN10669

Table 1-2 List of Related Environmental Documents (Continued)

Document	General Applicability	Reference
Holtec. 2024. Response to Requests for Confirmatory Information Regarding the Proposed Reauthorization of Power Operations of Palisades Nuclear Plant under Renewed Facility Operating License Number DPR-20. ADAMS Accession No. ML24319A053. ^(b)	Second set of responses from Holtec on NRC submitted requests for confirmatory information regarding Palisades.	Holtec second RCI response HDI 2024-TN10843
SEARCH. Technical Report: Phase 1 Archaeological Survey of the Palisades Nuclear Power Plant, Van Buren County, Michigan. Prepared for Enercon, prepared by SEARCH. SEARCH project number: 240030. August 2024. ADAMS Accession No. ML25023A165. ^(b)	Updated archaeological survey report for the Palisades site. The report provides updated cultural resource information and archaeological site information.	SEARCH Archaeological Report SEARCH 2024-TN10846
SEARCH. Technical Report: Architectural History Survey of Palisades Nuclear Plant, Van Buren County, Michigan. Prepared for Enercon, prepared by SEARCH. SEARCH project number: 240140. October 2024. ADAMS Accession No. ML25021A126. ^(b)	Updated architectural survey report for the Palisades site. The report provides updated historical building/structural information and context.	SEARCH Architectural Report Theriot and Travisano 2024-TN10847

ADAMS = Agencywide Documents Access and Management System; CFR = *Code of Federal Regulations*; Entergy = Entergy Nuclear Operations, Inc.; FES = Final Environmental Statement; GEIS = generic environmental impact statement; GWd = gigawatt-day(s); Holtec = Holtec Decommissioning International, LLC, Holtec Palisades, LLC, and Palisades Energy, LLC; LR = license renewal; N&S Report = HDI New and Significant Report; NEPA = National Environmental Policy Act; NRC = U.S. Nuclear Regulatory Commission; Palisades = Palisades Nuclear Plant; RAls = requests for additional information; RCIs = requests for confirmatory information; SEIS = supplemental environmental impact statement; UFSAR = Updated Final Safety Analysis Report.

(a) NEPA documents prepared by Federal agencies.

(b) Special technical, professional studies and analyses prepared by Federal, State, Tribal, and local agencies; or stakeholders with private interests.

1.4 Regulatory Provisions, Permits, and Required Consultations

Appendix C to this EA lists each environmental regulatory requirement, permit, and consultation necessary for the resumption of power operations of Palisades. The NRC staff have performed the consultations required under ESA (TN1010) and NHPA (TN4157).

2 DESCRIPTION OF PLANT FACILITY AND ALTERNATIVES

2.1 Description of Palisades Nuclear Plant

Section 2.1 of the 2006 supplemental environmental impact statement (SEIS) (NRC 2006-TN7346) provides a detailed description of Palisades and the surrounding location and is incorporated here by reference to define facility parameters that remain relevant to the Palisades site. Palisades is located on 432 ac (175 hectares [ha]) in Covert Township, Van Buren County, Michigan, on the eastern shoreline of Lake Michigan, about 4.5 miles (mi) (7 kilometers [km]) from South Haven, Michigan and includes approximately 1 mi (1.6 km) of lake frontage (Figure 2-1 and Figure 2-2 of this EA). The Palisades site extends approximately 1 mi (1.6 km) inland between Lake Michigan and the Blue Star Memorial Highway and adjacent Interstate Highway 196. The nearest population center is the township of Covert, which is approximately 2.5 mi (4 km) southeast of the Palisades site. Van Buren State Park is located immediately to the north of the Palisades site, and Van Buren Trail State Park is located northeast of the site. The local terrain consists of wooded sand dunes along the lakeshore, and the area surrounding the plant is largely rural.

Section 2.1.1 of the 2006 SEIS further describes that the local terrain consists of a gentle upward sloping beach at an elevation of about 580 ft (177 m) above mean sea level (MSL) that rises sharply into sand dunes at an elevation of approximately 780 ft (238 m) above MSL and then drops off abruptly to about 610 ft (186 m) MSL at the eastern site boundary. The dunes are relatively stable topographic features with occasional blowout caused by wind action. The majority of the land area is heavily wooded, with occasional wetlands. Besides the transmission line and corridor, the facilities at Palisades are only publicly visible from Lake Michigan and the beach areas to the north and south of the plant boundary.

As described in Section 2.2.1 of the 2006 SEIS (NRC 2006-TN7346), plant facilities are located about 2,500 ft (760 m) from both the northern and southern boundaries of the industrial zoned, 432 ac (175 ha) Palisades site. Buildings and other structures occupy approximately 80 ac (32 ha). These include the power generation and administration area (20 ac [8 ha]), transmission corridors and switchyard (30 ac [12 ha]), warehouse area (7 ac [2.8 ha]), cooling towers (4 ac [1.6 ha]), and other supporting buildings and waste storage (7 ac [2.8 ha]).

The steam supply system for Palisades is a pressurized water reactor consisting of a reactor primary coolant system and associated auxiliary systems. The reactor, steam generators, and related systems are enclosed in a containment building that is designed to prevent leakage of radioactivity to the environment in the improbable event of a rupture of the reactor coolant piping. Palisades relies on two sources of water: raw water from Lake Michigan and potable water from the South Haven Municipal Water Authority. The water withdrawn from Lake Michigan is via a pipeline from a submerged intake crib structure located 3,300 feet (ft) (1,005 meters [m]) offshore in water about 35 ft (11 m) deep (NRC 2006-TN7346: Section 2.1.3) (Figure 2-3 of this EA).

Originally, the crib was designed for a once-through cooling-water flow rate but was converted to a closed-cycle cooling system with reduced intake flow (NRC 2006-TN7346). Historic photographs and maps provided in Appendix I to this EA highlight the various stages of construction and land disturbance at Palisades during this era. Water flows from the intake crib through an 11 ft (3.4 m) diameter pipe to the onshore intake structure where it passes through trash racks constructed of steeply sloped bars to prevent entry of coarse debris. Debris

accumulated on the trash racks are removed by a mechanical rake or scoop. The water then flows through vertical 0.375 inches (in.) (0.95 centimeters [cm]) mesh traveling screens for removal of finer debris. The traveling screens are cleaned by rotating and backwashing the screens as needed (in automatic or manual operation) and sluicing the debris to a collection basket. The accumulated debris are disposed of in accordance with the Palisades National Pollutant Discharge Elimination System (NPDES) permit (MDEQ 2014-TN10665).

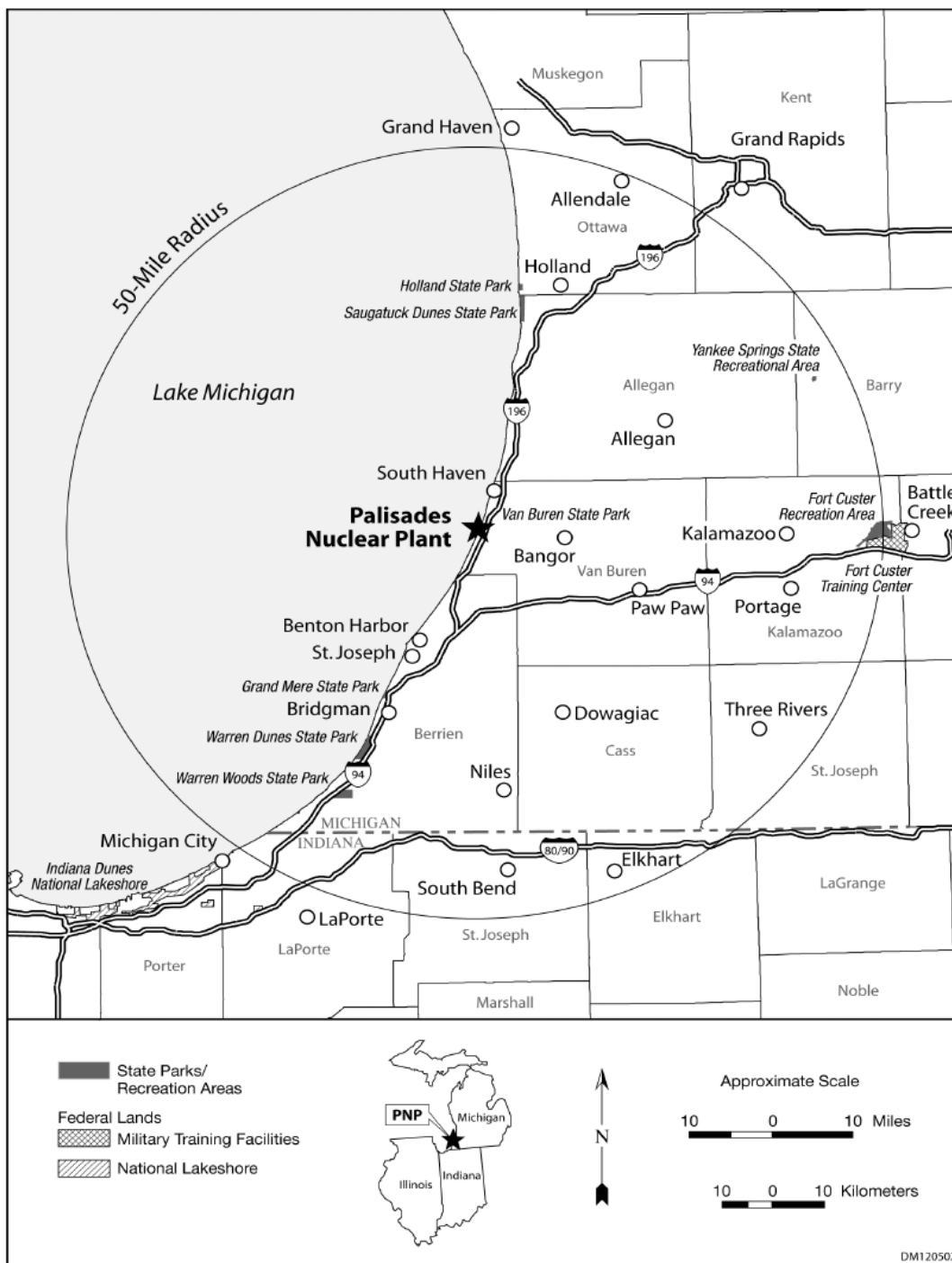


Figure 2-1 Palisades Nuclear Plant 50 mi (80 km) Radius Map. Source: NRC 2006-TN7346.



Figure 2-2 A Satellite Image Showing the Palisades Nuclear Plant Site Boundary in Southwest Michigan. Source Data: HDI 2024-TN10670: RAI-GEN-1.

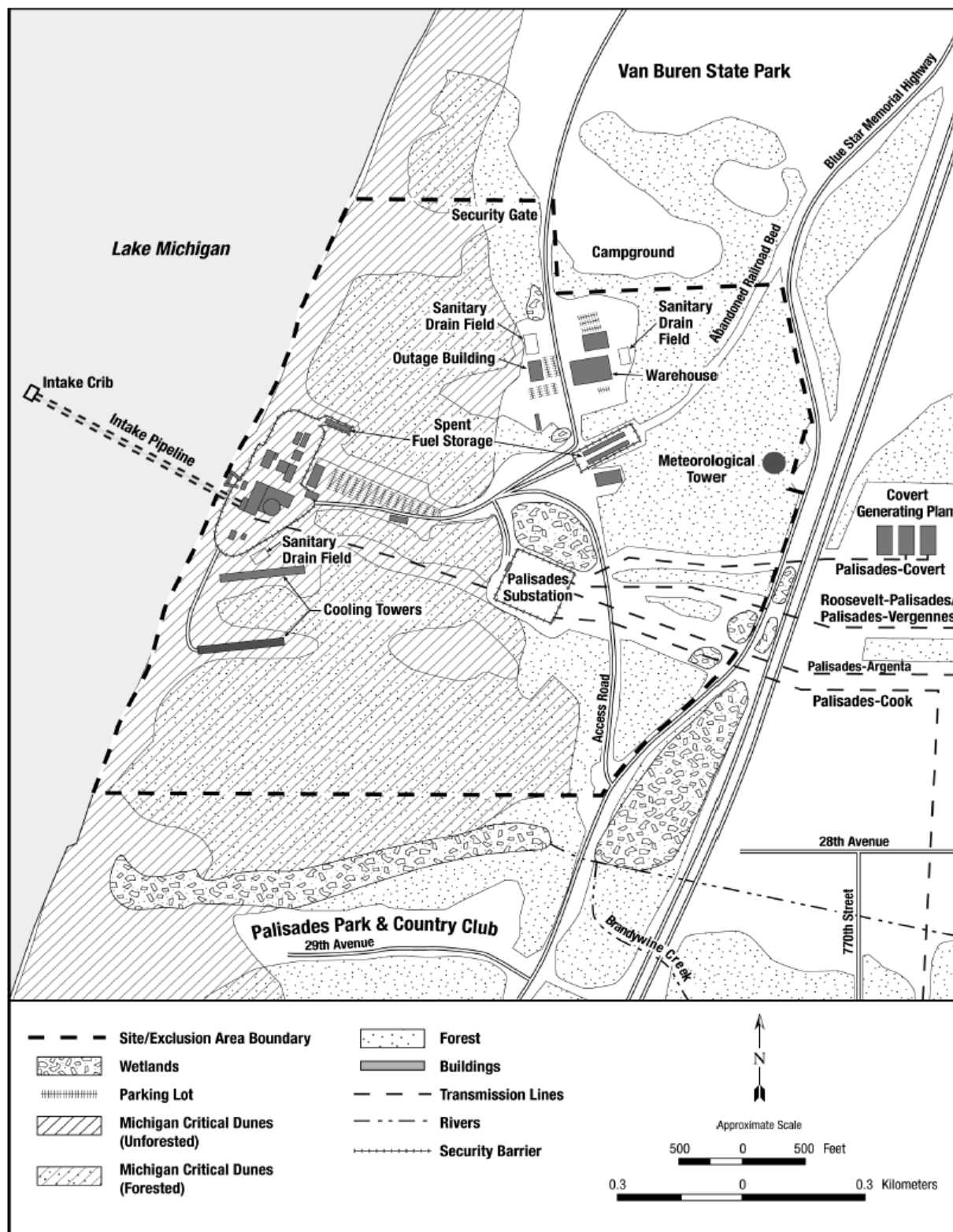


Figure 2-3 Palisades Nuclear Plant Site Layout. Source: NRC 2006-TN7346.

The NRC staff reviewed Holtec's New and Significant Report (N&S Report) (HDI 2023-TN10538) and verified information to identify changes to Palisades since the 2006 SEIS. Section 3.1 of the N&S Report states that a review of aerial imagery between 2006 and 2021 shows no major changes to onsite or offsite land use and that the general character of the surrounding area has remained largely the same.

Changes to major systems include the replacement of spent fuel racks in the spent fuel pool and replacement of the cooling towers (HDI 2023-TN10538). In 2012, cooling tower A was replaced with a pultruded fiberglass design, SPX Marley cooling tower with a reduced number of cells. Whereas the previous design contained 18 cells, the replacement tower includes 16 cells. In 2017, cooling tower B was also replaced with a pultruded fiberglass design, SPX Marley cooling tower, but maintained 18 cells. The replacement towers are crossflow mechanical draft cooling towers, designed for a 32 degrees Fahrenheit (°F) (17.8 degrees Celsius [°C]) range and a maximum sound level of 90 A-weighted decibels at 3 ft (0.9 m) from the equipment (HDI 2023-TN10712, HDI 2023-TN10538). The replacement towers included drift eliminators with a guaranteed drift rate of 0.001 percent of the circulating water flow rate (HDI 2024-TN10670: RAI-TE-1).

Additional changes that have occurred onsite between 2006–2022 include:

- installation of an auxiliary feedwater pump and associated piping and valves
- cross-connect between water storage tank T-939 and the condensate storage tank T-2
- new security emergency diesel generator
- two new Diverse and Flexible Coping Strategies storage buildings

2.2 Alternatives

For EAs, NRC regulations in 10 CFR 51.30(a)(1)(ii) (TN10253) call for a brief discussion of alternatives as required by NEPA.¹ NEPA Section 102(2)(F) requires Federal agencies to, “consistent with the provisions of this Act, study, develop, and describe technically and economically feasible alternatives,” and Section 102(2)(H) requires Federal agencies to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.” Although NEPA Section 102(2)(C) provides requirements for EISs rather than EAs, the NRC’s consideration of alternatives in this EA was influenced by that section. NEPA Section 102(2)(C) specifies consideration of a “reasonable range of alternatives” that are “technically and economically feasible and meet the purpose and need of the proposal” (TN661). Additionally, LIC-203, “Procedural Guidance for Categorical Exclusions, Environmental Assessments, and Considering Environmental Issues” (NRC 2020-TN6399), guides the NRC staff to consider a no-action alternative as part of the range of reasonable alternatives in EAs. In Section 2.2.1 and Section 2.2.2 of this EA, the NRC staff provide a description of those alternatives carried forward for further analysis in Section 4.2 and those considered and not carried forward.

¹ NEPA Section 51.30(a)(1)(ii) specifically references the requirements of NEPA Section 102(2)(E). However, NEPA has been substantially amended since the last revision to 10 CFR 51.30. The contents of NEPA Section 102(2)(E) were moved to Section 102(2)(H) and a new Section 102(2)(F) on the consideration of alternatives was added.

2.2.1 Alternatives Carried Forward for Further Analysis

2.2.1.1 *No-Action Alternative*

Under the no-action alternative, the NRC would not approve the exemption request, license transfer request, and LARs for Palisades. In this scenario, Palisades would not be reauthorized for refueling the reactor or resuming power operations and would continue to function as a plant in decommissioning as outlined in the Post-Shutdown Decommissioning Activities Report (PSDAR) (HDI 2020-TN10539). The no-action alternative would not meet the purpose and need of the proposed Federal actions to provide an option for baseload power and contribute to Michigan's clean energy goal. Holtec has not indicated how the energy demand underlying the purpose and need would be met for the power that would have otherwise been generated by resuming operations of Palisades. If it becomes necessary for utilities or other power suppliers to build other nuclear or non-nuclear power generation facilities to meet the demand, building those facilities would result in additional environmental impacts related to land disturbance and operation of construction equipment that would not be necessary if the already built Palisades is restarted.

Section 3 in this EA describes how the potential environmental impacts of the proposed Federal actions would be minimal, and any avoidance of environmental impacts from selecting the no-action alternative instead of the proposed Federal actions would therefore also be minimal. Additionally, environmental impacts from any land disturbance and operation of construction equipment to build other power generation facilities needed to offset the capabilities of the Palisades facilities could potentially be substantial. However, the no-action alternative is carried forward for analysis in Section 4.2 in order to meet procedural requirements.

2.2.2 Alternatives Considered and Not Carried Forward for Further Analysis

2.2.2.1 *Replacing Palisades Reactor with New Onsite Reactor*

One alternative would be to continue decommissioning the existing Palisades reactor and build a new reactor in its place to generate the needed power. Because decommissioning would require several years, the delay needed to finish decommissioning and remove the existing facilities before beginning to construct a new reactor may impede the timely implementation of the purpose and need of the proposed Federal action. This alternative would also require substantial construction costs beyond those needed to resume operation of the already built reactor. This alternative would reuse land that had been previously disturbed by the existing reactor, but it would still result in additional noise, emissions, and other impacts from building new facilities.

Another alternative would be to build a new reactor (and associated ancillary buildings) using other land within the Palisades site. As described in Section 2.2.1 of the 2006 SEIS (NRC 2006-TN7346), the site comprises approximately 432 ac (175 ha) of land, of which only about 80 ac (32 ha) are occupied by buildings and other permanent structures. The remaining land would be available to build a new reactor. Construction of the new reactor would not have to wait for decommissioning of the existing reactor, although building a new reactor would still take longer than resuming operation of an already built reactor. The new reactor could still use existing roads, transmission lines, and other support infrastructure already servicing the Palisades site. However, building a new reactor would still require substantial costs beyond those needed to resume operation of an already built reactor. Additionally, building the new reactor would require substantial additional ground disturbance not needed to put the existing reactor back in

operation. The unused lands on the Palisades site include sensitive dune, forest, shoreline, and wetland habitats. Using those lands to build a new reactor could result in loss or degradation of those habitats, as well as generate additional noise, emissions, and other impacts from building new facilities.

Neither of the alternatives described above were carried forward for detailed analysis because of the additional time and cost needed to build a new reactor and greater environmental impacts relative to resuming operation of the existing reactor.

2.2.2.2 Replacing Palisades Reactor with Other Power Generation Technologies

As stated in the purpose and need, the reauthorization of reactor power operations of Palisades would provide 800 MWe of additional “clean energy,” as defined by Michigan’s Public Acts of 2023, Act No. 235 (enrolled Senate Bill 271) (State of Michigan 2023-TN10671), to contribute to Michigan’s clean energy goals. It may be possible to generate the needed power using non-nuclear power generation technologies such as natural gas, solar, or wind. It may also be possible to generate the power by developing new nuclear facilities using technologies that differ from those previously used at Palisades, such as advanced nuclear designs or SMR technologies. Whether using non-nuclear or nuclear energy generation, implementing any of the possible alternatives would require building new power generation facilities. As noted in the section above, it would not be feasible to wait to fully decommission the existing Palisades reactor before building the alternative power generation facilities, but at least some of the new facilities could be built using other land within the Palisades site. However, it is unclear whether enough land is available on the Palisades site to accommodate land-extensive power generation methods such as wind or solar. Otherwise, the new power generation facilities could be built on other sites capable of supplying energy to Michigan’s population, although those sites may not be served by the existing infrastructure already servicing the Palisades site such as transmission lines and roads. Using alternative power generation fuels or technologies to generate the additional energy would therefore result in substantial additional environmental impacts not needed to resume operation of the existing reactor, especially those related to additional land use, ground disturbance, and use of construction equipment.

None of the alternatives described above were carried forward for detailed analysis because of the additional time and cost needed to build the alternative facilities and greater environmental impacts relative to resuming operation of the existing reactor.

2.2.2.3 Installing System Design Alternatives for Use with the Current Palisades Reactor

System design alternatives would involve fitting the existing Palisades reactor with alternative system designs for processes such as heat dissipation, circulating water, and transmission systems. However, the systems already in place at the reactor meet regulatory requirements (e.g., U.S. Environmental Protection Agency (EPA) 316(b) [TN662]). As described in Chapter 3 of this EA, the NRC staff have determined that the environmental impacts from resuming operation of the existing facilities, with their existing systems, as called for in the proposed Federal action would be minimal. There is therefore no reason to carry any such alternatives forward for more detailed analysis.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

3.1 Organizational Approach for Resource-Specific Environmental Impact Significance Determinations

This section provides the organizational structure for the environmental impact significance determination analysis for each of the identified resource areas. As described in Section 1.3.2 of this EA, the NRC scoping process was used to identify issues and environmental resource areas that are not anticipated to have a potential for significant impact or have been covered by prior environmental review(s). This process narrows the discussion of these issues to a summary of the analysis conducted, and brief discussion of why the resource area will not have a significant effect on the human environment or, if applicable, includes a reference to their coverage elsewhere. Based on the results of the NRC's scoping process, the NRC staff focused the EA analysis on resource areas with the potential for significant environmental impacts. The resource areas listed below were identified during scoping to not have the potential for significant impacts or were covered by prior environmental review(s). Therefore, the NRC staff provide a brief discussion of these resource areas in Section 3 of this EA.

- Land Use and Visual Resources (Section 3.2)
- Nonradiological Human Health (Section 3.11.2)
- Waste Management (Section 3.12)
- Uranium Fuel Cycle (Section 3.13)
- Postulated Accidents (Section 3.14)

Additionally, in response to the number of the public comments received during the NRC's scoping process concerning thyroid cancer in the vicinity of Palisades, the NRC staff developed Appendix H of this EA regarding cancer risks at and around Palisades.

3.1.1 The Affected Environment Related to the Proposed Federal Actions

As described in Section 1.3.4 of this EA, the environmental baseline or affected environment for Palisades and the proposed Federal actions under the NRC staff's evaluation are the environmental conditions at the point in time prior to the commencement of the project. Palisades is currently in a decommissioning state. Therefore, the affected environment will be defined for each resource area given this temporal baseline. In some instances, such as describing the built environment, much of the information from the 2006 SEIS (NRC 2006-TN7346) may be incorporated by reference, where appropriate. Whereas, for some resource areas, such as air quality or socioeconomics, current data is included as necessary for the evaluation.

Transition to decommissioning resulted in Holtec reducing the number of workers employed at Palisades from approximately 550 employees in 2022 to 218 employees in 2023 (HDI 2024-TN10670: RAI-SE-1). Holtec also removed two structures in the plant protected area during decommissioning because the buildings exhibited poor structural integrity (HDI 2023-TN10538). Holtec continues to conduct routine herbicide application (HDI 2024-TN10670: RAI-GEN-1).

While this decommissioning state reflects the current affected environment at Palisades, each resource area includes a specific, and relevant, discussion on various aspects of the affected environment to make an environmental significance determination for:

- Impacts or effects related to the activities for preparations for the resumption of power operations, described in Section 3.1.2 of this EA.

- Impacts or effects related to the resumption of power operations, described in Section 3.1.3 of this EA.
- Cumulative effects, described in Section 3.1.4 of this EA.
- Climate change and GHG evaluation, described in Section 3.1.5 and Appendix F of this EA.
- Activities related to the return to decommissioning, described in Section 3.15 of this EA.

3.1.2 Impacts from Preparations for Resumption of Power Operations

When considering the impacts related to the preparations for the resumption of power operations, Holtec provided a list of the associated activities to be completed for the resumption of power operations (HDI 2024-TN10670: RAI-GEN-1). Several of the activities involve ground disturbance that have the potential to affect environment resources and are listed in Table 3-1 and presented in Figure 3-1 below. The identified potential land disturbances are in previously disturbed areas (Figure 3-2 of this EA). Appendix I to this EA provides a set of historical photographs documenting the previous disturbance. The NRC staff considered these activities when determining the related environmental impacts.

Table 3-1 Land Disturbing Activities Related to the Preparations for Resumption of Power Operations of Palisades Nuclear Plant. Sources: HDI 2024-TN10670: RAI-GEN-1, HDI 2024-TN10856.

Activities	Acre ^(a)
Complete the security infrastructure changes including new barrier/wall, new intrusion detection, new/relocated ballistic resistant enclosures, and new security search detectors.	4
Replace 18 power cables from load centers to cooling tower stepdown transformers. Trench dimensions are estimated to be 50 in. wide and 27 in. deep.	3
Design and construct a new south radioactive material storage building inside the security protected area boundary to consolidate radioactive storage. It is anticipated that the excavation depth will be a minimum of 42 in. deep.	1
Expand access road at south end of protected area. The project includes a road lane inside the new security barrier and a road lane outside the security barrier for a total of approximately 85 ft in width. The deepest point into the previously disturbed critical dune will be approximately 45 vertical ft and is located on the east end of the roadway.	2
Repair underground pipe, leaking condensate storage tank (T-2) piping, and leaking Utility Water Storage Tank (T-91) piping (see Table 3-4 for additional details).	0.2
Construction of Digital Staging Testing Building (associated with the Digital Electrohydraulic Control Software and computer hardware control system replacement). The building is planned to be a single story building approximately 40 ft wide x 80 ft long and 20 ft tall located between the steam generator mausoleum and spare transformer pad. The building is expected to be erected upon a concrete pad foundation with a planned excavation depth of approximately 1 ft.	0.1
New BREs constructed within the protected area. Five outdoor BREs between 30 to 40 ft tall (above grade) will be erected. Shallow (3–6 in.) foundations, footprint is estimated to be 30 ft x 30 ft. All BREs are planned to be within the protected area, with three of the BREs along the west side of the Palisades site.	0.1
Routine maintenance of the stormwater outfalls which may involve removal of sediment.	0.1
Stormwater outfalls pipe replacement and riprap movement which could require staging of riprap and placing the same riprap back to the stormwater outfalls.	0.5

BRE = blast resistant encloser.

(a) Total acreage of disturbance for each activity includes any associated laydown area(s). Activities may not be mutually exclusive and may overlap.



Figure 3-1 Location of Select Ground-Disturbing Activities at Palisades Nuclear Plant Related to the Preparations for the Resumption of Power Operations.
Source Data: HDI 2024-TN10670: RAI-GEN-1.

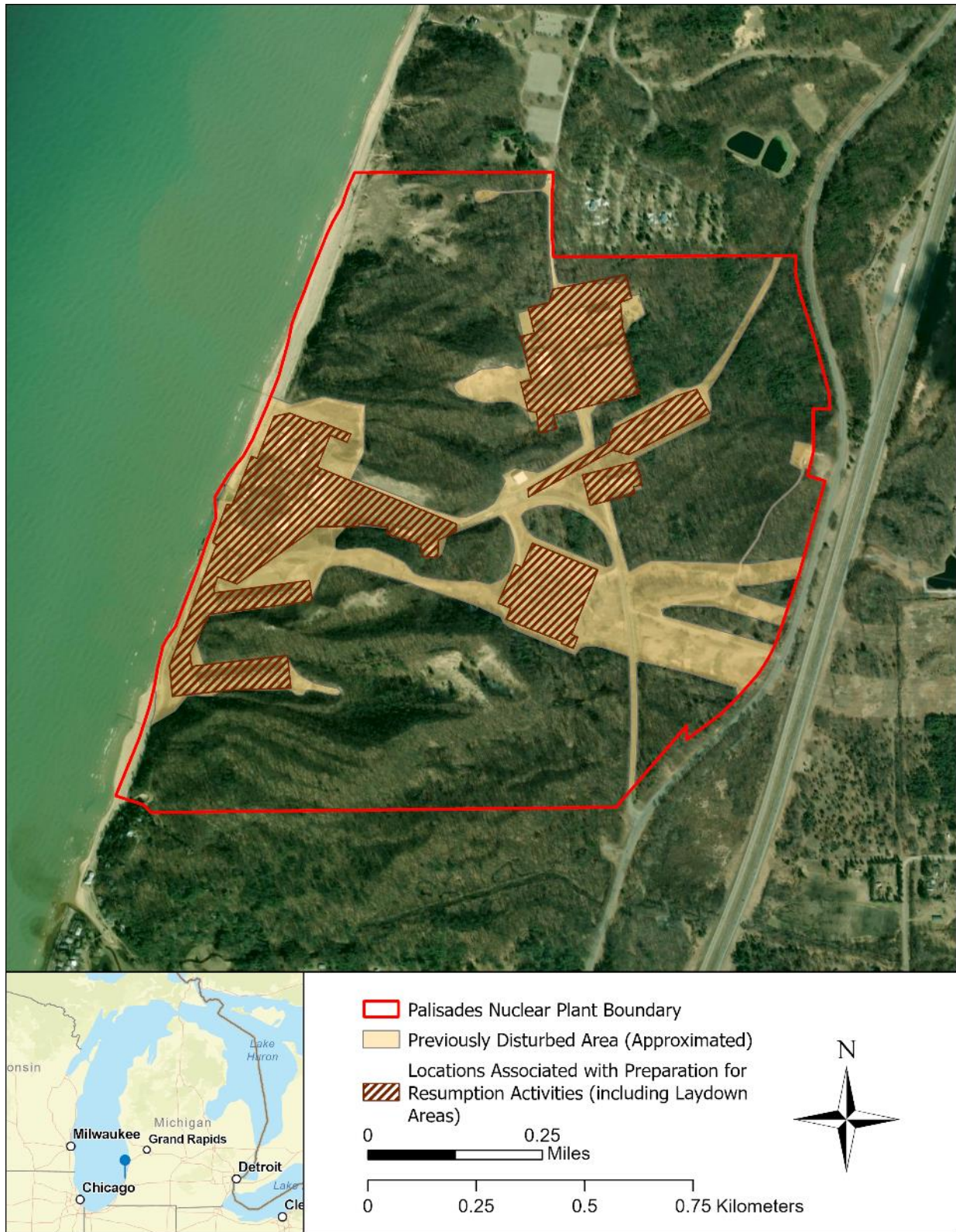


Figure 3-2 General Locations (Including Laydown Areas) of Preparation of Resumptions of Power Operations Activities at Palisades Nuclear Plant.
Source Data: HDI 2024-TN10670: RAI-GEN-1.

Other outdoor activities that do not involve land disturbance or preclude any significant environmental impact include maintenance and inspections, upgrades to heating, ventilation, and air conditioning units, building renovation, evaluation for removal of sediment in the mixing basin, reinstallation of the main transformer and associated metering, and installation of mobile personnel buildings. Temporary laydown areas will be required for preparation activities associated with inspections, procurement, building renovations and upgrades (e.g., Feedwater Purity Building renovation), cooling system expansion joint replacement, valve maintenance, and construction activities (Figure 3-2).

Holtec also plans to complete numerous indoor activities in preparation for reactor operations (HDI 2024-TN10670: RAI-GEN-1). These include maintenance activities, replacement of both component cooling-water (CCW) heat exchangers and other equipment, cooling system chemical decontamination, and inspections.

3.1.3 Impacts from the Resumption of Power Operations

Reactor operations would resume at Palisades if the NRC approves the exemption request, license transfer request, and LARs. These approvals would permit Holtec to transition Palisades from a facility in decommissioning to an operating facility under the Palisades RFOL. Holtec plans to resume reactor operational activities using the same management practices in use prior to decommissioning (HDI 2023-TN10538).

When evaluating the potential environmental impacts from the resumption of power operations, the NRC staff reviewed and incorporated by reference analyses completed in the 2006 SEIS (NRC 2006-TN7346), and other relevant environmental review documents, where appropriate. These previous NEPA analyses help support the independent significance determinations for the proposed Federal actions discussed in this EA. In many instances, the NRC staff's impact determination of SMALL² in the 2006 SEIS for a particular resource area informed the NRC staff's basis for a "NOT SIGNIFICANT" determination for that resource area in this EA.

The NRC staff's impact determinations in this EA also considered any new and relevant information that could affect the analysis for each resource area, including other relevant NEPA documents such as NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" Revision 2 (2024 LR GEIS) (NRC 2024-TN10161).

3.1.4 Cumulative Effects Evaluation

Cumulative effects are the effects on the environment resulting from the incremental effects of the Federal actions when added to the effects of other past, present, and reasonably foreseeable actions on a particular resource area. The cumulative effects evaluation accounts for both geographic (spatial) and time (temporal) considerations of past, present, and reasonably foreseeable actions. Appendix G, Table G-1 of this EA identifies other past, present, and reasonably foreseeable projects and actions the NRC staff considered when determining cumulative environmental effects. The NRC staff considered projects and actions within a 50 mi (80 km) radius of the Palisades site, except when specifically stated otherwise. Past actions

² The NRC staff typically characterize environmental impacts as SMALL as follows (NRC 2012-TN5527, NRC 2012-TN5528): Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. In assessing radiological impacts, the NRC has concluded that those impacts that do not exceed permissible levels in the agency's regulations are considered SMALL.

include NRC past actions, e.g., licensing of operations, which are included in the cumulative effects analysis. The NRC staff's analyses of the potential cumulative effects of the proposed Federal actions when added to the effects of other past, present, and reasonably foreseeable actions are presented within each resource area section of this EA.

3.1.5 Climate Change and Greenhouse Gas Evaluation

The NRC staff's evaluation considers climate change impacts through the remainder of the term of the Palisades RFOL. The climate change evaluation includes a description of how the baseline environment, defined in Section 3, might change as a result of climate change along with a discussion of how the impacts discussed in Sections 3 and 4 would either increase, decrease or remain the same in this new baseline environment. Potential climate change and GHG impacts are evaluated and described in Appendix F to this EA.

3.2 Land Use and Visual Resources

The NRC staff evaluated land use and visual resource information in related environmental documents to determine the potential environmental effects from the proposed Federal actions at the Palisades site. Portions of the following documents relevant to the subject area are incorporated by reference in support of the NRC staff's land use and visual resource significance effects determination (see Table 1-2 of this EA):

- 2006 SEIS (NRC 2006-TN7346): Sections: 2.1.1, External Appearance and Setting; 2.2.1, Land Use
- 2023 N&S Report (HDI 2023-TN10538): Section 3.1, Land Use
- 2024 LR GEIS (NRC 2024-TN10161): Section 4.2.1, Environmental Consequences of the Proposed Action – Continued Operation and Refurbishment Activities

A brief summary of the material incorporated by reference along with the relevance to the current environmental review is provided in the discussion that follows.

3.2.1 Affected Environment

As described in the 2006 SEIS (NRC 2006-TN7346), Palisades is located in a predominantly rural area, characterized by agriculture land, woods and sand dunes along the lakeshore of Lake Michigan. Palisades is bordered by Van Buren State Park on the north and a privately owned residential and lakefront recreational community, Palisades Park Country Club, on the south (see Figure 2-3 of this EA).

Palisades is also located within Michigan's coastal zone and includes sandy beaches on the shoreline of Lake Michigan that play a role in the preservation and wildlife habitat quality of the critical dune area. The movement of sand via littoral drift from surrounding shoreline areas is important for maintaining the structure of replenishing the beach. Site observations by the NRC ecologists in 2024 noted that the adjacent beaches lakeward of the developed areas on the Palisades site were armored against erosion and subsequently narrowed relative to the beaches fronting undeveloped lands on the site. The unarmored beaches at the Palisades site are relatively robust and wider in comparison.

Beach erosion and replenishment are covered under the Coastal Zone Management Act of 1972, as amended (CZMA) administered by Michigan's Coastal Management Program. Section 307(c)(3)(A) of the CZMA (16 U.S.C. 1456(c)(3)(A)) (TN1243), requires that an

applicant for a Federal license or permit, conducting an activity affecting any land or water use or natural resource of the coastal zone, provide in the application to the licensing agency (in this case, the NRC) a certification that the proposed activity complies with the enforceable policies of the State of Michigan's coastal zone management program. Per 15 CFR 930.51(b) (TN4475), the term "federal license or permit" includes certain specified types of renewals and major amendments that affect a coastal use or resource.

In order to meet this requirement, Holtec requested the Michigan Department of Environment, Great Lakes, and Energy (Michigan EGLE), Water Resources Division, affirm that the current Palisades CZMA Consistency Certification (Certification), issued on June 14, 2005, for the renewal of the Palisades facility operating license remains valid. In their response, Michigan EGLE outlined conditions to be met for the Certification to remain valid and provided current information on the requirements included in the 2005 Certification (HDI 2024-TN10670: RAI-GEN-3). As described in 15 CFR 930.51(b)(3), the determination hinges on whether the activity authorized by the amended license or permit would affect any coastal use or resource in a way that is substantially different than the description or understanding of effects at the time of the original activity. Consequently, the term of the 2005 Certification would continue through the expiration of the Palisades' RFOL unless the NRC determines that the amendment would affect the coastal use or resource in substantially different ways when compared to the original activity. The NRC has determined that the Federal actions would not be substantially different from the description or understanding of the effects at the time of the original activity. This conclusion is based on the NRC staff's review of the preparations for and the resumption of power operations as documented in the conclusions for Sections 3.2, 3.3, and 3.4 and Michigan EGLE's consistency determinations in the agency's issued permits (Table C-2).

As described in Section 2.2.1 of the 2006 SEIS, the plant facilities are located about 2,500 ft (760 m) from both the northern and southern boundaries of the industrial zoned, 432 ac (175 ha) Palisades site. A number of buildings and other permanent structures occupy approximately 80 ac (32 ha) of the Palisades site. These include the power generation and administration area (20 ac [8 ha]), transmission corridors and switchyard (30 ac [12 ha]), warehouse area (7 ac [2.8 ha]), cooling towers (4 ac [1.6 ha]), and other supporting buildings and waste storage (7 ac [2.8 ha]).

Information regarding changes to facilities at Palisades were provided as part of the applicant's 2023 N&S Report. Since the 2006 SEIS, two new Diverse and Flexible Coping Strategies buildings were constructed and two buildings were removed due to poor structural conditions (HDI 2023-TN10538: Section 3.1). The NRC staff note that in addition to facility changes, vapor plumes from cooling towers are not a part of the current visual landscape. The resumption of power operations, and operation of the cooling towers, would result in the occasional reappearance of vapor plumes under certain atmospheric conditions (Ryznar et al. 1980-TN11923). Vapor plumes are more frequently seen in winter months, or during the night and early morning when temperatures are lower, and humidity levels rise. Winds off the lake can cause plumes to dissipate close to the ground.

3.2.2 Environmental Impacts from the Preparations for the Resumption of Power Operations

Preparations for the resumption of power operations activities, summarized in Section 3.1.2, were reviewed to determine any land use or visual resource impacts. The construction of two new buildings, access road expansion, new security fence, and other ongoing industrial activities, would be consistent with the designated industrial use and appearance of the existing

nuclear power plant site. The NRC has also concluded that activities in support of the resumption of power operations would not affect any coastal use or resource in a substantially different way than during previous power operations (per 15 CFR 930.51(b)(3) [TN4475]; HDI 2024-TN10670: RAI-GEN-3; Table C-2). Based on this, the NRC staff have determined the proposed Federal actions would not alter the industrial land use and visual appearance of Palisades and would be NOT SIGNIFICANT.

3.2.3 Environmental Impacts from the Resumption of Power Operations

Environmental impacts from the resumption of power operations would result only from activities at or in immediate proximity to existing facilities on previously disturbed land within the industrial areas of the Palisades site on land zoned for industrial use. Activities in support of the proposed Federal actions (e.g., periodic vegetation clearing, landscaping, and other routine maintenance activities) would be consistent with the designated industrial use and appearance of the nuclear power plant site and would be similar to those that occurred at the nuclear plant during previous operation. Therefore, industrial activity would remain unchanged.

The Palisades plant is located on the shores of Lake Michigan. The visual appearance has been well established and remains unchanged from previous operation during decommissioning. The resumption of power operations, however, would also include the occasional reappearance of vapor plumes from the cooling towers. As explained in Section 3.2.1 of this EA, vapor plumes are more frequently seen in winter months, or during the night and early morning when temperatures are lower and humidity levels rise.

The NRC staff have concluded that activities in support of the resumption of power operations would not affect any coastal areas or resource in a substantially different way than during previous power operations (15 CFR 930.51(b)(3) [TN4475]; HDI 2024-TN10670: RAI-GEN-3). Therefore, the NRC staff have determined the proposed Federal actions would not alter the industrial land use and visual appearance of Palisades and, therefore, would be NOT SIGNIFICANT.

3.2.4 Cumulative Effects

Appendix G, Table G-1 identifies other past, present, and reasonably foreseeable actions that could result in cumulative effects. The addition of SMRs on the Palisades site would be consistent with the existing industrial land use and appearance of Palisades. SMR operation could generate additional vapor plumes if the proposed SMR technology requires building additional cooling towers.

As discussed in Sections 3.2.2 and 3.2.3 of this EA, the proposed Federal actions would have not have a noticeable effect on the industrial use and visual appearance beyond what has been previously experienced. SMRs, if constructed onsite, would be consistent with the existing industrial use and appearance of Palisades. Therefore, the NRC staff have determined that incremental land use and visual effects of the proposed Federal actions when added to the effects of other past, present, and reasonably foreseeable projects would not have significant cumulative effects.

3.3 Meteorology and Air Quality

The NRC staff evaluated previous environmental documents and analyses with regard to meteorology and air quality along with their relevance to potential environmental effects of the

proposed Federal actions at the Palisades site. Portions of the following environmental documents relevant to the subject area are incorporated by reference to support the NRC staff's significance effects determination for meteorology and air quality (see Table 1-2):

- 2006 SEIS (NRC 2006-TN7346): Section 2.2.4, Air Quality
- N&S Report (HDI 2023-TN10538): Table 3.7-2, PNP Annual Emissions (Pounds Per Year); Table 4.3-2, Comparison of Category 1 and 2 Terrestrial Resources Issues Over Time and Applicability to PNP
- 2024 LR GEIS (NRC 2024-TN10161): Section 4.6.1.1.4, Cooling Tower Impacts on Terrestrial Plants
- Holtec Requests for Additional Information (RAI) Response (HDI 2024-TN10670): RAI-GEN-1 (Detailed list of activities related to the Federal actions); RAI-GEN-3 (Environmental authorizations necessary for the proposed actions); RAI-MET-1 (Recent climatological data); RAI-MET-5 (Construction equipment emissions); RAI-MET-6 (Annual pollutant emissions since 2022); RAI-TE-1 (Cooling system changes)

A brief summary of the material incorporated by reference along with the relevance to the current environmental review is provided in the discussion that follows.

3.3.1 Affected Environment

In defining the affected environment for air quality and meteorology, the NRC staff assessed previous environmental documents, incorporating by reference where relevant, along with current data.

Regional Climatology

As described in the 2006 SEIS (NRC 2006-TN7346), the Palisades site is in the humid continental climate region zone, characterized by the dominance of tropical air masses in summer and polar air masses in winter. Heavy snow occurs during winter with polar air masses bringing moisture from the Great Lakes.

Temperature

Seasonal changes between summer and winter are very large, with an average seasonal temperature change of 46.4°F (25.8°C) occurring during 2000–2023. Normal monthly temperature ranges from 16.6 to 35.1°F (-8.6 to 1.7°C) in January and 66.8 to 77.7°F (19.3 to 25.4°C) in July (NOAA 2024-TN10785).

Normal Precipitation

Recent climate data from the National Oceanic and Atmospheric Administration (NOAA) was used to characterize the affected environment. Normal monthly precipitation during 2000–2023 ranged from 0.45 to 11.9 in. (1.1 to 30.2 cm) (NOAA 2024-TN10767). Local precipitation occurs throughout the year, with a typical increase in rainfall in summer. Precipitation ranges from 0.45 to 5.7 in. (1.1 to 14.5 cm) in winter months (November–March), between 0.6 to 11.9 in. (1.5 to 30.2 cm) during summer and fall months (May–October) and between 0.6 to 7.2 in (1.5 to 18.3 cm) during the month of April (NOAA 2024-TN10767).

Extreme Weather

There were 87 thunderstorm events reported from 2000 to 2023 in Van Buren County with a total damage of 5.6 million dollars (NOAA 2024-TN10768). Three Enhanced Fujita (EF) scale tornadoes of EF0 and one EF1 tornado occurred during the period between 2000 to 2023. An EF0 tornado developed during June 2010 with thunderstorms in southern Lake Michigan which moved northeast into Van Buren and Kalamazoo Counties causing damage of approximately 100,000 dollars (NOAA 2024-TN10770). Three flood events were recorded during this period, with the most recent one occurring near South Haven on April 17, 2013 causing damage over 32 million dollars (NOAA 2024-TN10769).

On-site Meteorological Monitoring

Holtec monitors 15-minute averages of wind speed, wind direction, standard deviations of wind direction (θ) and ambient temperature at 33 and 197 ft (10 and 60 m). The meteorological equipment at the Palisades site is periodically checked by onsite personnel while daily inspections are performed by remote computer and instrumentation is calibrated semiannually. The monitoring program procedure and quality assurance documents are maintained by the applicant within Holtec Procedure EM-33 (HDI 2024-TN10670: RAI-MET-1).

Winds are predominant from northwest and southwest during 2022 through 2023 at 197 ft (60 m) height. High wind speeds are more frequent during winter months and very low wind speeds are observed during summer months. The average wind speed showed a decreasing trend at both 33 ft (10 m) and 197 ft (60 m) heights from 1983 through 2023. An average wind speed of 7.67 miles per hour (mph) (3.43 m/s) was noted at 10 m and 13.6 mph (6.1 m/s) at 60 m during the period of 1983 to 2023. The atmospheric conditions were 25 percent unstable (A–C), 59 percent neutral (D–E), and 16 percent stable (F–G) during 2023. Stability frequencies are noted to shift toward the unstable classes in recent years (HDI 2024-TN10670: RAI-MET-1).

The Palisades site experiences considerable cloud cover during most of the year, which can influence air dispersion of radioactive releases as cloud cover generally creates a more stable atmosphere with less atmospheric mixing. The vent release height for radioactive releases is 191 ft (58.1 m). The relative air dispersion (χ/Q) for routine releases were determined to be 1.8×10^{-6} at the site boundary, which is about 0.5 mi (0.8 km) from the release point. Short-term χ/Q was estimated as 1.55×10^{-4} for 0 to 2 hours and 4×10^{-5} for 0 to 8 hours at the exclusion area boundary of 2,641 ft (805 m) (Entergy 2016-TN10765: Chapter 2).

Regional Air Quality

Palisades falls within the South Bend-Elkhart (Indiana)-Benton Harbor (Michigan) Interstate Air Quality Control Region. Van Buren County, Michigan, where the plant is located, is in attainment for all criteria pollutants. Berrien County in the south and Allegan and Muskegon Counties in the north are currently in moderate non-attainment for the 8-hour ozone standard of 2015 (40 CFR Part 81-TN7226). Porter County in Indiana to the south of the Palisades site is also a non-attainment area for ozone standard of 2015. Ionia County is a maintenance area for lead standard of 2008. LaPorte County in Indiana to the south of the Palisades site, is a maintenance area for the 24-hour sulfur dioxide standard of 1971 and the 8-hour ozone standard of 1997. There are no Prevention of Significant Deterioration Class I areas located within 100 mi (161 km) radius of the Palisades site.

Major emission point sources in Van Buren County include a natural gas fired 1,176 megawatts (MW) power plant and a pharmaceutical laboratory that operates gas boiler and emergency diesel generators. The Kalamazoo County has major point sources such as a pharmaceutical manufacturer, a paper mill, university, and aluminum industry. The Allegan County has two major natural gas compressor stations, a paper mill, and an animal slaughterhouse. There are landfills and a major natural compressor station in Berrien County (MEGLE 2024-TN10766).

The major emission sectors for nitrogen oxides (NO_x) in these four counties are vehicular traffic (41 percent), railroad, marine vessels and nonroad vehicles (15 percent), industrial and commercial fuel combustion (17 percent) and residential heating (10 percent) based on a 2020 emissions inventory (EPA 2024-TN10668).

The de minimis emissions for ozone precursors, particulate matter ($\text{PM}_{2.5}$), and sulfur dioxide (SO_2) are 100 tons per year (TPY) and 25 TPY for lead in moderate non-attainment areas and maintenance areas. The de minimis emission rates provide thresholds below which no conformity determination is required for criteria pollutants. The NRC staff use the thresholds for maintenance areas when determining the impacts from criteria pollutant emissions to understand whether the project could potentially further degrade the air quality in a non-attainment area or maintenance area. While Van Buren County is in attainment for all criteria pollutants, where the Palisades site is located, there are surrounding locations which are in non-attainment or maintenance areas for ozone, lead, and sulfur dioxide.

Gases found in the Earth's atmosphere that trap heat and play a role in the Earth's climate are collectively termed GHG. Climate change is a subject of national and international interest because of how it changes the affected environment. Commission Order CLI-09-21 (NRC 2009-TN6406) provides the current direction to the NRC staff to include the consideration of the impacts of the emissions of carbon dioxide (CO_2) and other GHGs that drive climate change in its environmental reviews for major licensing actions. The GHG emissions estimates from a 1,000 MWe reactor and the scaling calculations for Palisades are presented in Appendix F. The NRC staff estimated the GHG emissions, using the assumptions discussed in Appendix F, of the proposed actions, 1,444,739 metric tons (MT) $\text{CO}_2(\text{eq})$ —this includes emissions from preparation activities and resumption of operations. The total life-cycle emissions (which also include decommissioning) were estimated to be about 1,474,000 MT $\text{CO}_2(\text{eq})$.

3.3.2 Environmental Impacts from the Preparations for the Resumption of Power Operations

The activities related to the preparations for the resumption of power operations, summarized in Section 3.1.2 of this EA, were reviewed to determine any impacts related to meteorology and air quality. The identified activities include the upgrade or replacement of existing equipment and facilities. These activities will include some ground-disturbing activities and employ construction equipment and heavy-duty trucks that burn diesel. The applicant estimated 3,000 truck deliveries over an 18-month period during the preparations for the resumptions of power operations (HDI 2024-TN10670: RAI-GEN-1). An estimate of truck emissions was performed assuming each truck would travel a total of 1,000 mi (1,609 km) (NRC 1975-TN216: Table S-5). Table 3-2 below shows the estimates calculated and verified by NRC staff using emission factors for diesel trucks provided by the U.S. Department of Transportation (DOT 2024-TN10673). There will be slight emissions from other construction activities, such as maintenance activities and required endurance testing. However, these activities are periodic and will not significantly impact the local air quality. It is expected, and as confirmed during NRC's audit, that the applicant would use best management practices (BMPs) to reduce fugitive

dust, such as watering (NRC 2024-TN10842). Additionally, it is anticipated that emissions from onsite sources operating during the preparations for the resumption or power operations, such as the oil boilers, would be similar to emissions during the period of decommissioning in 2023 (Table 3-3). GHG emissions estimates during the preparation for resumption of power operations are presented in Appendix F of this EA. The NRC staff anticipate combustion and fugitive emissions from preparation activities would be NOT SIGNIFICANT.

Table 3-2 Emissions Estimates from Truck Deliveries at the Palisades Nuclear Plant over the 18-Month Period of Preparation Activities in Metric Tons

Pollutant	Emission Factor (gram/mile)	Emissions (MT)
VOC	0.181	0.543
CO	1.592	4.776
NO _x	2.711	8.133
PM _{2.5}	0.058	0.174
CO ₂	1,387.0	4,161.0

CO = carbon monoxide; CO₂ = carbon dioxide; MT = metric ton(s); NO_x = nitrogen oxides; PM = particulate matter; VOC = volatile organic compound.

3.3.3 Environmental Impacts from the Resumption of Power Operations

Cooling Towers

The Palisades site has two banks of 65 ft (20 m) high mechanical draft cooling towers on the southern side of the plant, which replaced the original cooling towers in 2012 and 2017 (Section 2.1 of this EA). Cooling towers produce condensate plumes along with their associated drift. The replacement towers have drift eliminators that have a drift rate not to exceed 0.001 percent of the circulating water flow rate (HDI 2024-TN10670: RAI-TE-1). In the 2024 LR GEIS (NRC 2024-TN10161), the NRC staff noted that all observable effects on vegetation from the cooling tower plume ceased after the plant stopped adding sulfuric acid to the cooling water prior to 1987 (CPC 1987-TN11913) and the initial license renewal for Palisades, and noted that there were no anticipated additional impacts associated with cooling tower drift from the original towers. There are no planned modifications to the cooling towers as part of the resumption of power operations (HDI 2023-TN10538). Since there would be no significant changes in the manner in which the cooling towers are operated (e.g., cooling-water chemistry), and Palisades has replaced the original cooling towers with new towers with drift eliminators, there would be no significant impact from the operations of the cooling towers.

Emissions from Normal Operations

Palisades currently holds a source-wide operating permit (permit no. MI-ROP-B2934-2019a) to install and operate the emission sources (HDI 2024-TN10670: RAI-MET-5, RAI-GEN-1). An air permit renewal application was submitted by Holtec to the Michigan EGLE and is pending approval (HDI 2024-TN10670: RAI-GEN-3). No additional emission equipment units are expected for the resumption of power operations. The Palisades site will operate three fuel oil fired boilers for evaporation heating (21 million British thermal units/hour [MMBtu]/hr), plant heating (23.3 MMBtu/hr), and office heating (2.5 MMBtu/hr). The Palisades site will also operate two emergency diesel fired generators (21.8 MMBtu/hr) with a stack height of 50 ft (15.2 m) above the ground. Palisades will perform routine testing of another diesel fired emergency generator (17.5 MMBtu/hr), 800 brake horsepower (bhp) emergency diesel engine for auxiliary feedwater system, two 175 bhp emergency fire pumps, and two 10 bhp emergency air

compressors. Based on the draft permit requirements, the renewal permit, if issued, will require that the applicant shall not exceed the sulfur content of 1.5 percent in fuel oil feed. The two boilers will have a stack height of 100 ft (30.5 m) above the ground with no pollutant control equipment.

Palisades is subject to 40 CFR Part 70 (TN5488), because the potential to emit NO_x and SO₂ exceeds 100 TPY. Palisades is a minor source of hazardous air pollutant (HAP) emissions because the potential to emit any single HAP regulated by Section 112 of the Federal Clean Air Act is less than 10 TPY, and the potential to emit of all HAPs combined are less than 25 TPY. No emission units at Palisades are currently subject to the Prevention of Significant Deterioration regulations of 40 CFR 52.21 (TN4498), because the process equipment was installed prior to June 19, 1978 (MEGLE 2022-TN10667). The annual emissions reported during 2018, 2022, and 2023 are provided in Table 3-3 below. The NRC staff note that Palisades shut down in May 2022, therefore the emissions from 2022 are representative of air emissions during partial operation and decommissioning, while 2023 is representative of air emissions during decommissioning. The NO_x emissions from fossil fuel combustion are relatively higher than other pollutants, but still much lower than the threshold of 100 TPY. Additional contribution to ozone formation from NO_x and volatile organic compound (VOC) emissions should be insignificant. The Palisades site has surrounding counties which are in maintenance status for lead and sulfur dioxide. However, these emissions are very small from the Palisades site, and the emissions from the proposed actions would not affect the surrounding counties' maintenance status. Emissions of hazardous compounds are also negligible (HDI 2024-TN10670: RAI-MET-6).

Table 3-3 Total Annual Emissions Reported by Palisades Nuclear Plant for Operations In Metric Tons per Year. Sources: HDI 2023-TN10538, HDI 2024-TN10670: RAI-MET-6.

Year	NH ₃	CO	Lead	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC
2018	0.043	1.5	7 × 10 ⁻⁵	6.2	0.51	0.32	0.006	0.31
2019	0.019	1.299	3 × 10 ⁻⁵	5.021	0.486	0.116	0.003	0.19
2020	0.020	1.234	3 × 10 ⁻⁵	4.791	0.422	0.119	0.003	0.17
2021	0.021	1.246	3 × 10 ⁻⁵	4.838	0.462	0.264	0.005	0.17
2022	0.040	0.84	6 × 10 ⁻⁵	3.4	0.30	0.18	0.009	0.16
2023	0.076	0.54	1 × 10 ⁻⁵	2.6	0.23	0.15	0.015	0.03

CO = carbon monoxide; NH₃ = anhydrous ammonia; NO_x = nitrogen oxides; PM = particulate matter; SO₂ = sulfur dioxide; VOC = volatile organic compound.

The NRC staff's independent analysis of the Palisades cooling towers and emissions from normal operations, including GHG emissions presented in Appendix F, determined that the impacts related to the resumption of power operations would be NOT SIGNIFICANT.

3.3.4 Cumulative Effects

Appendix G, Table G-1 of this EA identifies past, present, and reasonably foreseeable projects that could cumulatively contribute to the environmental effects of the proposed Federal actions. Key past and present actions affecting air quality in the affected area include ongoing operations of fossil fuel fired power plants, mining activities, redevelopment and highway construction activities, industries including refinery, paper mill, pharmaceutical, food processing, metal fabrication, airports, and landfills. Future actions including highway construction and construction and operation of SMRs will affect the regional air quality. The 2020 National

Emissions Inventory shows 1992 tons of NO_x emissions, 990 tons of PM_{2.5} emissions, and 9,652 tons of VOC emissions in Van Buren County (EPA 2024-TN10668). Palisades' NO_x emissions were estimated up to 8 TPY with much lower emissions for other criteria pollutants. Thus, Palisades' emissions contribution is very small (<0.4 percent) compared to the existing emissions inventory in the region. The NRC staff determined that the incremental effects of the proposed Federal actions related to meteorology and air quality when added to the effects of other past, present, and reasonably foreseeable projects would not have significant cumulative effects.

3.4 Surface Water Resources

The NRC staff evaluated previous environmental documents and analyses with regard to surface water resources, along with their relevance to potential environmental effects of the proposed Federal actions at Palisades. Portions of the following environmental documents relevant to the subject area are incorporated by reference to support the NRC staff's significance effects determination for surface water resources (see Table 1-2 of this EA):

- 2006 SEIS (NRC 2006-TN7346): Sections: 2.1.3, Cooling and Auxiliary Water Systems; 2.2.2, Water Use
- 2024 LR GEIS (NRC 2024-TN10161): Section 3.5.1, Surface Water Resources
- N&S Report (HDI 2023-TN10538): Section 3.2, Water Resources Holtec
- RAI Response (HDI 2024-TN10670): RAI-GEN-1 (Detailed list of activities related to the Federal actions); RAI-GEN-3 (Environmental authorizations necessary for the proposed actions); RAI-SE-1 (Temporary workforce); RAI-SE-2 (Description and breakdown of projected plant employment); RAI-SW-11 (Changes to CCW system heat exchangers)
- Holtec Requests for Confirmatory Information (RCI) Response (HDI 2024-TN10669): RCI-SW-5, 6, and 7 (Confirmation of water-resources baseline condition – water use); RCI-SW-3 (Confirmation of water-resources baseline condition – intake structure); RCI-SW-10 (Confirmation of water-resources baseline condition – stormwater)

A brief summary of the material incorporated by reference along with the relevance to the current environmental review is provided in the discussion that follows.

3.4.1 Affected Environment

Section 2.1 of this EA describes the location, layout, and cooling system of Palisades, including the intake and discharge structures and source of plant water use. Additional details of the cooling and auxiliary water system are described in the 2006 SEIS (NRC 2006-TN7346). The 2006 SEIS describes that Palisades relied on potable water from South Haven Municipal Water Authority and raw water from Lake Michigan. The raw water from Lake Michigan was primarily used during power operations for waste heat removal from the nuclear plant and steam plant auxiliary systems but also was used for feedwater to produce demineralized water for the cooling loops. Water was withdrawn from Lake Michigan via a pipeline from a submerged intake crib structure, 35 ft (11 m) deep (NRC 2006-TN7346), located offshore and into an onshore intake structure, which included three service water pumps and trash racks. The affected environment described in the 2006 SEIS provides information related to the pre-decommissioning condition at Palisades during previous power operations. Many of the systems in use during the 2006 SEIS have remained and would be used during the resumption of power operations. Holtec performs periodic maintenance of stormwater outfalls including

removal of sediment from the mixing basin under the Michigan EGLE-issued dredging permit no. WRP020704 (HDI 2025-TN10669: RCI-SW-3).

Surface Water Use

Following cessation of operations of Palisades, surface water use at the plant has decreased. The decrease was mainly related to the following: (1) cooling water no longer needed for power production; current cooling is used only for the spent fuel pool (HDI 2024-TN10669: RCI-SW-5, 6, and 7) and (2) the reduction in potable and sanitary water use because the workforce decreased from approximately 550 in 2022 to 218 in 2023 and 449 currently (HDI 2024-TN10670: RAI-SE-1, RAI-SE-2). Currently, Palisades withdraws approximately 6,000 gallons per minute (gpm) of water from Lake Michigan for spent fuel pool cooling (HDI 2024-TN10669: RCI-SW-5, 6, and 7). This water is returned to Lake Michigan. Palisades uses approximately 2.8 gpm (16,000 cubic ft [ft³] per month) (10.6 lpm and 450 m³) of potable water from South Haven Municipal Water Authority (HDI 2024-TN10669: RCI-SW-5, 6, and 7).

The cooling tower basins were drained after Palisades ceased operations (HDI 2024-TN10669: RCI-SW-10). Currently, rainwater may accumulate in the basins during storms. The cooling tower basins drain by gravity. Each cooling tower basin holds 158,500 ft³ (4,488 m³) of water (HDI 2024-TN10856). In addition, supply lines to the cooling towers, cooling tower water deck, return pipes to the condenser, supply water boxes, condenser tubes, and discharge water box hold additional water. The total volume of the circulating water system from the circulating water pumps to the condenser outlet water boxes is approximately 604,000 ft³ (17,100 m³) or 4.5 million gallons (17 million liters) (HDI 2024-TN10856).

The intake structure is inspected annually for integrity and other environmental conditions including zebra mussel buildup (HDI 2024-TN10669: RCI-SW-3). No dredging is currently performed at the intake structure.

Surface Water Quality

Following cessation of operations of Palisades, cooling-water discharge decreased with associated reduction in heat and pollutant loads. Palisades discharges stormwater, wastewater, and treated water under NPDES permit no. MI0001457, which expired October 1, 2018 (MDEQ 2014-TN10665), but has been administratively renewed following a renewal application on June 11, 2018 (HDI 2024-TN10670: RAI-GEN-3). A public hearing on the draft of the renewed NPDES permit (MEGLE 2023-TN10739) was held by Michigan EGLE on October 1, 2024 (MEGLE 2024-TN10787). The renewed NPDES permit, if issued, will be valid through October 1, 2028. Palisades also has a Michigan EGLE-issued Storm Water Management Industrial Site Certification, I-18257, with an expiration date of July 1, 2026 (HDI 2024-TN10670: RAI-GEN-3). Michigan EGLE has issued a Clean Water Act (CWA) Section 401 water quality certification on May 5, 2025 (EPA 2025-TN11930; MEGLE 2025-TN11933).

On October 30, 2023, a noncompliance of the NPDES permit occurred due to overapplication of sodium hypochlorite in the service water system that resulted in an exceedance of total residual oxidant (TRO) permit limit of a daily maximum of 300 µg/L because of one TRO sample measuring 360 µg/L (HDI 2023-TN10674). The daily average TRO limit of 200 µg/L was not exceeded. Holtec notified Michigan EGLE and took corrective actions. The event was documented in Palisades' corrective action process (HDI 2023-TN10674).

Palisades does not use any retention or detention ponds (HDI 2024-TN10669: RCI-SW-5, 6, and 7). Sanitary wastewater is treated and disposed at septic drain fields. Solids are periodically removed from the septic drain fields and disposed offsite at licensed facilities.

The topography of the Palisades site has a local high between the two cooling tower banks (HDI 2024-TN10669: RCI-SW-10). This topographic configuration supports surface runoff from cooling tower B area to the south toward grassy and wooded areas. There are no catch basins, or stormwater drains near or on the south side of cooling tower B. Stormwater for the rest of the Palisades site is drained by a stormwater drainage system that eventually discharges into Lake Michigan (Figure 3-3 below). There are two stormwater outfalls on the south side of the discharge structure, just north of the old barge slip area. There are three stormwater outfalls on the north side of the discharge structure. Palisades maintains a stormwater pollution prevention plan to manage discharge of stormwater from the plant site to Lake Michigan (HDI 2023-TN10538). Palisades also manages inadvertent releases of oil, salt, and other polluting materials under its spill prevention, control, and countermeasures and pollution incident prevention plan (SPCC-PIPP).

3.4.2 Environmental Impacts from the Preparations for the Resumption of Power Operations

Activities related to the preparation for the resumption of power operations of Palisades are described in Section 3.1.2 of this EA. The ground-disturbing activities associated with preparation for resumption of power operations may have potential interfaces with the surface water environment. These interfaces could be related to water use for workers (potable and sanitary); dust suppression during preparations for installation of the new barrier/wall, power cable replacement for cooling towers, expansion of the access road, and installing other buildings and enclosures; potential removal of sediment from the mixing basin; and stormwater outfalls' pipes replacement. Holtec expects site employment levels to peak at 1,600 workers during the preparations for resumption of power operations (HDI 2024-TN10670: RAI-SE-1). The peak workforce would be similar to that expected for refueling outages and therefore the potable and sanitary water use by workers would be similar to refueling outages during previous power operations. The activities related to preparation for resumption of power operations are similar to activities associated with license renewal for a plant's non-cooling system, and impacts to surface water use from non-cooling systems were generically determined to be small by the NRC staff in the 2024 LR GEIS (NRC 2024-TN10161). The expansion of the access road requires a permit from Michigan EGLE under the Sand Dunes Protection and Management of Michigan's Natural Resources and Environmental Protection Act (HDI 2024-TN10670: RAI-GEN-1; Michigan Compiled Law 353-TN10693). The stormwater outfalls' routine maintenance (that may include sediment removal) and pipes replacement would be performed under the existing, Michigan EGLE-issued dredging permit no. WRP020704. Removed sediments would be tested for radioactivity and other contaminants before disposal offsite (HDI 2024-TN10669: RCI-SW-3). The activities are limited in areal extent (see Table 3-1 in Section 3.1.2 of this EA) and therefore any water needed for dust suppression is expected to be minor.

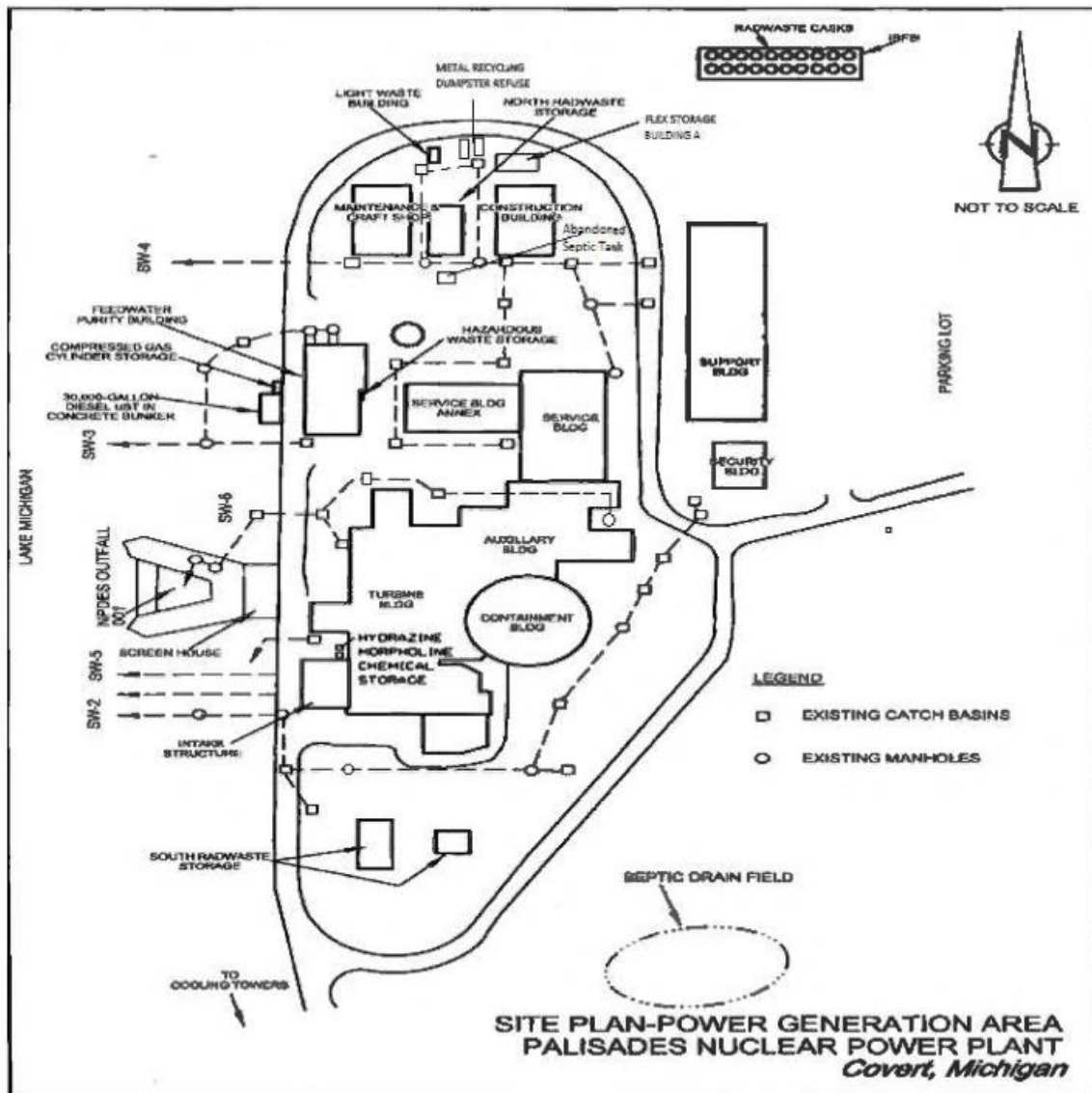


Figure 3-3 Stormwater Drainage System Map at Palisades Nuclear Plant. Source: HDI 2024-TN10670: RAI-SW-4.

In preparation for resumption of power operations, the cooling tower basins would be filled using water obtained from Lake Michigan (HDI 2024-TN10669: RCI-SW-10). The volume of water needed to fill these basins and other components of the circulating water system is approximately 4.5 million gallons (17 million liters) (HDI 2024-TN10856). This volume is insignificant compared to water availability in Lake Michigan, which has a volume of approximately 1,180 cubic miles (mi³) or 1.3×10^9 million gallons (4,918 cubic kilometers [km³] or 4.9×10^9 million liters) (GLC 2024-TN10738). Therefore, the impact of this water use on surface water resources would be minor. In addition, Palisades would continue to withdraw 6,000 gpm (23,000 lpm) water from Lake Michigan to support spent fuel pool cooling (HDI 2024-TN10669: RCI-SW-5, 6, and 7). Water withdrawn to support spent fuel pool cooling would continue to be returned to Lake Michigan and therefore would result in no consumptive water use. Therefore, the impact of this water use on surface water resources would be minor.

The activities in preparation for resumption of power operations may affect surface water quality by potentially altering drainage patterns, resulting in greater surface runoff from the locations of these activities, and transporting sediment and other pollutants with surface runoff to Lake Michigan. These activities are similar to activities associated with license renewal for a plant's non-cooling system and impacts to surface water quality from non-cooling systems, if performed using BMPs, were generically determined to be small by the NRC staff in the 2024 LR GEIS (NRC 2024-TN10161). As stated, these activities are limited in areal extent (see Table 3-1 in Section 3.1.2 of this EA). These activities would be performed under NPDES permit no. MI0001457 which is currently undergoing renewal (HDI 2024-TN10670: RAI-GEN-3), following the stormwater pollution prevention plan (SWPPP), and employing BMPs. These measures will ensure adverse impacts on surface water quality would be minor.

As part of the preparations for resumption of power operations, Holtec is considering replacement of both CCW heat exchangers. The potential impacts of the proposed CCW heat exchangers on surface water resources are evaluated in Section 3.4.3.

Based on information in the review of Holtec's N&S Report (HDI 2023-TN10538), Holtec's responses to NRC's RAI (HDI 2024-TN10670) and RCI (HDI 2024-TN10669), public scoping (Appendix B), and the assessment described above, surface water resource impacts related to the activities from the preparations for resumption of power operations would be NOT SIGNIFICANT.

3.4.3 Environmental Impacts from the Resumption of Power Operations

Holtec expects site employment to be 600 workers during and after the resumption of power operations (HDI 2024-TN10670: RAI-SE-1). The potable and sanitary water use for the operation workforce would be similar to that during the previous power operations, as described in the 2006 SEIS (NRC 2006-TN7346). As noted in the N&S Report, the potable water would continue to be obtained from the South Haven Municipal Water Authority (HDI 2023-TN10538). This surface water use is similar to anticipated activities associated with license renewal for a plant's non-cooling system, and impacts to surface water use from non-cooling systems during power operations were generically determined to be small by the NRC staff in the 2024 LR GEIS (NRC 2024-TN10161).

Upon resumption of power operations, raw water would be withdrawn from Lake Michigan for Palisades' service water system and the circulating water system (HDI 2023-TN10538). During normal operations, a total of 92,000 gpm³ (40,000 gpm from each of two dilution water pumps and 6,000 gpm from each of two service water pumps) would be withdrawn (HDI 2024-TN10669: RCI-SW-5, 6, and 7). The evaporative loss in the cooling tower would be 12,000 gpm and the remaining 80,000 gpm of the withdrawn water would be returned to Lake Michigan. Over a year of operations, the evaporative loss would be less than 0.001 percent of the water volume of Lake Michigan. As described in Section 3.4.2 of this EA, there is no consumptive water use associated with the proposed CCW heat exchangers. The NRC staff have concluded that the plant water use following resumption of reactor power operation would be similar to Palisades' previous power operation. In the 2006 SEIS, the NRC staff determined that all cooling system-related surface water use impacts for power operations of Palisades were small (NRC 2006-TN7346).

³ There are three 6,000 gpm service water pumps at Palisades, two of which are normally in service (HDI 2024-TN10669: RCI-SW-5, 6, and 7). Altogether, the two 40,000 gpm dilution water pumps and the three 6,000 gpm service water pumps provide a 98,000 gpm water withdrawal capacity.

During power operations, impacts to surface water quality from plant discharges would be regulated under the Palisades' NPDES permit (see Table C-2). Under the NPDES permit, Palisades is expected to maintain a stormwater pollution prevention plan for managing stormwater discharge to Lake Michigan. As part of the draft renewal NPDES permit that is awaiting final approval (MEGLE 2023-TN10737), Holtec would be required to perform a thermal plume study for the plant discharge from Outfall 001 (Figure 3-3). The NRC staff also expect that inadvertent release of polluting materials would continue to be managed under the SPCC-PIPP. Sanitary wastewater is expected to be treated at the existing septic fields and solids periodically disposed at appropriately licensed offsite facilities. Because there would not be any changes to power generation capacity and the circulating water system, the NRC staff expect that the thermal discharges to Lake Michigan would be comparable to previous power operations. In the 2006 SEIS, the NRC staff determined that all cooling system-related surface water quality impacts for power operations of Palisades were small (NRC 2006-TN7346).

Holtec is considering replacement of both CCW heat exchangers before resuming power operations of Palisades (HDI 2024-TN10670: RAI-SW-11). Palisades uses two existing CCW heat exchangers, each of which has a nominal 50 percent cooling capacity. The CCW system is the secondary, closed cooling loop that uses service water and is the intermediate cooling system between the radioactively contaminated systems and the tertiary, open loop service water system that comprises the ultimate heat sink. The existing system requires both CCW heat exchangers to be in service due to flow rate limitations. The proposed CCW heat exchangers will each have a nominal 100 percent capacity, which allows operational flexibility. Holtec would not make any changes to the service water side of the CCW heat exchangers and therefore no changes to the interface to the surface water environment are expected. There is no change to the heat loads that are serviced by the proposed CCW heat exchangers. The total service water flow rate is also not expected to change; the service water flow may be through one or both proposed CCW heat exchangers depending on whether one or both proposed CCW heat exchangers are in use. There is no consumptive water use associated with the CCW heat exchangers. Therefore, the proposed CCW heat exchangers would not affect surface water resources.

Based on information in the review of Holtec's N&S Report (HDI 2023-TN10538), Holtec's responses to NRC's RAIs (HDI 2024-TN10670) and RCIs (HDI 2024-TN10669), public scoping (Appendix B to the EA), and the assessment described above, surface water resource impacts related to the resumption of power operations would be NOT SIGNIFICANT.

3.4.4 Cumulative Effects

Appendix G, Table G-1 of the EA identifies past, present, and reasonably foreseeable projects that could cumulatively contribute to the environmental effects of the proposed Federal actions. The actions or projects in the vicinity of Palisades that may affect surface water resources include:

- future onsite construction (a new spent fuel pad and future SMRs)
- potential subsequent license renewal (SLR) of Palisades
- continued operation of energy generation facilities
- construction, upgrade, and rebuilding of power transmission infrastructure
- continued operation of existing mines
- residential, commercial, and industrial development
- continued operation of water supply and wastewater treatment facilities
- cleanup of contaminated sites

- continued operation and upgrade of transportation infrastructure
- continued recreational activities

For the identified projects, any effects of existing surface water use and impacts on surface water quality are being permitted and managed under appropriate regulations. Foreseeable water use and water quality impacts would be managed under the Federal and State permits and regulations, as appropriate. Therefore, the NRC staff have determined that the incremental effects of the proposed Federal actions related to surface water resources when added to the effects of other past, present, and reasonably foreseeable projects would not have significant cumulative effects.

3.5 Geologic Environment and Groundwater Resources

The NRC staff evaluated previous environmental documents and analyses with regard to the geologic environment and groundwater resources along with their relevance to potential environmental effects of the proposed Federal actions at the Palisades site. Portions of the following environmental documents relevant to the subject area are incorporated by reference to support the NRC staff's significance effects determination for groundwater resources and geologic environment (see Table 1-2 of this EA):

- 2006 SEIS (NRC 2006-TN7346): Section 4.5, Groundwater Use and Quality
- N&S Report (HDI 2023-TN10538): Sections: 3.2.1.1, Groundwater Use; 3.2.1.2, Groundwater Quality
- Holtec RAI Response (HDI 2024-TN10670): RAI-GEN-1 (Detailed list of activities related to the Federal actions)
- Holtec Second RCI responses (HDI 2024-TN10843): RCI-GW-2a (Confirmation of information provided in the HDI's "Updated Hydrogeologic Investigation Report: Palisades Nuclear Power Plant Covert, Michigan," dated September 14, 2023)
- Updated Final Safety Analysis Report Revision 35 (Entergy 2021-TN10998): Section 2.3.2, Glacial Geology

A brief summary of the material incorporated by reference along with the relevance to the current environmental review is provided in the discussion that follows.

3.5.1 Affected Environment

Updated Final Safety Analyses Report Revision 35 provides a relevant discussion of the geologic conditions at the Palisades site. Palisades is located in southwest Michigan in the Central Lowland Physiographic Province. Mississippian age (358.9–323.2 million years ago) Coldwater Shale underlies the region and was identified at 440 ft (130 m) above MSL within the vicinity of the containment building. Repeated glaciation during the Pleistocene (2.58 million to 11,700 years ago) resulted in extensive till and boulder clay deposits and eventually established the current boundaries of Lake Michigan (Entergy 2021-TN10998). Glacial deposits range from a few hundred feet to several hundred feet in thickness in the vicinity of the Palisades site. Sand dunes mantle the glacial deposits, rising from 582 ft (177.4 m) MSL on the shore of Lake Michigan to an elevation of 780 ft (237.7 m) MSL at the site of the containment vessel. The dunes are present 2 mi (3.2 km) north to 5 mi (8 km) south of Palisades. Glacial and post-glacial deposits have been classified into four distinct deposits at the Palisades site: (1) dune sand, (2) dense to very dense gray silty sand or sandy silt, (3) stiff gray clay, and (4) stiff to hard gray

glacial till. Onsite, the dune sand is approximately 40–140 ft (12–42.7 m) thick, becoming dense to very dense below 590 ft (179.8 m) MSL. The glacial till layers are approximately 78–90 ft (24–27 m) thick and overlie the Coldwater Shale (Entergy 2021-TN10998). Prior to construction and operation, the site was utilized as a sand quarry. There are no other noted geologic resources in the vicinity of Palisades.

Sand and gravel glacial outwash deposits are the primary source of groundwater supply in the region and groundwater is the main water supply source in Van Buren County. Groundwater present within the Coldwater Shale is of low yield and quality (Cummings et al. 1984-TN10676). There are 187 known active wells within 2 mi (3.2 km) of Palisades, the majority of which are domestic wells completed in unconsolidated glacial deposits (DTMB 2024-TN10677). There are no registered domestic wells down gradient of the onsite groundwater flow, and there are no major sources of groundwater withdrawal, such as large-scale industrial or agricultural pumping, that might change the flow direction of the groundwater (DTMB 2024-TN10677; Entergy 2021-TN10998). Within the vicinity of the Palisades site, groundwater is unconfined within the dune sand and flows toward Lake Michigan (NMC 2005-TN10678). Field studies conducted at the site report groundwater elevations range from 7–110 ft bgs (2.1–33.5 m bgs). Groundwater flow velocities range from 816–1,274 ft/year (249–388 m/year) in the upper dune sand and from 9–99 ft/year (2.7–30 m/year) in the deeper, silty sand unit above the clay (HDI 2024-TN10843). Due to the low permeability of the glacial till, vertical groundwater flow is limited. Historically, three groundwater wells were used for grounds maintenance and other miscellaneous uses at a combined capacity of 24 gpm (NMC 2005-TN10678). As discussed in the N&S Report, these production wells were disused in 2019, and no other groundwater was used at the site during operation or is currently used in the decommissioning phase (HDI 2023-TN10538: Section 3.2.1.1). Domestic and landscaping water needs at the plant are fully met by municipal sources.

Palisades monitors 39 groundwater wells in support of the Industry Groundwater Protection Initiative (GPI) (NEI 2019-TN6775). Monitoring under Nuclear Energy Institute 07-07 continued after operations ceased at the plant (HDI 2024-TN10679). The wells are screened within the dune sand and sampled quarterly for gamma activity and tritium (HDI 2023-TN10538). Between 2009 to 2022, Palisades reported experiencing 10 instances of elevated tritium detected in onsite wells (see Table 3-4 of this EA for details). From January 1, 2023 to June 26, 2024, tritium was detected in MW-2, MW-11, TW-17, and TW-18 at a maximum concentration of 1,441 picoCuries per liter (pCi/L) at TW-17 (HDI 2024-TN10679). Groundwater sample data from MW-2, MW-3, MW-11, and MW-13 indicate tritium releases have impacted onsite groundwater. However, tritium has not been detected in groundwater in the lower dune sand, indicating that impacted groundwater is within the upper 10–15 ft (3–4.6 m) of the aquifer (HDI 2023-TN10538: Section 3.2.1.2).

Table 3-4 Tritium Releases and Elevated Detection in Onsite Groundwater at Palisades Nuclear Plant, 2009–2024. Sources: HDI 2024-TN10843: RCI-GW-2a, HDI 2023-TN10538.

Date	Description of Release	Corrective Actions and Outcome
2009–2013	<ul style="list-style-type: none"> Fluctuating tritium concentrations in well MW-3 (north of T-90 and T-91 tanks). Levels reported in the 2008 monitoring data (as reported in the 2008 Hydrogeologic Investigation Report) were stated to be “less than the EPA drinking water MCL of 20,000 pCi/L.” Results indicated the source to be underground piping in the vicinity of the Auxiliary Building Addition. 	<ul style="list-style-type: none"> 18 temporary monitoring wells installed in 2009 to further identify the source of the tritium. Investigative and pipe repair/replacement activities.
February 26, 2015	<ul style="list-style-type: none"> Elevated tritium concentration in TW-7. Source identified to be the Turbine Building drain tank line. 	<ul style="list-style-type: none"> Piping replaced. Elevated tritium levels reduced by March 11, 2015.
March 2015	<ul style="list-style-type: none"> Elevated tritium concentrations detected in MW-2 and MW-11. Source determined to be associated with the February 2015 leak from the Turbine Building drain tank line. 	<ul style="list-style-type: none"> Elevated tritium levels reduced by September 2015 (MW-11) and February 2016 (MW-2). Turbine Building drain system replaced as a cautionary measure.
November 2, 2016–December 27, 2016	<ul style="list-style-type: none"> Elevated tritium concentrations detected at MW-11. Source identified to be originating from the T-91 Utility Water Storage tanks. 	<ul style="list-style-type: none"> T-91 Utility Water Storage Tank and associated piping repaired. Tritium concentrations decreased below EPA MCL.
2019	<ul style="list-style-type: none"> Tritium detected in MW-11 at a concentration of 45,268 pCi/L in November 2019. In 2020, tritium concentrations measured above the EPA MCL at MW-2, MW-3, MW-11, TW-2, TW-4, TW-6, TW-7, TW-10, TW-14, TW-17 and were elevated (e.g., at or just below EPA MCL) in MW-13 and TW-5. Source determined to be previously discharged effluents that migrated to a storm drain near to MW-11 that normally discharges to the mixing basin. 	<ul style="list-style-type: none"> No action taken as no new significant dose pathway and release previously reported under a batch release process.
October 2019–January 2020	Increasing tritium concentrations observed in 7 monitoring wells.	<ul style="list-style-type: none"> Palisades’ staff performed work to line the interior of the M-8 (plant heating boiler) and M-61 (evaporator heating boiler) boiler room sump and associated drain lines.

Table 3-4 Tritium Releases and Elevated Detection in Onsite Groundwater at Palisades Nuclear Plant, 2009–2024. Sources: HDI 2024-TN10843: RCI-GW-2a, HDI 2023-TN10538. (Continued)

Date	Description of Release	Corrective Actions and Outcome
September 5, 2020	<ul style="list-style-type: none"> The T-2 (condensate storage tank) level lowered unexpectedly. Failure/leak identified in a buried condensate return pipe to the T-2. Tritium concentrations were measured at 19,588 and 36,869 pCi/L at nearest monitoring well (MW-11) to T-2 on September 9, 2020, and October 8, 2020, respectively. 	<ul style="list-style-type: none"> Leaking pipe replaced with aboveground and indoor piping. Isolated and drained the T-2 tank. Tritium concentrations at MW-11 decreased below 800 pCi/L by November 2020. Additional pipe repair planned as part of preparations for the resumption of power operations activities (HDI 2024-TN10670: RAI-GEN-1).
2021	<ul style="list-style-type: none"> Tritium detected above EPA MCL in 6 wells at a maximum concentration of 49,197 pCi/L in TW-3. 	<ul style="list-style-type: none"> Palisades' staff performed work to line the interior of the section of buried piping between the M-950 (service building boiler) room and the M-8/M-61 boiler room sump.
February 2022	<ul style="list-style-type: none"> Tritium detected above its MCL in two wells with a maximum detection of 32,254 pCi/L in MW-2. 	<ul style="list-style-type: none"> Site corrective action process identified and isolated a leak between the Condensate Receiver Tanks T-20, T-38, and T-927 and the Condensate Receiver Tank T-2. 2023 levels not detected above minimum detectable activity.
May 2022	<ul style="list-style-type: none"> Elevated tritium detected in a water sample collected from the 1C switchgear sump within the protected area at a maximum concentration of 645,255 pCi/L. Tritium was detected at a concentration of 10,370 pCi/L in May 2022 at GPI monitoring location TW-6. Source determined to be a leak from a buried pipe, either the T-91 recirculation line or the T-87 to T-91 transfer line. 	<ul style="list-style-type: none"> Leaking section flushed, drained, and taken out of service. Tritium levels in the sump decrease to levels <15,000 pCi/L. A work request was generated to perform repairs to the system before it is put back in service. This involves capping the underground piping, installing aboveground piping, and rerouting radwaste through the aboveground pipes. Pipe repair planned as part of preparations for the resumption of power operations activities (HDI 2024-TN10670: RAI-GEN-1).

EPA = U.S. Environmental Protection Agency; GPI = Groundwater Protection Initiative; MCL = maximum contaminant level; MW = monitoring well.

Additionally, between April and September 2018, the P-8D Auxiliary Feed Water Pump and associated piping was installed. This area is a known area of previous inadvertent radiological releases. Almost 700 gamma isotopic analyses were performed, of which 19 samples contained detectable Co-60 and/or Cs-137. This material was disposed of as radioactive waste (HDI 2024-TN10843: RCI-GW-2a).

Palisades discharges some radiological waste into Lake Michigan after dilution in the mixing basin in accordance with criteria established in 10 CFR Part 50, Appendix I (NRC 2006-TN7346). Annual Radiological Effluent Release Reports are submitted to the NRC (per 10 CFR 50.36a [TN249]) to report the quantities of radionuclides released from liquid and gaseous effluents (Entergy 2020-TN10683, Entergy 2021-TN10682, Entergy 2022-TN10681; HDI 2023-TN10680, HDI 2024-TN10679). The results of groundwater monitoring under the GPI are also reported in the Annual Radiological Effluent Release Reports. The NRC staff reviewed 5 years of available radiological release reports (2019–2023 monitoring results), in addition to radiological environmental monitoring program (REMP) results. REMP results are provided in Annual Radiological Environmental Operating Reports (Entergy 2020-TN10687, Entergy 2021-TN10686, Entergy 2022-TN10685; HDI 2023-TN10684, HDI 2024-TN10771).

The cessation of operations of Palisades resulted in a decrease in liquid effluent releases to Lake Michigan and to total tritium discharged via groundwater (Entergy 2022-TN10681; HDI 2023-TN10680, HDI 2024-TN10679). In 2023, Holtec estimated an activity of 1.82×10^{-3} Curies (Ci) was discharged from onsite groundwater to the lake, compared to 1.1682×10^{-1} Ci in 2021, Palisades' last full year in operation (HDI 2024-TN10679; Entergy 2022-TN10681). The tritium discharged via groundwater over the past 5 years represents a small portion (≤ 1 percent in any given year) of the total liquid tritium discharged from Palisades. None of the surface water and drinking water samples collected as part of the plant's REMP monitoring contained measurable radiological materials attributed to Palisades' effluents in the past 5 years (Entergy 2020-TN10687, Entergy 2021-TN10686, Entergy 2022-TN10685; HDI 2023-TN10684, HDI 2024-TN10771).

Holtec maintains a SPCC-PIPP for the management of inadvertent release of oil, salt, and polluting materials. Internal procedures are also in place for the storage, handling, cleanup, and disposal of chemicals at the Palisades site (HDI 2023-TN10538). Additionally, a SWPPP that includes BMPs to prevent pollutants from entering stormwater, to direct the flow of stormwater, and to treat stormwater is maintained by the Palisades site.

3.5.2 Environmental Impacts from the Preparations for the Resumption of Power Operations

There are potential environmental impacts for activities required to support the resumption of power at Palisades (HDI 2024-TN10670: RAI-GEN-1). Planned activities include underground pipe repairs to fix the leaking condensate storage tank (T-2) and the Utility Water Storage Tank (T-91) piping and the construction of two new buildings within the protected area. All planned disturbances for the preparations for the resumption of operations will occur in previously disturbed areas, reducing the impact to soil resources. The impact to groundwater resources from these activities is considered likely to be localized and of short duration. Any potential release of pollutants during ground disturbance will be mitigated through Holtec's SPCC-PIPP and SWPPP and associated BMPs. Although the maximum excavation depth of the new South Radiological Waste Storage facility has not been defined, any potential groundwater intrusion during excavation activities will be controlled and mitigated in accordance with Federal and State regulations and site procedures (HDI 2024-TN10843: RCI-GW-2a). Palisades implements an "as low as reasonably achievable" program in accordance with Federal regulations and all work activities are screened for appropriate radiological controls in accordance with occupational radiological control regulations (HDI 2024-TN10856). Domestic water is served by municipal sources, and groundwater consumption is not anticipated to be required for the resumption of power operations. Geologic resources would not be used or altered during the preparations for resumption of power operations of Palisades. For these reasons, the NRC staff

conclude the impact on geologic resources and groundwater resources from the preparation of resumption of power operations would be NOT SIGNIFICANT.

3.5.3 Environmental Impacts from the Resumption of Power Operations

The impacts from operation under the Palisades RFOL is described in the 2006 SEIS (NRC 2006-TN7346). Since the 2006 SEIS was published, new issues applicable to the resumption of power operations of Palisades have been identified in the 2024 LR GEIS (NRC 2024-TN10161), including groundwater use and contamination (non-cooling system impacts) and radionuclides released to groundwater.

Current groundwater use at the Palisades site is different from that described in the 2006 SEIS (NRC 2006-TN7346). Groundwater use at the Palisades site was discontinued in 2019 and groundwater is not anticipated to be used during the resumption of power operations. There are no current or planned continuous contaminant plume extractions or other dewatering activities at Palisades (HDI 2023-TN10538). Site-specific programs (e.g., SPCC-PIPP, SWPP, NPDES) and BMPs are and will continue to be utilized at the site to manage and reduce the occurrence of inadvertent releases of nonradiological contaminants.

Palisades monitors onsite groundwater in accordance with the GPI to ensure timely and effective management of situations involving inadvertent releases of licensed material to groundwater. Since decommissioning, tritium is the only radionuclide detected onsite in the dune-sand aquifer due to previous unplanned releases. Groundwater containing tritium discharges to Lake Michigan represents a small portion (typically ≤ 1 percent) of the total tritium discharged to the lake via regulated batch liquid effluent releases. Although the total tritium discharged via groundwater to the lake decreased during decommissioning, planned activities (i.e., buried pipe repair) may mitigate potential increases in concentration of tritium in onsite groundwater during the resumption of power operations. No radiological material attributed to Palisades has been detected in drinking water or surface water samples near the plant, and there are no registered groundwater wells downgradient of groundwater flow from the Palisades site. For the reasons above, the NRC staff conclude that inadvertent releases of tritium have not substantially affected offsite groundwater quality or use near Palisades. Geologic resources would not be used or altered during the resumption of power operations of Palisades.

Based on the above, the NRC staff consider the impact on geologic resources and groundwater from the resumption of power operations would be NOT SIGNIFICANT.

3.5.4 Cumulative Effects

Appendix G, Table G-1 of this EA identifies past, present, and reasonably foreseeable projects that could cumulatively contribute to environmental impacts of the proposed Federal actions.

Key past and present actions affecting groundwater resources include the planned construction of multiple SMRs and the potential SLR of Palisades. The SMRs are planned to be constructed within the Palisades site boundary and additional groundwater monitoring wells could be installed to supplement the current groundwater monitoring program (SMR 2024-TN10713). Excavation for the nuclear power block associated with the SMR modules may extend to a depth of approximately 140 ft (43 m) below grade (NRC 2018-TN7244), which would likely require the application of methods (e.g., grouting and dewatering) to stabilize the deep excavation during construction. If excavation for construction of the SMR reaches 140 ft (43 m) below grade, the base would likely intersect clay till at approximately 440 ft (134 m) bgs. The

low hydraulic conductivity of the clay till (10^{-9} to 10^{-4} cm/sec based on published values for this type of material [Freeze and Cherry 1979-TN3275]) would likely restrict groundwater flow into or from the excavation. Any potential releases of radionuclides in this stratum would move west toward Lake Michigan or downward toward bedrock, which is not widely used for water supply due to low yield and quality.

The potential impacts of increased runoff and subsurface pollutant infiltration or discharge to nearby water bodies would be prevented or mitigated through implementation of BMPs and an SWPPP. It is unlikely that SMR operation would require the consumptive use of groundwater, and operational dewatering rates, if required, would be managed subject to applicable permitting requirements. The cumulative effects of SLR are expected to be consistent with conditions described and analyzed in the 2006 SEIS (NRC 2006-TN7346) and those described in Section 3.5.3 of this EA.

Therefore, the NRC staff determined that the incremental effects of the proposed Federal actions related to groundwater resources when added to the effects of other past, present, and reasonably foreseeable projects would not have significant cumulative effects.

3.6 Terrestrial Ecology

The NRC staff evaluated previous environmental documents and analyses with regard to terrestrial ecology along with their relevance to potential environmental effects of the proposed Federal actions at the Palisades site. Portions of the following environmental documents relevant to the subject area are incorporated by reference to support the NRC staff's significance effects determination for terrestrial ecology (see Table 1-2 of this EA):

- 2006 SEIS (NRC 2006-TN7346): Sections: 2.2.6, Terrestrial Resources; 2.2.7, Radiological Impacts; 3.0, Environmental Impacts of Refurbishment; 4.1, Cooling System; 4.2, Transmission Lines; 4.6, Threatened or Endangered Species
- N&S Report (HDI 2023-TN10538): Sections: 2.1.1, General Plant Information; 3.3, Ecological Resources; 4.3.2, Terrestrial Resources; 4.3.3.1, SEIS Findings
- Holtec RAI Response (HDI 2024-TN10670): RAI-GEN-1 (Detailed list of activities related to the Federal actions); RAI-GEN-3 (Environmental authorizations necessary for the proposed actions); RAI-SE-1 (Temporary workforce); RAI-TE-1 (Cooling system changes)

A brief summary of the material incorporated by reference along with the relevance to the current environmental review is provided in the discussion that follows.

3.6.1 Affected Environment

In defining the affected environment for terrestrial ecology, the NRC staff assessed previous environmental documents, incorporating by reference where relevant, along with current data.

3.6.1.1 *Site and Vicinity*

Terrestrial and Wetland Habitats

The Palisades site and vicinity lie within the Michigan Lake Plain (EPA Level IV Ecoregion 56d) and the Southern Michigan/Northern Indiana Drift Plains (EPA Level III Ecoregion 56) (EPA 2010-TN10689). The EPA characterizes the Michigan Lake Plain as a sandy coastal strip with beaches, high dunes and dune ridges, swales, and mucky inter-dune depressions (EPA 2007-

TN10688). The lake-moderated climate, along with the beach and dune plant habitats, differentiate it from other adjacent inland ecoregions to the east within the Southern Michigan/Northern Indiana Drift Plains. Descriptions of terrestrial habitats and species are provided in the 2006 SEIS (NRC 2006-TN7346) and in the N&S Report (HDI 2023-TN10538). The 432 ac (174.8 ha) Palisades site consists of about 80 ac (32.4 ha) of developed lands. The remaining 389 ac (157.4 ha) of undeveloped lands are dominated by deciduous forests (about 239 ac [96.9 ha]), with smaller amounts of early successional habitats (43 ac [17.5 ha]), dunes and sandy habitats (16 ac [6.5 ha]), and wetlands (9 ac [3.6 ha]). Since the 2006 SEIS (NRC 2006-TN7346), both rows of cooling towers were replaced, in 2012 and 2017, respectively, within the same footprint (HDI 2023-TN10538; Google Earth 2024-TN10690).

Only a few small and scattered wetlands occur on the Palisades site. The 2006 SEIS (NRC 2006-TN7346: p. 2-34) notes that onsite wetlands encompass a total area of 9 ac (3.6 ha). The NRC staff accessed the online National Wetlands Inventory (NWI) mapper on June 14, 2024 (FWS 2024-TN10691) and downloaded Michigan NWI data for analysis. The NWI mapper showed nine mapped wetlands onsite, totaling approximately 4.4 ac (1.8 ha). Four types were present on NWI: one freshwater emergent wetland (0.19 ac [0.08 ha]), four freshwater forested/shrub wetlands (1.95 ac [0.79 ha]), one freshwater pond (0.23 ac [0.09 ha]), and three beach areas inundated by Lake Michigan (2.01 ac [0.81 ha]). Figure 3-4 below shows the location of NWI mapped wetlands within the Palisades site boundary.

As described in Section 3.2 of this EA, the entire Palisades site is protected under CZMA (MEGLE 2020-TN10692). In a letter dated August 30, 2024 (HDI 2024-TN10670: RAI-GEN-3, Attachment 2), Michigan EGLE stated that the 2005 CZMA certification and conditions remain valid through the expiration of Palisades' operating license, if conditions outlined in the letter are met, and that it does not waive need for other permits (Table C-2).

Michigan regulates activities in designated critical dune areas (CDA) to protect coastal dunes along Lake Michigan, requiring a use permit for regulated activities within CDAs (Michigan Compiled Law § 353-TN10693). Regulated activities within CDAs include the construction of buildings, septic systems, water wells, driveways; excavation and filling; and vegetation removal (VBCD 2021-TN10694). The NRC staff downloaded information from Michigan EGLE (MDNR 1993-TN10695) and determined that the Palisades site has approximately 247 ac (100 ha) of designated CDAs. Palisades site CDAs are located west of the Palisades Power Plant Road (Figure 3-4 of this EA). Approximately 244 ac (98.8 ha) of the CDAs are barrier dunes, and 3 ac (1.2 ha) are an exemplary dune associated plant community outside of designated dune formations (PC-43, Mesic Southern Forest). The applicant has applied for a permit renewal (see Table C-2) from Michigan EGLE for maintenance dredging of sand along security fences, other security infrastructure, and stormwater outfall structures. Michigan EGLE is processing Holtec's application for the reauthorization of previously permitted activities. The permit would allow for the placement of dredged material on the beach and covers any additional security measures to be placed or constructed within the existing security system's footprint area.

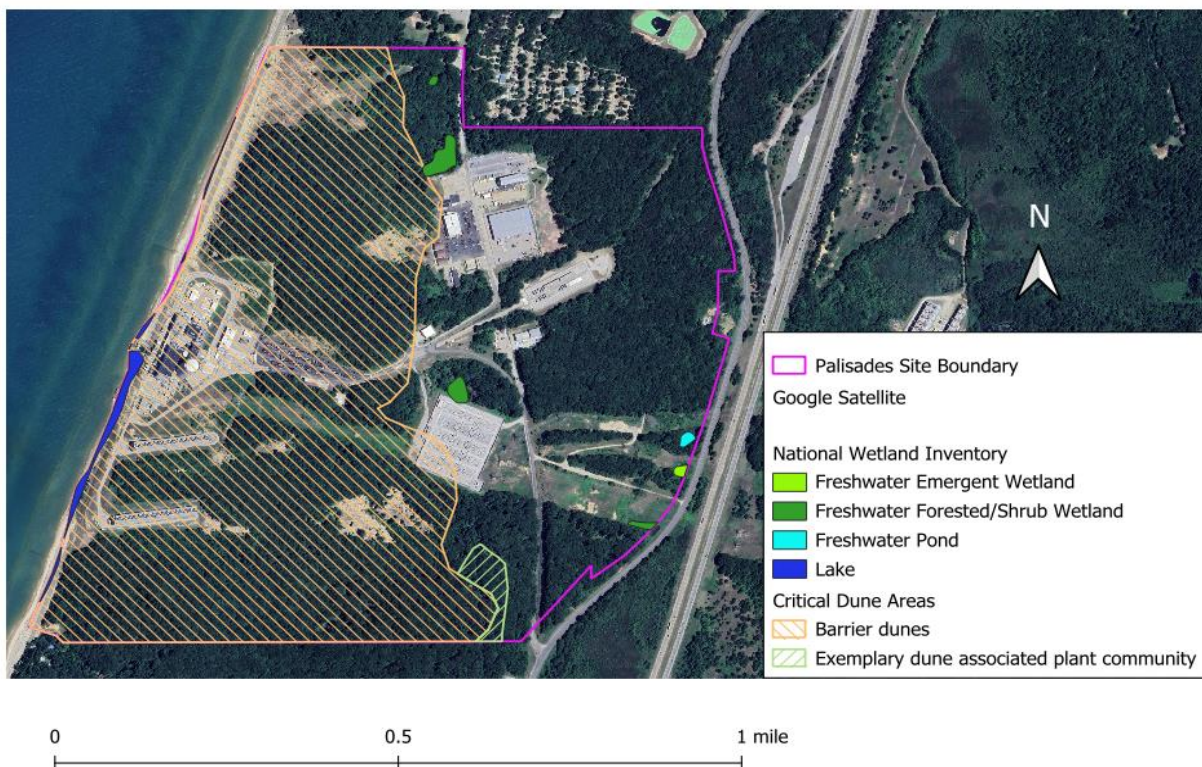


Figure 3-4 Michigan Critical Dune Areas and National Wetlands Inventory Wetlands within the Palisades Nuclear Plant Site Boundary. Data Sources: MEGLE 2023-TN10860; HDI 2024-TN10670: RAI-GEN-1.

3.6.1.2 Important Species and Habitats

Table 2-2 of the 2006 SEIS (NRC 2006-TN7346) identifies and characterizes terrestrial species protected under Federal and State (Michigan) regulations as threatened or endangered. In the N&S Report, Holtec evaluated additional information about special status terrestrial species and habitats that could be affected by the resumption of power operations of Palisades (HDI 2023-TN10538). The evaluations included species listed as threatened or endangered under the Federal ESA (TN1010), species designated with a State-protected status (Michigan Compiled Law Part 365-TN10704), eagles protected under the Bald and Golden Eagle Protection Act (TN1447), and migratory birds protected under the Migratory Bird Treaty Act (TN3331). The complete analyses for these important resources by the NRC staff are in Appendix J to this EA.

Federally Listed Species

The action area for purposes of assessing impacts to federally listed resources is defined as all areas that could be directly or indirectly affected by a Federal action and may include areas beyond the immediate area of the action (50 CFR Part 402-TN4312). For the present actions, the NRC staff defined the action area as the Palisades site, including the land covers and terrestrial habitats described in Section 3.6.1, plus a 6 mi (9.7 km) radius to reflect possible indirect effects on habitats in the surrounding landscape. The NRC staff independently accessed the U.S. Fish and Wildlife Service (FWS) Information for Planning and Consultation database on May 21, 2024 and received information on 11 species listed as threatened, endangered, or candidate under the Federal ESA (FWS 2024 – TN10697). The database also

indicated that no designated or proposed critical habitat occurs within the action area. The NRC staff independently accessed the FWS database for updated information on April 24, 2025, and found no changes regarding Federal ESA species other than the dropping of one species (Karner Blue Butterfly) included previously in the FWS database (FWS 2025-TN11903). The NRC staff also conducted a desktop review of the Palisades action area, using available scientific literature and studies, results of past ESA Section 7 consultations related to the Palisades site, the applicant's N&S Report (HDI 2023-TN10538), and other publicly available information. In addition, ecologists from the NRC staff visited the site for familiarization purposes on from July 8 to July 10, 2024, and other NRC environmental staff were on the site from September 11 to September 12, 2024. Table 3-5 below summarizes the current Federal status of the 11 species noted in either of the FWS database searches, past effects determinations by the NRC staff in the 2006 SEIS (NRC 2006-TN7346), and the NRCs' 2024 effects determination for the proposed Federal actions. Appendix J, Section J.7 to this EA contains the NRC staff's biological evaluation.

During the NRC staff's environmental review for the 2006 SEIS (NRC 2006-TN7346), the staff evaluated the effects of Palisades operations on four federally listed species (Indiana bat [*Myotis sodalis*], Pitcher's thistle [*Cirsium pitcherii*]; Karner blue butterfly [*Lycaeides melissa samuelis*]; Mitchell's satyr butterfly [*Neonympha mitchellii mitchellii*] and one candidate species—eastern massasauga [*Sistrurus catenatus*]). In 2016, eastern massasauga was federally listed as threatened (81 FR 67193-TN10698). Of these five species, only Pitcher's thistle was then known to occur on the Palisades site, and the NRC effects determination was "may affect, not likely to adversely affect." In a letter dated May 15, 2006 (DOI 2006-TN10699), FWS agreed that the 2006 SEIS did not involve any major construction or physical alteration of the action area and concurred with the NRC staff's effect determinations for these species (summarized in Table 3-5 of this EA).

The 2006 SEIS did not consider six species that were either not designated under the ESA at that time or were federally listed but not expected to occur within the action area at that time (NMCCO 2005-TN10839): northern long-eared bat (*Myotis septentrionalis*, listed as threatened in 2015 [80 FR 17974-TN4216] and reclassified as endangered in 2023 [87 FR 73488-TN8545]), tricolored bat (proposed for listing as endangered in 2022 [87 FR 56381-TN8546]), rufa red knot (*Calidris canutus rufa*; listed as threatened in 2015 [79 FR 73706-TN4267]), piping plover (*Charadrius melodus*; listed as endangered in 1985 [50 FR 50726-TN5502]), whooping crane (*Grus americana*; designated experimental, not essential populations in 2001 [66 FR 33903-TN9652]), and monarch butterfly (proposed as threatened in December 2024 [89 FR 100662-TN10959]).

In its independent review (Appendix J to this EA), the NRC staff determined that two species are known to presently occur on the Palisades site (Pitcher's thistle and monarch butterfly). Habitat for the dune endemic Pitcher's thistle consists of open sand dune and low open beach ridges along shorelines of Lakes Michigan, Superior, and Huron (FWS 2024-TN10700). In the 1980s and 1990s, Pitcher's thistle was known to occur near the cooling towers but was not present at this location in 2005 (NRC 2006-TN7346). However, surveys reported in 2005 found 113 individuals on the northern end of the Palisades site, on stabilized dunes and flats just south of Van Buren State Park. Field surveys of potentially suitable dune habitat conducted by Holtec in 2024 identified the only Pitcher's thistle location onsite as an area in a forest clearing situated approximately 1,000 ft (300 m) east (inland) of the cooling towers (HDI 2025-TN11910; HDI 2024-TN10669: RCI-TE-2). The other species presently known to occur on the site, monarch butterfly, is dependent on milkweeds (primarily *Asclepias* spp.) for egg-laying and larval food (87 FR 26152-TN8591). During 2024 site visits, the NRC staff noted the presence of

flying adult monarchs and widely scattered, occasional milkweed stems on vegetated dunes close to the beach and along the access road.

Table 3-5 Federally Listed Species Under U.S. Endangered Species Act Evaluated for Palisades Nuclear Plant

Common Name	Species	Current Federal Status ^(a)	Previous 2006 SEIS Effect Determination ^(b)	2024 NRC Effect Determination ^(b)
northern long-eared bat	<i>Myotis septentrionalis</i>	FE	n/a	NLAA
Indiana bat ^(c)	<i>Myotis sodalis</i>	FE	NLAA	NLAA
tricolored bat	<i>Perimyotis subflavus</i>	PFE	n/a	NLAA
rufa red knot ^(d)	<i>Calidris canutus rufa</i>	FT	n/a	NLAA
piping plover DPS ^(c)	<i>Charadrius melodus</i>	FE	n/a	NLAA
whooping crane	<i>Grus americana</i>	FE (NEP)	n/a	NE
eastern massasauga	<i>Sistrurus catenatus</i>	FT	NLAA	NLAA
Karner blue butterfly ^(d)	<i>Lycaeides melissa samuelis</i>	FE	NE	NE
Mitchell's satyr butterfly	<i>Neonympha mitchellii mitchellii</i>	FE	NLAA	NE
monarch butterfly	<i>Danaus plexippus</i>	PFT	n/a	NLAA
Pitcher's thistle	<i>Pitcher's thistle</i>	FT	NLAA	NLAA

(a) Indicates protection status under the Endangered Species Act. FC = candidate for Federal listing; FE = federally endangered; FT = federally threatened; PFE = proposed for Federal listing as endangered; PFT = proposed for Federal listing as threatened; NEP = in the vicinity of the action area, this species is part of a nonessential experimental population.

(b) The NRC staff make its effect determinations for federally listed species in accordance with the language and definitions specified in the FWS and National Marine Fisheries Service Endangered Species Consultation Handbook (FWS and NMFS 1998-TN1031). NLAA = may affect, not likely to adversely affect. NE = No effect. n/a = not applicable, because the NRC staff did not evaluate this species in the 2006 SEIS (NRC 2006-TN7346).

(c) Species has designated critical habitat, but it does not overlap the action area (FWS 2024-TN10697). DPS = distinct population segment

(d) Species has proposed critical habitat, but it does not overlap the action area (FWS 2024-TN10697).

State-Listed Species

The ESA of the State of Michigan (Michigan Compiled Law Part 365-TN10704) specifies the State's responsibility for conserving, protecting, restoring, and propagating endangered and threatened species. In the N&S Report, Holtec presented a list of Federal and State-listed species that occur in Van Buren and Berrien Counties (HDI 2023-TN10538). The NRC staff independently downloaded and reviewed these same county lists (MSU 2024-TN10861, MSU 2024-TN10862). Appendix J, Section J.1, Table J-1 of this EA summarizes habitat requirements of State threatened and endangered terrestrial bird, mammal, and plant species observed in Van Buren and Berrien Counties since 2000. Because Michigan Department of Natural Resources Director's Order No. FO-224.21 (MNRC/MDNR 2021-TN10703) provides specific protections for amphibians and reptiles, Appendix J, Section J.1, Table J-2 presents habitat requirements for amphibians and reptiles listed as threatened and endangered that have not been seen since 2000, as well as those that are listed as species of Special Concern. Two State-listed species have been observed at the Palisades site: the endangered prairie vole and the threatened eastern box turtle (HDI 2024-TN10670: RAI-GEN-3, Attachment 2).

Eagles and Migratory Birds

The 2006 SEIS (Section 2.2.6, incorporated by reference) stated that 113 bird species have been documented on the site. According to the FWS IPAC report, accessed April 24, 2025 (FWS 2025-TN11903), 21 Birds of Conservation Concern have the potential to occur on site. Birds of Conservation Concern are bird species not designated as federally threatened or endangered that are of the highest conservation priority for FWS. In addition, breeding bald eagles have the potential to occur on site (breeding period December 1–August 31), as do non-breeding golden eagles (FWS 2024-TN10697). Additional information on eagles and migratory birds is provided in Appendix J, Section J.2.

Invasive Species

Executive Order 13112 (64 FR 6183-TN4477), as amended by Executive Order 13751 (81 FR 88609-88614), directs Federal agencies to not authorize, fund, or carry out actions likely to cause or promote the introduction or spread of invasive species unless the Federal agency determine that the benefits of the action clearly outweigh the harm from invasive species and that all feasible and prudent measures to minimize risk of harm are taken (64 FR 6183-TN4477, Section 2). The Southwest by Southwest Corner Cooperative Invasive Species Management Area, which includes the location of the Palisades site, has identified 12 terrestrial species as specific targets for detecting and controlling if found (Van Buren CD 2024-TN10877): three insects, one fungal disease, and eight plants. All but the Asian long-horn beetle (*Anoplophora glabripennis*) are known to occur in Michigan, but it is unknown whether any of these other species occur on site. See Appendix J, Section J.3 for a full species list.

3.6.2 Environmental Impacts from the Preparations for Resumption of Power Operations

Preparations for resumption of power operations would occur over an anticipated 18-month period. Noise from equipment and vehicle traffic would increase over this time. The applicant estimated 3,000 truck deliveries over this period (HDI 2024-TN10670: RAI-GEN-1). Because the increased vehicular use and truck deliveries would only be temporary and would use previously established roadways, increased noise and traffic impacts to wildlife are expected to be minor. The estimated footprint of disturbance for proposed activities is shown in Figure 3-2 of this EA.

The applicant proposes specific preparation activities to prepare for resumption of operation (HDI 2024-TN10670: RAI-GEN-1). The NRC staff reviewed these activities and associated shapefiles provided by the applicant and conducted an independent analysis of the terrestrial habitats to be disturbed. The activities would disturb approximately 11 ac (4.5 ha) of sparsely vegetated land outside of existing built areas (HDI 2024-TN10670: RAI-GEN-1) (Table 3-1 of this EA). Preparation activities, including those in sparsely vegetated areas, are proposed only within areas of previously disturbed soils, mostly inside existing facilities and structures. Disturbance of a few small or narrow vegetated areas would be necessary to install new cables to the cooling towers, a security fence upgrade, and widening an access road along the southern edge of the secure area. The applicant would have to obtain relevant permits for work within CDAs and Lake Michigan waters and shorelines from Michigan EGLE and U.S. Army Corps of Engineers.

The applicant would continue routine application of commercial herbicides and other pesticides as necessary to maintain the grounds. Use would be limited to ground-based application in accordance with herbicide labels at labeled rates by certified applicators, as described in

nonradiological reports from 2019 to 2023 (Entergy 2020-TN10708, Entergy 2021-TN10707, Entergy 2022-TN10709; HDI 2023-TN10705, HDI 2024-TN10706). Approximately 34.5 ac (14.0 ha) of the proposed land disturbance footprint would fall within mapped CDAs. However, all of this land disturbance would take place in existing developed areas or previously disturbed lands, and all Michigan EGLE permits required for work in the CDAs would be obtained. These permits would likely require restoration of indigenous dune vegetation to any areas of disturbed dunes. Associated preparation activities (Table 3-1 of this EA) within mapped CDAs include intake pipe and crib, cable trays to cooling towers, buried pipeline repair area, security fence upgrade, access drive, and the radiological waste location within the secure area.

The NRC staff conclude that preparations for the resumption of power operations would be NOT SIGNIFICANT on terrestrial resources because: (1) the area likely to be disturbed, approximately 11 ac (4.5 ha), lies completely within already developed or previously disturbed parts of the Palisades site; (2) these activities are unlikely to alter patterns of wildlife use and migration across the site; and (3) required permit conditions and BMPs from Federal, State, and local agencies will minimize impacts to terrestrial resources. As noted in its biological evaluation in Appendix J, Section J.7, Table J-5, the NRC staff have determined that impacts to federally listed terrestrial species (Table 3-5 of this EA) would be “no effect” or “may affect, not likely to adversely affect.” On May 9, 2025, the Michigan Field Office of the FWS concurred with the NRC staff’s “may affect, not likely to adversely affect” conclusions for the eastern massasauga rattlesnake and Pitcher’s thistle (FWS 2025-TN11931). On May 14, 2025, the FWS Office clarified that their concurrence extends to the NRC staff’s other conclusions of “may affect, not likely to adversely affect” for resources protected under the ESA (FWS 2025-TN11932).

3.6.3 Environmental Impacts from the Resumption of Power Operations

In its 2006 SEIS (NRC 2006-TN7346), the NRC staff evaluated Palisades operational impacts to terrestrial resources using the 1996 LR GEIS (NRC 1996-TN288). Since the 2006 LR SEIS was published, terrestrial issues have been reorganized and updated in the 2013 LR GEIS (NRC 2013-TN2654) and the 2024 LR GEIS (NRC 2024-TN10161: p. 2-8). For the analysis in this section, the NRC staff incorporated by reference its 2006 analysis (NRC 2006-TN7346) and Holtec’s updated N&S Report analysis of terrestrial resources (HDI 2023-TN10538), which used the 2013 LR GEIS (NRC 2013-TN2654). In its own independent assessment of operational impacts, the NRC staff evaluated whether past operational terrestrial issues analyzed in the 2006 SEIS would be significantly different under resumption of operations and whether any new information should be considered.

As a result of this independent review, the NRC staff use the 2024 LR GEIS terrestrial resource issues (eight operational issues summarized in NRC 2024-TN10161: p. 2-8) to summarize its decisions to not provide a detailed analysis of five issues. The NRC staff determined that three terrestrial resource operational effects would be minimal and not different from past operations and current conditions under resumption of operations: bird collisions with plant structures and transmission lines, in-scope transmission line right-of-way management impacts on terrestrial resources, and electromagnetic effects on terrestrial plant and animals for in-scope transmission lines. Two terrestrial resource issues do not apply to Palisades and will not be discussed further: water use conflicts with terrestrial resources (plants with cooling ponds or cooling towers using makeup water from a river) and cooling system impacts on terrestrial resources (plants with once-through cooling systems or cooling ponds).

The NRC staff analyzed in detail below three terrestrial resource issues that were not analyzed previously or could be different from current conditions: (1) exposure of terrestrial organisms to

radionuclides (not analyzed in 2006 SEIS), (2) non-cooling system impacts on terrestrial resources (not analyzed in 2006 SEIS, potentially different from non-operating conditions), and (3) cooling tower impacts on terrestrial plants (potentially different from current non-operating conditions).

In addition to these three terrestrial issues, the NRC staff updated its operational impacts analysis on federally protected species and other important terrestrial species and habitats (Table 3-5). As noted in its biological evaluation in Appendix J, Section J.7, Table J-5, the NRC staff have determined that impacts to federally listed terrestrial species (Table 3-5 of this EA) would be “no effect” or “may affect, not likely to adversely affect.” As noted above in Section 3.6.2 for preparations for resumption of operations, the Michigan Field Office of the FWS concurred in May 2025 with the NRC staff conclusions of “may affect, not likely to adversely affect” for resources protected under the ESA (FWS 2025-TN11931, FWS 2025-TN11932).

Exposure of Terrestrial Organisms to Radionuclides

The 2006 SEIS for Palisades (NRC 2006-TN7346) did not address exposure of terrestrial organisms to radionuclides because the 1996 LR GEIS (NRC 1996-TN288) did not include this issue from routine operations as an issue to analyze. Radionuclides may be released from nuclear power plants into the environment through several pathways (NRC 2024-TN10161: pp. 4-49 to 4-52). During normal operations, nuclear power plants can release gaseous emissions that deposit small amounts of radioactive particulates in the surrounding environment. Nuclear power plants can also release radionuclides as liquid effluents into water, and terrestrial plant roots can absorb radionuclides from shallow groundwater or surface waters. Animals may experience exposure to ionizing radiation through (1) inhalation; (2) direct contact with air, water, or other media; or (3) ingestion of contaminated food, water, or soil.

Palisades REMP has been ongoing since 1971 and is described in the 2006 SEIS (NRC 2006-TN7346). The NRC staff reviewed Holtec’s analysis of this issue (HDI 2023-TN10538) and reviewed Palisades Annual Radiological Environmental Operating Reports from 2019 to 2023 (Entergy 2020-TN10687, Entergy 2021-TN10686, Entergy 2022-TN10685; HDI 2023-TN10684, HDI 2024-TN10771). No measurable levels of radiation above baseline levels attributable to operations of Palisades were found through routine monitoring conducted in the Palisades vicinity from 2019 to 2022. Additionally, no measurable levels of radiation above baseline levels were detected during 2023 monitoring when the reactor was in decommissioning status. The NRC staff has concluded that exposure to radionuclides on terrestrial organisms would be NOT SIGNIFICANT.

Non-Cooling System Impacts on Terrestrial Resources

The 2006 SEIS for Palisades (NRC 2006-TN7346) did not address non-cooling system impacts on terrestrial resources because the 1996 LR GEIS (NRC 1996-TN288) only included this issue to analyze for refurbishment. According to the 2024 LR GEIS (NRC 2024-TN10161: Section 4.6.1.1), non-cooling system impacts on terrestrial resources can include impacts that result from Palisades site and landscape maintenance activities, stormwater management, elevated noise levels, and other ongoing operations and maintenance activities that would occur during operations on and near a plant site. The NRC staff reviewed Holtec’s analysis of terrestrial resource issues in the N&S Report (HDI 2023-TN10538: Section 4.3.2), Palisades NPDES permit (MDEQ 2014-TN10665, MEGLE 2023-TN10739), nonradiological environmental reports from 2019 to 2023 (Entergy 2020-TN10708, Entergy 2021-TN10707, Entergy 2022-TN10709; HDI 2023-TN10705, HDI 2024-TN10706), and Palisades compliance documents

available through Michigan EGLE's portal (MEGLE 2024-TN10868, MEGLE 2024-TN10869). Because the Palisades site is within Michigan's CZMA (Section 3.6.1 of this EA) and has designated CDAs onsite (Figure 3-4 of this EA), Michigan EGLE regulates many plant operations and activities.

Site-specific programs (e.g., SPCC-PIPP, SWPP, NPDES) and BMPs are and will continue to be utilized at the Palisades site to decrease environmental effects and reduce the occurrence of inadvertent releases of nonradiological contaminants (NRC 2024-TN10842). Michigan EGLE will continue to regulate and evaluate land disturbing activities in CDAs and the site itself. The NRC staff has concluded that non-cooling system impacts on terrestrial resources would be NOT SIGNIFICANT.

Cooling Tower Impacts on Terrestrial Plants

As summarized in meteorology and air quality (Section 3.3.1 of this EA) and detailed in Rochow 1978-TN10666, Palisades' initial cooling tower operations resulted in loss of forest vegetation, severe icing, and signs of chemically induced vegetation injury associated with sulfate deposition from the towers. Most vegetation damage occurred within 160 ft (50 m) of the towers, with trees and shrubs affected. As detailed in the 1996 LR GEIS (NRC 1996-TN288: Section 4.3.5.1), woody species damage resulted from the unique Palisades topography, unusual operating and weather conditions, and use of sulfuric acid as a biocide (which was discontinued prior to 1987 before the 2006 SEIS; CPC 1987-TN11913). Rochow 1978-TN10666 reported the tower drift design rate at the time of damage to be between 0.005 and 0.2 percent. The 2006 SEIS (NRC 2006-TN7346: pp. 4-10 through 4-11) rated the impacts of Palisades cooling tower operations on vegetation (crops, ornamental vegetation, and native plants) as SMALL. Both rows of cooling towers were replaced, in 2012 and 2017, respectively, within the same footprint (HDI 2023-TN10538; Google Earth 2024-TN10690). The replacement towers have drift eliminators that have a guaranteed drift rate of not to exceed 0.001 percent of the circulating water flow rate (HDI 2024-TN10670: RAI-TE-1).

Field surveys of potentially suitable dune habitat conducted by Holtec in 2024 identified the only Pitcher's thistle location onsite as occurring in a forest clearing situated approximately 1,000 ft (300 m) east (inland) of the cooling towers (HDI 2025-TN11910; HDI 2024-TN10669: RCI-TE-2). No information is available to NRC staff on the sensitivity of Pitcher's thistle to cooling tower drift. Considering the physical stresses inherent in surviving in dune habitat, it is possible that cooling tower drift could contribute cumulatively to adverse effects on a Pitcher's thistle population. However, because the mechanical draft cooling towers are equipped with drift eliminators and are separated from the Pitcher's thistle population by approximately 1,000 ft (300 m) of deciduous forest vegetation, it is reasonable to expect that noticeable drift is unlikely to reach the population. If substantially potent drift were to reach the Pitcher's thistle populations onsite, the effects would likely be first visible on deciduous tree foliage at the edge of the cooling towers, giving nuclear power plant managers time to take corrective action. The NRC staff conclude that cooling tower impacts to Pitcher's thistle to be "may affect, not likely to adversely affect."

The NRC staff conclude that resumption of cooling tower operations would be less than those determined to be SMALL in 2006. This is based on: the changes in cooling tower operations from the initial conditions that led to vegetation damage; the replacement of both towers within the last 12 years; replacement tower drift rate of 0.001 percent; and a determination of "may affect, not likely to adversely affect" for Pitcher's thistle for cooling tower operations. Therefore, the NRC staff conclude that the impact from resumption of cooling tower operations would be NOT SIGNIFICANT.

3.6.4 Cumulative Effects

Appendix G, Table G-1 of this EA identifies past, present, and reasonably foreseeable projects that could cumulatively contribute to the environmental effects of the proposed Federal actions.

The projects in the vicinity of Palisades that may affect terrestrial ecology include future onsite construction (a new spent fuel pad and new SMRs); potential SLR of Palisades; continued operation of energy generation facilities; construction, upgrade, and rebuilding of power transmission infrastructure; continued operation of existing mines; residential, commercial, and industrial development; continued operation of water supply and wastewater treatment facilities; cleanup of contaminated sites; continued operation and upgrade of transportation infrastructure; and continued recreational activities. The general characteristics of the terrestrial habitats and ecological resources in the landscape on and surrounding the Palisades site would not be noticeably altered by the projects. The resumption of power operations would result in only small areas of terrestrial habitat disturbance situated in previously developed areas of the site. It is also anticipated that SMR development would mostly take place within previously developed areas of the site and affect only narrow or small areas of naturally vegetated terrestrial habitat adjoining areas of previous development, without noticeably intruding into areas of intact terrestrial habitat in relatively undeveloped areas of the site. Therefore, the NRC staff determined that the incremental effects of the proposed Federal actions related to terrestrial ecology when added to the effects of other past, present, and reasonably foreseeable projects would not have significant cumulative effects.

3.7 Aquatic Ecology

This section describes the aquatic resources of the affected environment (i.e., Lake Michigan). The NRC staff evaluated previous environmental documents and analyses with regard to aquatic ecology along with their relevance to potential environmental effects of the proposed Federal actions at the Palisades site. Portions of the following environmental documents relevant to the subject area are incorporated by reference to support the NRC staff's significance effects determination for aquatic ecology (see Table 1-2 of this EA):

- 2006 SEIS (NRC 2006-TN7346): Sections: 2.1.3, Cooling and Auxiliary Water Systems; 2.2.3, Water Quality; 4.1, Cooling System
- N&S Report (HDI 2023-TN10538): Section 3.2.2.2, Surface Water Quality
- 2024 LR GEIS (NRC 2024-TN10161): Sections: 3.5.1.2, Surface Water Quality; 4.6.1.2, Aquatic Resources
- 1972 FES (AEC 1972-TN10603): Section V.C.1.a., Sources of Potential Biological Damage; Table V-1, Examples of Number and Length of Fish Counted Daily at the Intake Screens from January 23, 1972 - February 22, 1972; Appendix V-2, Outline Map of North America Showing the Southern Limit of Distribution of Lake Whitefish

A brief summary of the material incorporated by reference along with the relevance to the current environmental review is provided in the discussion that follows.

3.7.1 Affected Environment

In defining the affected environment for aquatic ecology, the NRC staff assessed previous environmental documents, incorporating by reference where relevant, along with current data.

3.7.1.1 Site and Vicinity

Palisades is located along the southeastern shore of Lake Michigan's main basin, which provides the source and receiving body for the plant's cooling-water system. Lake Michigan's main basin, which is separated into a northern and southern basin, contains cold, clear, nutrient-poor (oligotrophic) water with water depths ranging from 50 ft (15 m) at 1 mi (1.6 km) offshore, to a maximum depth of 923 ft (281 m), and average depths of 279 ft (85 m) (Michigan Sea Grant 2024-TN10710). Water moves slowly along the southeastern side of the lake in a generally northern direction toward the Strait of Mackinac to Lake Huron (Michigan Sea Grant 2024-TN10710; NOAA Undated-TN10711). Surface water temperatures in Lake Michigan vary from a low of 36.9°F (2.7°C) in February to a high of 70.5°F (21.4°C) in August (NOAA 2024-TN10714). A 2021 study by NOAA revealed a warming trend in surface water temperatures based on a single location, which was hypothesized to be due to climate change (Anderson et al. 2021-TN10715). Using a 30-year dataset, NOAA found that the winter cooling season in the deep waters of the lake is shortening (less than 100 days), and the summer warming season is lengthening (greater than 200 days) which could lead to permanent changes in the lake's seasonal mixing patterns and disrupt the food web (Anderson et al. 2021-TN10715). The aquatic biological communities of Lake Michigan, including plankton, macrophytes, benthic invertebrates, and fish, are described in detail in Appendix J, Section J.4 to this EA.

3.7.1.2 Important Species and Habitats

The Michigan Department of Natural Resources (MDNR) is responsible for fisheries management in Lake Michigan and co-manages some commercial and recreational fisheries from approximately Grand Haven, Michigan northward with Indian Tribes. The co-managed fishing areas end approximately 50 mi (80 km) north of Palisades and are not discussed further (MDNR 2024-TN10762). The aquatic region of the action area (as defined above in Section 3.6.1.2) encompasses the area of Lake Michigan influenced by the intake and discharge systems. These systems are described in the 2006 SEIS (NRC 2006-TN7346). There are no federally protected aquatic species, essential fish habitat, or national marine sanctuaries located within action area (FWS 2024-TN10697, FWS 2025-TN11903; NMFS 2024-TN10304; NOAA Undated-TN10727). Additional information can be found in Appendix J, Sections J.4 and J.5 of this EA.

Commercially Important Fisheries

The only commercially fished species in Lake Michigan since 2022 is the lake whitefish (*Coregonus clupeaformis*) although over the last five years small amounts of burbot (*Lota lota*), chub (*Squalius cephalus*), round whitefish (*Prosopium cylindraceum*), smelt (Osmeridae), and sucker (Catostomidae) were also commercially harvested (MDNR 2024-TN10728; Michigan Sea Grant 2024-TN10729). Lake whitefish is a benthic cool water fish that primarily feeds on zooplankton and *Diporeia* (Michigan Sea Grant 2024-TN10730). Whitefish spawn in early winter in shallow rocky or sandy bottom lake waters less than 25 ft (7.6 m) deep, the young hatch in the spring and leave for deeper and cooler waters by early summer where they live in schools at depths of up to 200 ft (61 m) (MDNR 2024-TN10731). The lake whitefish population has declined rapidly in Lake Michigan over the past 15–20 years, with slow growth and poor body condition that correlates with the loss of their primary food source, *Diporeia*, to invasive *Dreissena* mussels (MEGLE 2022-TN10732). Since the early 2000s, whitefish populations have also experienced poor recruitment, the process of young fish making it to the adult stage, which is thought to be a result of changes in water temperature, water levels, currents, and ice cover due to changing climate conditions (MEGLE 2022-TN10732).

Recreationally Important Fisheries

Recreational fisheries in the Michigan portion of Lake Michigan are also regulated by MDNR. Popular sport fish include yellow perch (*Perca flavescens*), walleye (*Sander vitreus*), largemouth (*Micropterus salmoides*) and smallmouth bass (*Micropterus dolomieu*), sunfish (*Centrarchidae*), crappie (*Pomoxis* spp.), rock bass (*Ambloplites rupestris*), lake trout (*Salvelinus namaycush*), and salmon (chinook, coho, steelhead; *Oncorhynchus* spp.). Lake trout is an important species that contributes to a multimillion-dollar Lake Michigan sport fishery. The Michigan United Conservation Clubs reported in 2019 that recreational fishing in Michigan, not just in Lake Michigan, generates \$2.3 billion in economic activity (MUCC 2019-TN10733).

State-Protected and Other Special Status Aquatic Species

MDNR has regulatory authority for fish and wildlife in Michigan including endangered species. The Endangered Species Protection Act of the State of Michigan (Michigan Compiled Law Part 365-TN10704) specifies the State's responsibility for conserving, protecting, restoring, and propagating endangered and threatened species. Under these laws, "endangered" indicates the species is in danger of extinction throughout all or a significant portion of its range, "threatened" indicates the species is likely to become endangered within the foreseeable future, and the designation of "special concern" indicates declining or relict species in the State. While not protected by State law, species of special concern need protection to prevent them from becoming threatened or endangered. Michigan last updated its State-listed species list on March 20, 2023, and species that could occur in Van Buren or Berrien counties in the vicinity of Palisades are listed in Appendix J, Section J.6, Table J-4 of this EA (MSU 2024-TN10734).

3.7.1.3 Invasive and Nuisance Species of Lake Michigan

Non-native species are those species that are present only because of introduction and that would not naturally occur either currently or historically in an ecosystem. Invasive species cause harm when they out-compete native species by reproducing and spreading rapidly in areas where they have no natural predators, thus changing the balance of the ecosystems (MDNR 2024-TN10735). For purposes of this discussion, nuisance species are non-native species that alter the environment but that do not rise to the level of invasive.

At least 180 aquatic species have been introduced into the Great Lakes over the years but most of them were either unable to establish or only have a small impact on the ecosystem. A small number of these have had negative impacts to the ecosystem and fisheries including sea lamprey (*Petromyzon marinus*), alewife (*Alosa Pseudoharengus*), zebra mussels (*Dreissena polymorpha*) and quagga mussels (*Dreissena rostriformis bugensis*), round goby (*Apollonia melanostomus*), and the spiny waterflea (*Bythotrephes longimanus*) (GLFC 2024-TN10736). Invasive species of concern in Michigan include Asian clam (*Corbicula fluminea*), grass carp (*Ctenopharyngodon idella*), Eurasian ruffe (*Gymnocephalus cernuus*), hydrilla (*Hydrilla verticillata*), Japanese/Oriental weatherfish (*Misgurnus anguillicaudatus*), New Zealand mudsnail (*Potamopyrgus antipodarum*), rudd (*Scardinius erythrophthalmus*), tench carp (*Tinca tinca*), and the tubenose goby (*Proterorhinus semilunaris*) (MDNR 2024-TN10737).

The primary invasive species of concern related to Palisades operations is biofouling of the cooling-water intake system by invasive bivalves, such as zebra mussels and quagga mussels. The spring 2024 intake crib inspection and cleaning reported 100 percent coverage of the bars along the sides of the intake crib by zebra mussels roughly 1.5 in. (3.8 cm) thick (HDI 2024-TN10843: RCI-AE-4a). Divers also found and cleaned out debris, including zebra mussels, just

west of the traveling screens. These invasive mussels are controlled using biocides and cleaned out of the intake by divers annually; biocide use is regulated by Michigan EGLE as part of the discharge authorizations in permit no. MI0001457 under Section A, Part I (MDEQ 2014-TN10665).

3.7.2 Environmental Impacts from the Preparations for Resumption of Power Operations

3.7.2.1 Site and Vicinity

The only potential impacts to the onsite streams during the proposed activities would result from stormwater runoff and sedimentation. Planned stormwater drainage management would continue to follow BMPs with monitoring of outfalls to prevent pollutants from entering stormwater (see Section 3.4.2 of this EA). The NRC staff conclude that, based on the current SWPPP, the existing stormwater system, and the small area of potential surface disturbance or new impervious surfaces, the impacts to onsite streams from the proposed activities would be minimal.

Holtec would have to withdraw approximately 4.5 million gallons (17 million liters) of water from Lake Michigan to initially fill the cooling tower basins. Holtec plans no changes to the water intake system from Lake Michigan, relative to the previously operating plant. A description of the cooling-water intake system can be found in the 2006 SEIS (NRC 2006-TN7346). Diver inspections of the intake system were conducted in the spring of 2024. The inspection showed that sand, zebra mussels, and other debris had infiltrated the intake system (intake crib, mixing bay, etc.) but there was no visible damage to the mixing bay, trash racks, or traveling screens (HDI 2024-TN10843: RCI-AE-4a). The intake areas would need to be cleaned of sand and debris and some repairs would need to be made to the intake crib prior to the filling of the cooling tower basins during the preparation for resumption of power operations. The potential impacts related to withdrawals of water from Lake Michigan would be minimal, as described below for resumption of power operations. The NRC staff conclude that the effects on aquatic organisms during the proposed preparations for the resumption of power operations of Palisades would be NOT SIGNIFICANT.

3.7.2.2 Important Aquatic Species and Habitats

Four State-listed fish species have occurred in the vicinity of Palisades, although the lake herring and shortjaw cisco have not been observed in 30 years (Table J-4 of this EA). The lake herring was one of several fish that were depleted in the 1950s by the invasive, parasitic sea lamprey, at the same time they were also being outcompeted by the invasive alewife (introduced in 1949) as the principal forage fish species (MSU 2009-TN11691). The shortjaw cisco is currently considered extirpated from Lake Michigan due to a combination of overfishing, pressure from the invasive sea lamprey and alewife, declines in food availability, habitat loss, contaminants, and hybridization and has not been documented in Lake Michigan since 2001 (MSU 2024-TN10734). The starheaded topminnow and spotted gar are expected to still be in the vicinity. The spotted gar is tolerant of warm waters and low dissolved oxygen. Both species can be found in shallow waters or near the surface and both spawn in shallow water, although the gar prefers heavily vegetated areas and the topminnow prefers gravel. Because of the applicant's efforts to control sedimentation and the offshore location of the intake, the potential for impacts to these fish species from activities at the site would be NOT SIGNIFICANT. There are also four State-listed mussels, the slippershell, creek heelsplitter, flutedshell, and round pigtoe, that may occur within the vicinity of Palisades (Table J-4 of this EA). Holtec has not

identified any State-listed species in the intake or discharge systems during annual monitoring (HDI 2024-TN10843: RCI-AE-4a). Therefore, the potential for impact to State-listed mussel species is expected to be NOT SIGNIFICANT.

3.7.3 Environmental Impacts from the Resumption of Power Operations

The impacts from resumption of operation of Palisades would be similar to those described in the 2006 SEIS (NRC 2006-TN7346), which is incorporated by reference. In Section 3.3.1 of the N&S Report, the applicant states that no additional aquatic studies have been conducted and that the descriptions and discussions of aquatic resources in the 2006 SEIS remain valid (HDI 2023-TN10538). The NRC staff have not identified any new and significant information during its independent review of the N&S Report (HDI 2023-TN10538), the 2024 site visit, the scoping process for this EA, and the NRC staff's evaluation of other available information.

3.7.3.1 Site and Vicinity

For aquatic resources, the primary concerns relate to water withdrawal and consumption, especially flow rate and whether there is ample water to operate the facility without a detrimental impact to the aquatic organisms living in Lake Michigan (GLC 2024-TN10738). Lake Michigan water is drawn into the cooling-water intake system through a submerged crib structure 3,300 ft (1,005 m) offshore, with bars and mesh screens filtering out debris and larger organisms (NRC 2006-TN7346). While most of the water used for cooling would be returned to the lake, the cooling system would lose approximately 12,000 gpm or 0.0006 percent of the total volume of water in Lake Michigan to evaporation from the cooling towers each year. Currently, even in the present state of decommissioning, one intake pump is running and pulling 6,000 gpm (8.64 mgd) from Lake Michigan to cool the spent fuel that is onsite, and all the pumped water is returned to the lake (HDI 2024-TN10669: RCI-SW-5, 6, and 7). This pump would continue to operate after resumption of power operations. During return normal operations approximately 98,000 gpm (141 mgd) would be pumped from the lake at a flow rate of 0.1 feet per second (fps) and 86,000 gpm (124 mgd) returned (HDI 2023-TN10538). These impacts would also be possible while initially filling the cooling tower basins during the preparations for resumption of power operations.

Impingement and Entrainment of Aquatic Organisms

If approved and power operations resume, the resumed water intake would impinge and entrain aquatic organisms from Lake Michigan. Section 2.1 of this EA and the 2006 SEIS (NRC 2006-TN7346) describe the Palisades cooling and auxiliary water systems in detail. Smaller organisms, such as fish eggs and larvae, can be entrained and pass through the system, where they are subjected to mechanical, thermal, and toxic stresses before the water is discharged back into the lake. Impinged organisms are collected at the trash racks or traveling screens and disposed as solid waste.

A description of the susceptibility of organisms to impingement and entrainment can be found in the 2024 LR GEIS (NRC 2024-TN10161). The magnitude of the impact that impingement and entrainment create on the aquatic environment depends on the plant-specific characteristics of the cooling system as well as the local aquatic community. Relevant nuclear power plant-based characteristics include location of the cooling-water intake structure, intake velocities, withdrawal volumes, screening device technologies, and the presence or absence of a fish return system. Relevant characteristics of the aquatic community include species present in the

environment, life history characteristics, population abundances and distributions, special species statuses and designations, and regional management objectives.

Cooling-water intake from Lake Michigan to Palisades is authorized under NPDES permit no. MI0001457. The NPDES permit expired in 2018 and is under administrative extension (MDEQ 2014-TN10665). The draft permit was published in 2023 and a final permit is expected prior to the resumption of power operations (MEGLE 2023-TN10739). As part of the draft permit, Michigan EGLE reviewed the cooling-water intake structures (CWIS) and determined that they comply with the best technology available standards for impingement mortality and entrainment to minimize adverse environmental impact in accordance with 40 CFR Subpart J under Section 316(b) of the CWA. The chosen method of compliance for impingement is 40 CFR Part 125.94(c)(1) (TN254)—closed-cycle recirculating system. In addition, the Palisades CWIS is best technology available as specified by operating an existing offshore velocity crib under 40 CFR Part 125.94(c)(4).

The impacts on impingement from the resumption of power operations of Palisades would be similar to those described in the 1972 FES, which analyzed impingement potential for principal fish species during interim operations of Palisades in 1972 (AEC 1972-TN10603), and which is incorporated by reference. This issue was not further analyzed in the 2006 SEIS because it was considered a Category 1 issue. For the most part, fish and free-swimming organisms would avoid impingement because the intake crib is located in the water column, about 6 ft (2 m) above the bottom, 3,300 ft (1,005 m) from the shoreline, and the intake velocity is only approximately 0.1 fps. The intake is well sited to avoid most fishes' preferred habitat and distribution in the water column, apart from rainbow smelt, alewife, and bloater. During interim operations during start-up in 1972, the primary impingement mortality was of sculpins in January and February (AEC 1972-TN10603). Enercon Services, Inc. conducted an impingement estimate in 2000, estimating the impingement of 863 fish, which included yellow perch, alewives, and spottail shiners, from July to November (Enercon/Normandeau 2018-TN10740). The location of the intake and the low intake water velocity would help prevent any large fish from being sucked into the intake crib and then the intake pipe. Small fish and other aquatic organisms that are unable to swim against the 0.1 fps current at the intake would be drawn inside and impinged on the traveling screens and trash racks, or if small enough entrained. EPA data shows that 96 percent of studied fish can avoid an intake structure when the intake velocity is 0.5 fps or less so, hence the resulting impingement is expected to be a relatively small amount in relation to nearby populations within the lake (EPA 2014-TN10834).

Updating the gross estimate of damage to aquatic biota analyzed in the 1972 FES (AEC 1972-TN10603) for current fish density, which is estimated to be 7.8 pounds (lb)/ac (8.7 kilograms per hectare [kg/ha]) and the reduced flow into the cooling system of 98,000 gpm, total fish loss to impingement is estimated at just under 6,000 lb (2,721 kilograms [kg]) per year. This amount is 10 times less than was calculated in the 1972 FES and just 0.06 percent of the total fish harvested from Lake Michigan in 2023 (GLFC 2024-TN10835).

The impacts on entrainment from the resumption of power operations of Palisades would be similar to those described in the 1972 FES, which analyzed entrainment potential for principal fish species in the vicinity of Palisades (AEC 1972-TN10603), and which is incorporated by reference. In addition, Enercon Services, Inc. conducted an entrainment estimate in 2000, estimating total entrainment of 26,770 fish larvae, including yellow perch, alewives, and cyprinid species (minnows and carps) (Enercon/Normandeau 2018-TN10740). Most fish species, including yellow perch, alewives, minnows, and carp, tend to produce large numbers of offspring to account for high mortality rates in natural aquatic settings. In addition, fish and

free-swimming organisms would avoid entrainment because the intake crib is located in the water column, about 6 ft (2 m) above the bottom, 3,300 ft (1,005 m) from the shoreline, and the intake velocity is approximately 0.1 fps. As discussed above for entrainment, EPA recognizes that intake velocities not exceeding 0.5 fps are generally protective of aquatic biota from impingement as well (EPA 2014-TN10834). Since plankton recover and reproduce rapidly, the small amount entrained and killed in the cooling-water system would have a minimal effect on the productivity of the lake.

Based on the information presented above, the NRC staff conclude that the impacts of impingement and entrainment on aquatic organisms resulting from the proposed Palisades preparation for the resumption of power operations would be NOT SIGNIFICANT.

Thermal Impacts of Discharges

In the 2006 SEIS (NRC 2006-TN7346), the NRC staff discussed field surveys to assess the thermal plume after the MDCTs were installed, which is incorporated in the EA by reference. At its largest in the winter, the 3°F (1.67°C) isotherm encompassed approximately 286 ac (116 ha) of water surface and seldom extended below a depth of 5 ft (1.5 m) with discharge temperatures of 25 to 34°F (-3.9 to 1.1°C), except in peak winter when they reached 44°F (6.7°C) above the ambient lake temperature (NRC 2006-TN7346). In its current decommissioning state, Palisades is averaging a discharge temperature of approximately 2°F (1.1°C) above ambient water temperatures (MEGLE 2024-TN10741). The draft NPDES permit no. MI0001457 proposes to limit the thermal discharge from Palisades to 2,100 MBtu/hr, with requirements for daily temperature monitoring at the intake and discharge along with recording the total number of minutes per day that the final effluent temperature is greater than 80°F (26.7°C) (MDEQ 2014-TN10665; MEGLE 2023-TN10739). After normal operations resume at Palisades, Michigan EGLE would require, as detailed in the draft NPDES permit, that a thermal plume study be conducted at the discharge location. Based on compliance with the NPDES permit, the NRC staff conclude that thermal impacts on aquatic organisms would be NOT SIGNIFICANT for the proposed resumption of power operations.

Chemical Impacts from Discharges

The first chemical issue concerns the potential effects of nonradiological contaminants on aquatic organisms that could occur from nuclear power plant operations. This issue initially became a concern because some nuclear power plants used heavy metals in condenser tubing that could leach from the tubing and expose aquatic organisms to these contaminants (NRC 2024-TN10161). Because aquatic organisms can bioaccumulate heavy metals, even when exposed at low levels, this can be toxic to fish and other animals that consume contaminated organisms. However, Palisades has stainless steel condenser tubes that do not leach metals to the cooling-water discharge (HDI 2023-TN10538). The NRC staff verified that the issue associated with heavy metals leaching from condenser tubing does not apply to Palisades.

For certain plant equipment and systems Holtec will use, Michigan EGLE approved chemical additives to control pH, scale, corrosion, and biofouling. The 2006 SEIS (NRC 2006-TN7346) and the Environmental New and Significant Review (HDI 2023-TN10538) describe the chemicals used and the discharge limits under the administratively extended NPDES permit no. MI0001457 and are incorporated by reference. Section 3.4 of this EA addresses the discharge of metals in cooling system effluent. As explained in that section, Palisades NPDES permit establishes allowable levels of metals including copper, silver, zinc, nickel, and lead (MDEQ 2014-TN10665; MEGLE 2023-TN10739). While the proposed preparation for the resumption of

power operations would mean restarting chemical discharges from the CWIS into Lake Michigan, the chemical concentrations at the outfall are regulated by the NPDES permit. Also, no impacts to the aquatic environment from these chemicals were observed when Palisades was operating under its provisional license (1971–1991), full-term operating license (1991–2007), or its license renewal (2007–2022, expires 2031).

The other chemical issue concerns the potential impacts on aquatic organisms from exposure to radionuclides from routine radiological effluent releases. The NRC requires nuclear power plants to maintain a REMP as per requirements specified in 10 CFR Part 50, Appendix I, 10 CFR Part 20 (TN283), and 10 CFR Part 72 (TN4884), and through plant-specific technical specifications. These collectively require that licensees establish and implement a REMP to obtain data on measurable levels of radiation and radioactive material. The 2021 and 2022 REMP report did not show any measurable levels of radiation, above baseline environmental levels, detected in the vicinity of Palisades. If power operations resume, Palisades would be required to remain in compliance with NRC radiological effluent limits and reimplement the REMP to ensure aquatic organisms' exposure to any radionuclides are within acceptable limits.

The NRC staff conclude that the effects of nonradiological and radiological contaminants on aquatic organisms during the proposed resumption of power operations of Palisades would be NOT SIGNIFICANT.

3.7.3.2 Important Aquatic Species and Habitats

As noted in Section 3.7.2.2, four State-listed fish species have occurred in the vicinity of Palisades, although the lake herring and shortjaw cisco have not been observed in 30 years (Table J-4 of this EA). The starheaded topminnow and spotted gar are expected to still be in the vicinity. The spotted gar is tolerant of warm waters and low dissolved oxygen. Both species can be found in shallow waters or near the surface and both spawn in shallow water, although the gar prefers heavily vegetated areas and the topminnow prefers gravel. As a result, the potential for impact to the spotted gar or the starheaded topminnow from entrainment, impingement, thermal or chemical discharges, and other operational activities is expected to be NOT SIGNIFICANT due to the location of the intake offshore and mid-water column.

As also noted in Section 3.7.2.2, there are also four State-listed mussels, the slippershell, creek heelsplitter, flutedshell, and round pigtoe, that may occur within the vicinity of Palisades (Table J-4 of this EA). Potential impacts could include entrainment of the larval forms, entrainment or impingement of the fish host, and thermal or chemical impacts to individuals that settle near the discharge. Holtec has not identified any State-listed species in the intake or discharge systems during annual monitoring (HDI 2024-TN10843: RCI-AE-4a). As a result, the potential for impact to State-listed mussel species from entrainment, impingement, thermal or chemical discharges, or other operational activities is expected to be NOT SIGNIFICANT.

3.7.4 Cumulative Effects

Appendix G, Table G-1 of this EA identifies past, present, and reasonably foreseeable projects that could cumulatively contribute to the environmental impacts of the proposed Federal actions. Key past and present actions affecting aquatic resources in the affected area include planned construction of multiple SMRs, expansion of the independent spent fuel storage installation (ISFSI), and the potential SLR of Palisades in 2026. There are also three other energy generating facilities (Donald C. Cook Nuclear Power Plant, Covert Generating Plant, and Holland Energy Park) on or near Lake Michigan, within a 40 mi (64 km) radius of Palisades. These plants have been operating concurrently with Palisades prior to shut down in 2022. The

expansion of the ISFSI and planned construction of multiple SMRs would take place, if completed, on the landward side of the dunes onsite at Palisades. The ISFSI expansion would occur in an area that is already concrete and not affect the surface water input. The ISFSI expansion is also replacing an existing ISFSI location, so cooling water needs are not expected to increase above what is currently being used. If the planned installation of multiple SMRs are approved, it will be subject to regulation by the NRC and the intake and discharge of any additional water from Lake Michigan will be subject to regulation under the CWA. Therefore, the NRC staff determined that the incremental effects of the proposed Federal actions related to aquatic ecology when added to the effects of other past, present, and reasonably foreseeable projects would not have significant cumulative effects.

3.8 Historic and Cultural Resources

The NRC staff evaluated previous environmental documents and analyses regarding historic and cultural resources and the relevance to potential environmental effects of the proposed Federal actions at the Palisades site. Portions of the following environmental documents relevant to the subject area are incorporated by reference to support the NRC staff's significance effects determination for historic and cultural resources (see Table 1-2 of this EA):

- 2006 SEIS (NRC 2006-TN7346): Sections: 2.2.9.1, Cultural Background; 2.2.9.2, Historical and Archaeological Resources at the Palisades Site
- SEARCH Archaeological Report (SEARCH 2024-TN10846): in its entirety
- SEARCH Architectural Report (Theriot and Travisano 2024-TN10847): in its entirety

A brief summary of the material incorporated by reference along with the relevance to the current environmental review is provided in the discussion that follows.

3.8.1 Affected Environment

In the 2006 SEIS (NRC 2006-TN7346), the NRC staff evaluated and described the historic and archaeological background, cultural resources surveys, and identified historic properties at Palisades. The APE for the license renewal action evaluated as part of the 2006 SEIS included the entire 432 ac (175 ha) Palisades site. The NRC staff identified, confirmed, and validated only minor changes in the known affected environment as part of this EA. The following sections reflect new information since publication of the 2006 SEIS (NRC 2006-TN7346).

3.8.1.1 *Area of Potential Effects*

The APE for this project includes the entire 432 ac (175 ha) Palisades site (Figure 3-5 of this EA) that may be directly or indirectly affected by activities related to both the preparations for and the resumption of power operations. Aside from the transmission line and corridor, the facilities at Palisades are only publicly visible from Lake Michigan and the beach areas to the north and south of the plant boundary. Therefore, the APE analysis also includes a 1 mi (1.6 km) buffer, which allows the NRC staff to evaluate the potential impacts to historic properties located nearby but outside of the Palisades site boundary.

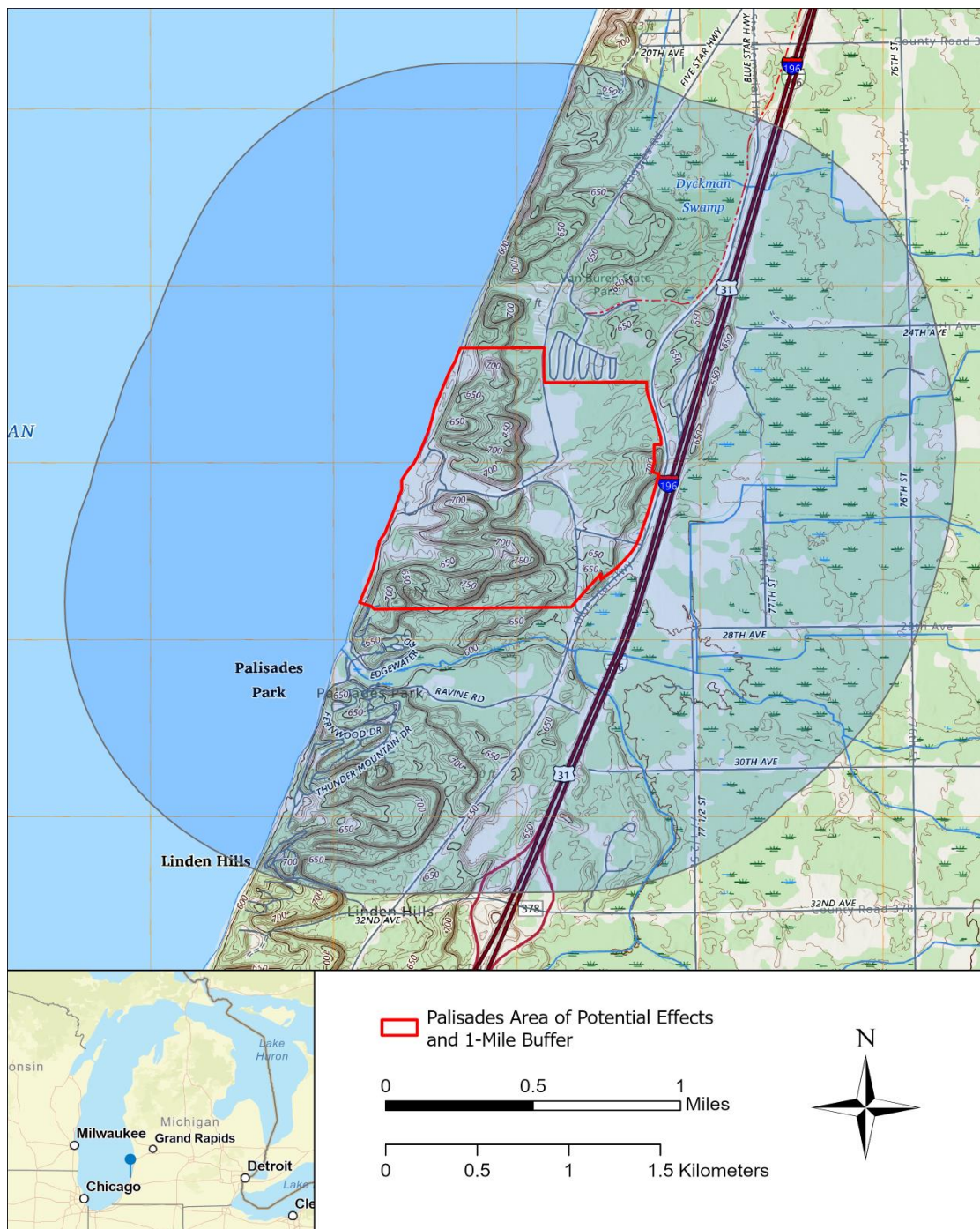


Figure 3-5 Area of Potential Effects and 1 mi (1.6 km) Buffer Area at the Palisades Nuclear Plant Site. Source: HDI 2024-TN10670: RAI-GEN-1.

3.8.1.2 Cultural Background

The 2006 SEIS (NRC 2006-TN7346) describes the long-term cultural history and chronology for this portion of the Great Lakes and southwest Michigan, specifically because Indigenous peoples have lived in this region for at least the past 10,000 years. Recent archaeological summaries of the cultural context within this region of southwest Michigan support this

interpretation (SEARCH 2024-TN10846). The NRC staff characterized the cultural chronology which included a “Paleoindian” or “First Peoples” period between 10,000–8,000 Before Common Era (BCE), an “Archaic” period between 8,000–1,000 BCE, a “Woodland” period between 1,000 BCE–1050 Common Era (CE), a “Mississippian” period between 1050–1600 CE, and a “Contact/Post-Contact” period from 1600 CE–present (NRC 2006-TN7346). While these cultural chronological periods are broadly accurate and reflective of the changes in cultural periods in this region of the Great Lakes, recent research also indicates that sand dunes along the southeastern shore of Lake Michigan—including in Van Buren State Park to the immediate north of Palisades—have intact, buried paleo-soil surfaces (Lovis et al. 2012-TN10742). Excavation, sampling, and radiocarbon dating of deeply buried sand dune deposits indicate that between approximately 6,000 to 5,000 years ago the area around Van Buren State Park consisted of a noncontiguous marshy environment. This marsh environment extended between Holland, Michigan south to Indiana and existed for about 1,000 years prior to the beginning of sand dune formation. Sand dunes in this region formed episodically for around 2,500 years but slowed, allowing the formation of a new paleo-soil surface around 2,000 years ago. Episodic sand dune formation then continued for the last 1,000 years (Lovis et al. 2012-TN10742). These records indicate that sand dunes at Palisades and this region of southeastern Lake Michigan have buried paleo-soil surfaces with the potential for evidence of past human activity (i.e., areas with stable ground surfaces where evidence of human activity might accumulate).

The 2006 SEIS (NRC 2006-TN7346) identified the shipwreck site of the *City of Greenbay* as the closest shipwreck to Palisades, located approximately 0.5 mi (0.8 km) north. Since publication of the 2006 SEIS, one new shipwreck site has been identified in southeastern Lake Michigan. The *A.P. Dutton*, which sank in 1868, is located approximately 4.6 mi (7.2 km) west of Palisades (SEARCH 2024-TN10846).

3.8.1.3 Identified Historic Properties

The 2006 SEIS (NRC 2006-TN7346) describes that no archaeological or architectural cultural resources surveys occurred at Palisades prior to construction in 1967 to 2006, although a cultural resource assessment was prepared in 1979. As noted in the 2006 SEIS (NRC 2006-TN7346), this assessment identified the need for an archaeological survey in undisturbed portions of Palisades. Archaeologists re-visited Palisades in 1982 to assess the potential impacts from building projects. A report was produced for the Palisades operator at the time, Consumers Power Company, but was not submitted for review to the Michigan State Historic Preservation Office (Michigan SHPO) (NRC 2006-TN7346). However, as part of a recent proposal to construct and operate multiple SMRs at Palisades (SMR 2024-TN10713), Holtec subcontracted to SEARCH, Inc., to complete archaeological and architectural surveys from 2023 through 2024 (SEARCH 2024-TN10846; Theriot and Travisano 2024-TN10847). These surveys occurred in three parts: (1) a pedestrian, surface-level archaeological survey through the Palisades sand dune environments (i.e., western portion of the Palisades site); (2) a subsurface campaign of archaeological shovel testing occurred through non-sand dune environments at Palisades (i.e., eastern portion of the Palisades site); and (3) a built-environment survey of the Palisades facilities conducted by an architectural historian.

Historic properties are defined as cultural resources which are eligible or listed on the National Register of Historic Places (NRHP) (NPS 2024-TN10772). Results from the archaeological survey indicated that there are three archaeological sites located at Palisades (20VA92, 20VA93 and 20VA94), but none of these sites are eligible or potentially eligible for the NRHP (SEARCH 2024-TN10846; HDI 2024-TN10669). The Michigan SHPO concurred with these determinations by letter dated September 18, 2024 (MI SHPO 2024-TN10850). All other

regional site information within an approximate 1 mi (1.6 km) radius of Palisades remains the same as in the 2006 SEIS (NRC 2006-TN7346). Results from the architectural survey recommended that only the containment building was potentially eligible for NRHP listing (HDI 2024-TN10669; Theriot and Travisano 2024-TN10847; MI SHPO 2024-TN10844, MI SHPO 2024-TN10873), but after further evaluation and consultation, the Michigan SHPO determined that the containment building cannot be considered separately from the remaining parts of the Palisades facility and does not rise to the level of significance required for listing in the NRHP under Criteria C for Architecture/Engineering by letter dated November 6, 2024 (MI SHPO 2024-TN10844). The NRC staff transmitted the archaeological report to the federally recognized Indian Tribes (NRC 2024-TN11054); no comments were received.

3.8.1.4 Consultation

The NRC notified and consulted with the Advisory Council on Historic Preservation, Michigan SHPO and 35 federally recognized Indian Tribes, as further described in Appendix D, Appendix E, and Appendix I.

3.8.2 Environmental Impacts from the Preparations for Resumption of Power Operations

Section 3.1 of this EA describes the activities Holtec is completing as part of the preparations for the resumption of power operations. Several of these activities have expected ground disturbance in and around the Palisades site. These ground-disturbing activities include the construction of a new access road, removal and construction of a new security fence, a re-cabling project between the reactor facility and the cooling towers, demolition of two current radioactive storage facilities, and construction of a new radioactive waste storage facility and a new digital storage facility (see Table 3-1 of this EA). These activities, as shown in Figure 3-1 of this EA, are all occurring within the western portion of the Palisades site, with the only exception being the construction of the digital storage facility.

The western portion of Palisades was considerably modified through ground disturbance, sand dune remediation, and shoreline modification during the original construction of Palisades in the late-1960s and early 1970s (Appendix I to this EA) (SEARCH 2024-TN10846). Although no archaeological survey (e.g., shovel testing) occurred in the critical dune environment within the western portion of Palisades, if future ground-disturbing activities occur within this area, then a Michigan State critical dune permit would be required. Holtec will have cultural resource protection procedures for any ground-disturbing activities at the site (HDI 2024-TN10843: RCI-HCR-7a). These procedures were submitted to the Michigan SHPO and federally recognized Indian Tribes for review and comment, and Michigan SHPO provided comments by letter dated October 23, 2024 (HDI 2024-TN10843: RCI-HCR-7a; MI SHPO 2024-TN10983). The Michigan SHPO also recommended that noninvasive archaeological survey techniques be employed if future undertakings overlap with the CDAs, since these are dynamic environments and may include deeply buried deposits (MI SHPO 2024-TN10850).

As no historic properties have been identified at Palisades and activities related to the preparations for resumption of power operations will have a nominal subsurface impact that does not extend below previously disturbed grades and will occur in previously disturbed areas (e.g., the cooling tower re-cabling project extends to a depth of 27 in. [69 cm] [HDI 2024-TN10670: RAI-GEN-1]), no significant impacts to archaeological resources are indicated.

Activities that will occur at Palisades as part of the preparations for the resumption of power operations that are within buildings and structures will not result in significant impacts to architectural resources. There are no eligible built-environment properties within the APE. In accordance with 36 CFR 800.4 (TN513), this undertaking will have no historic properties affected as no historic properties have been identified and activities associated with the resumption of power operations are limited to previously disturbed areas. Holtec will have procedures to address inadvertent discoveries and notification protocols. Additionally, no historic and cultural resources have been identified within the APE. By letter dated February 24, 2025, the Michigan SHPO concurred with this determination (MI SHPO 2025-TN11679). Therefore, the NRC staff determined that impacts to historic and cultural resources related to the activities from the preparations for resumption of power operations would be NOT SIGNIFICANT.

3.8.3 Environmental Impacts from the Resumption of Power Operations

In 2006, the previous Palisades operator (Entergy) had existing historic and cultural resources procedures (NMC 2006-TN10743), which provided a screening tool and mechanism to protect archaeological sites and other resources that may be inadvertently encountered during day-to-day operations (NRC 2006-TN7346). The Michigan SHPO concurred with NRC's determination of "no historic properties are affected" as part of the 2006 SEIS (NRC 2006-TN7346), because while Palisades lacked archaeological and architectural surveys, Entergy had procedures in place to protect unidentified cultural resources.

By returning to power operations, Palisades would operate in a manner similar to past operations, except with the addition of new archaeological and architectural surveys and updated site-wide cultural resource procedures (HDI 2024-TN10670, HDI 2024-TN10843: RCI-HCR-7a; MI SHPO 2024-TN10850). In accordance with 36 CFR 800.4 (TN513), this undertaking will have no historic properties affected as no historic properties have been identified, and Holtec has procedures to address inadvertent discoveries and notification protocols. Additionally, no historic and cultural resources have been identified within the APE. By letter dated February 24, 2025, the Michigan SHPO concurred with this determination (MI SHPO 2025-TN11679). Therefore, the NRC staff determined that impacts to historic and cultural resources related to the activities associated with resumption of power operations would be NOT SIGNIFICANT.

3.8.4 Cumulative Effects

Appendix G, Table G-1 of this EA identifies past, present, and reasonably foreseeable projects that could cumulatively contribute to the environmental effects of the proposed Federal actions. For the cumulative analysis for this resource, the region of interest is the APE. Key past, present, and reasonably foreseeable actions in the vicinity of Palisades that may affect historic and cultural resources include the potential construction of multiple SMRs (SMR 2024-TN10713) and potential SLR. Ground disturbance as part of construction activities associated with the potential SMR project has the greatest possibility to affect historic and cultural resources. The potential SLR and SMR projects are new and separate undertakings under NHPA and would be independently evaluated by the NRC under Section 106 of the NHPA (TN4157). Therefore, the NRC staff determined that the incremental effects of the proposed Federal actions related to historical and cultural resources when added to the effects of other past, present, and reasonably foreseeable projects would not have significant cumulative effects.

3.9 Socioeconomics

The NRC staff evaluated previous environmental documents and analyses with regard to socioeconomics along with their relevance to potential environmental effects of the proposed Federal actions at the Palisades site. Portions of the following environmental documents are incorporated by reference to support the NRC staff's significance effects determination for socioeconomics (see Table 1-2 of this EA):

- 2006 SEIS (NRC 2006-TN7346): Section 4.4, Socioeconomics
- N&S Report (HDI 2023-TN10538): Section 3.4, Socioeconomics
- Holtec RAI Response (HDI 2024-TN10670): RAI-SE-1 (Temporary workforce); RAI-SE-2 (Description and breakdown of projected plant employment)
- A brief summary of the material incorporated by reference along with the relevance to the current environmental review is provided in the discussion that follows.

3.9.1 Affected Environment

This section describes current baseline socioeconomic conditions near Palisades, including population demographics, regional economy, and infrastructure and public services. Socioeconomic information documented in the 2006 SEIS (NRC 2006-TN7346) has been updated to reflect more recent socioeconomic data where applicable. Based on information provided by Holtec (HDI 2024-TN10670: RAI-SE-2), nearly 70 percent of the current 442 Palisades workforce resides in Berrien and Van Buren Counties.

The following tables present demographic, income, and housing information about the two-county region of influence (ROI) from the Census Bureau. Based on the information presented in Table 3-6, racial and ethnic diversity in the ROI is similar to the State of Michigan as a whole. Van Buren County has a smaller percentage African American population and a higher percentage Hispanic, Latino, or Spanish population. Information in Table 3-7 of this EA shows that the unemployment in the ROI is similar to the Michigan average, with lower incomes and higher numbers of people and families living in poverty than in Michigan as a whole. As shown in Table 3-8 of this EA, vacant housing rates exceed the State level and median home values and rents are below the average State levels.

Table 3-6 Demographic Profile of the Population in the Region of Influence of Palisades Nuclear Plant in 2020

Demographic	Berrien County	Van Buren County	ROI	Michigan
Total population	154,316	75,587	229,903	10,077,331
Percent White race alone	72.3	78.6	74.4	72.4
Percent Black or African American race alone	13.7	3.1	10.2	13.5
Percent American Indian and Alaska Native race alone	0.5	0.7	0.6	0.5
Percent Asian race alone	2.0	0.5	1.5	3.3
Percent Native Hawaiian and Other Pacific Islander race alone	0.1	0.0	0.1	0.0
Percent some other race alone	0.4	0.4	0.4	0.4
Percent two or more races	4.9	4.8	4.9	4.4

Table 3-6 Demographic Profile of the Population in the Region of Influence of Palisades Nuclear Plant in 2020 (Continued)

Demographic	Berrien County	Van Buren County	ROI	Michigan
Hispanic, Latino, or Spanish Ethnicity of Any Race (Total Population)	9,210	8,966	18,176	564,422
Percent Hispanic, Latino, or Spanish Ethnicity of Any Race of total population	6.0	11.9	7.9	5.6

ROI = region(s) of influence.
Source: USCB 2022-TN11058.

Table 3-7 Estimated Income Information for the Socioeconomic Region of Influence of Palisades Nuclear Plant, 2018–2022, 5-Year Estimates

Metric	Berrien County	Van Buren County	ROI	Michigan
Median household income (dollars)	60,379	65,531	62,017	68,505
Per capita income (dollars)	36,764	32,361	35,314	37,929
Families living below the poverty level (percent)	12.1	9.5	11.2	8.8
People living below the poverty level (percent)	15.7	14.2	15.2	13.1
Unemployment rate	6.6	4.7	6.0	6.0

ROI = region(s) of influence.
Source: USCB 2022-TN10748.

Table 3-8 Housing in the Region of Influence of Palisades Nuclear Plant, 2018–2022, 5-Year Estimate

Metric	Berrien County	Van Buren County	ROI	Michigan
Total housing units	76,948	37,076	114,024	4,580,447
Occupied housing units	63,512	29,609	93,121	4,009,253
Total vacant housing units	13,436	7,467	20,903	571,194
Percent total vacant	17.5	20.1	18.3	12.5
Owner occupied units	46,359	23,731	70,090	2,906,470
Median value (dollars)	193,600	172,100	186,609	201,100
Owner vacancy rate (percent)	1.1	0.3	0.8	1.0
Renter occupied units	16,328	5,323	21,651	1,045,070
Median rent (dollars/month)	885	843	875	1,037
Rental vacancy rate (percent)	4.3	6.8	4.9	4.8

ROI = region(s) of influence.
Source: USCB 2022-TN10749.

3.9.2 Environmental Impacts from the Preparations for Resumption of Power Operations

Socioeconomic impacts of preparation for resumption of power operations activities would be similar to those experienced during a typical nuclear power plant refueling outage (HDI 2024-TN10670: RAI-SE-1). Holtec expects site employment levels during preparation for resumption of power operations to peak at 1,600 workers before ramping down to the previously established reactor operations workforce (HDI 2024-TN10670: RAI-SE-1). Preparation for the

resumption of power operations activities are temporary, and impacts would be similar to the socioeconomic impacts described for Palisades refueling outages in the 2006 SEIS (NRC 2006-TN7346). Based on this information, socioeconomic impacts from the proposed Federal actions would be similar to those experienced during previous Palisades refueling outages, of short duration, and would be NOT SIGNIFICANT.

3.9.3 Environmental Impacts from the Resumption of Power Operations

Socioeconomic impacts of nuclear power plant operations would be similar to those described in the 2006 SEIS (NRC 2006-TN7346). Holtec expects site employment levels during operations to be 600 workers (HDI 2024-TN10670: RAI-SE-1). The operations workforce would be expected to reside in similar patterns to when the plant was operating prior to decommissioning, as described in the 2006 SEIS (NRC 2006-TN7346).

In addition, the resumption of operations of Palisades would increase the amount of tax money paid to Van Buren County and the City of Benton Harbor. Annual property tax payments for Palisades paid to Van Buren County (with a small portion to the City of Benton Harbor) averaged \$10 million per year prior to reactor shutdown and the commencement of decommissioning. Annual property tax payments during Palisades decommissioning decreased over a 6-year period to approximately \$1.6 million. Annual property tax payments could increase up to \$15.6 million in 2025 due to power plant modifications and improvements that could increase the nuclear plant's valuation. However, Holtec expects property tax payments to return to pre-decommissioning levels (approximately \$10 million per year) starting in 2027 (HDI 2023-TN10538).

Other socioeconomic impacts from nuclear power plant operations include effects on community services, transportation (e.g., traffic volumes), and the economic impacts of expenditures for goods and services including labor. These impacts are described in the 2006 SEIS (NRC 2006-TN7346), and NRC staff do not expect socioeconomic impacts to noticeably differ after the resumption of power operations. Based on this information, including information from Holtec (HDI 2023-TN10538), the socioeconomic impacts from the proposed Federal actions and the resumption of reactor power operations would be similar to those described in the 2006 SEIS and would be NOT SIGNIFICANT.

3.9.4 Cumulative Effects

Appendix G, Table G-1 identifies other past, present, and reasonably foreseeable actions that could result in cumulative effects. The proposed SMR project would require additional workers during construction and operation. However, NRC staff recognize the site has experienced fluctuations in site worker numbers in the past and that the expected fluctuations associated with the SMR would be generally consistent with previous fluctuations. Minor beneficial economic impacts including the resumption of pre-decommissioning tax revenues would result from the proposed SMR project.

As discussed in Sections 3.9.2 and 3.9.3, the socioeconomic effect of the proposed Federal actions would be similar to those experienced during previous refueling outages and reactor operations of Palisades. Therefore, the NRC staff have determined that the incremental socioeconomic effects of the proposed Federal actions when added to the effects of other past, present, and reasonably foreseeable projects would not have significant cumulative effects.

3.10 Environmental Justice

Executive Order 14173, “Ending Illegal Discrimination and Restoring Merit-Based Opportunity,” (90 FR 8633-TN11607) issued January 21, 2025, revoked Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” (59 FR 7629-TN1450) issued February 11, 1994, among other things. Staff Requirements Memorandum (SRM)-COMSECY-25-0007, “Withdrawing the Environmental Justice Policy Statement and Environmental Justice Strategy,” issued April 10, 2025, approved publication of a notice in the *Federal Register* (90 FR 17887-TN11684), which explained that, in response to the policies in Executive Order 12898, the NRC had made voluntary commitments on environmental justice in its Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (Environmental Justice Policy Statement) and Environmental Justice Strategy (69 FR 52040-TN1009). Accordingly, with the revocation of Executive Order 12898, the NRC also withdrew its Environmental Justice Policy Statement and Environmental Justice Strategy. Based on Executive Order 14173 and SRM-COMSECY-25-0007, this EA does not address environmental justice.

3.11 Radiological and Nonradiological Human Health

The NRC staff evaluated previous environmental documents and analyses with regard to radiological and nonradiological human health and the relevance to potential environmental effects of the proposed Federal actions at the Palisades site. Portions of the following documents relevant to the subject area are incorporated by reference in support of the NRC staff’s radiological and nonradiological human health significance effects determination (see Table 1-2 of this EA):

- 2006 SEIS (NRC 2006-TN7346): Sections: 2.2.7, Radiological Impacts; 2.2.8, Socioeconomic Factors; 4.1, Cooling System; 4.2, Transmission Lines; 4.3, Radiological Impacts of Normal Operation
- 2023 N&S Report (HDI 2023-TN10538): Sections: 3.9, Human Health; 4.8.1, SEIS Findings; 4.9.2, N&S Review for Reauthorization of Power Operations
- 2024 LR GEIS (NRC 2024-TN10161): Sections: 3.3.3, Noise; 3.9, Human Health; 4.2, Land Use and Visual Resources

A brief summary of the material incorporated by reference along with the relevance to the current environmental review is provided in the discussion that follows.

3.11.1 Radiological Human Health

3.11.1.1 Affected Environment

The affected environment is described generically for all nuclear power plants in the 2024 LR GEIS (NRC 2024-TN10161) and specifically in the 2006 SEIS (NRC 2006-TN7346). The REMP is also described in the 2006 SEIS (NRC 2006-TN7346).

Table 3.9.2 of the N&S Report (HDI 2023-TN10538) presents the REMP sample results for 2021 and 2022, and the reported data in the table is consistent with the reporting data described in the 2006 SEIS (NRC 2006-TN7346). The NRC staff conducted a review of the Palisades Annual Radioactive Effluent Reports (NRC 2024-TN10750) and NRC Office of Enforcement Annual Reports going back to 2006 (NRC 2024-TN10751). The effluent reports indicated that

emissions during operation and subsequent decommissioning were within compliance with 10 CFR Part 20 (TN283) and Appendix I of 10 CFR Part 50 (TN249).

In addition to reviewing data from actively monitored emissions, the NRC staff reviewed independent data collected by Michigan EGLE. The Michigan EGLE runs an independent REMP (MEGLE 2016-TN10744) for all nuclear power plants within the State, including areas surrounding Palisades. This data is published from 1958 up to 2016 and includes environmental sampling of air particulate, air vapors, milk, surface water, and direct radiation monitoring (MEGLE 2014-TN10865). The data collected by Michigan EGLE for the majority of plant operations demonstrate that Palisades emissions are low and confirms submitted Annual Radioactive Effluent Reports for the same time frame are within regulatory limits.

The N&S Report (HDI 2023-TN10538) provides the most recent (2018–2022) average occupational radiation dose per individual; the total effective dose equivalent (TEDE) was 0.225 roentgen equivalent(s) man (rem). The annual occupational TEDE limit is 5 rem, as outlined in 10 CFR 20.1201(a)(1). Also provided in the N&S Report (HDI 2023-TN10538) are the doses to a member of the public for the last full year of operation (2021), which were: 0.112 millirem (mrem) for whole body, 0.117 mrem for thyroid, and 0.522 mrem for other organs. Furthermore, in the 2006 SEIS (NRC 2006-TN7346) the maximum annual TEDE (over the five-year period 2000–2005) was reported as 7.53×10^{-3} mrem, with the TEDE including estimates for liquid and gaseous effluents. The average occupational radiation exposure TEDE dose for the operational years 2006 to 2021 ranged from 0.09 rem to 0.39 rem (NRC 2024-TN9915). These dose results confirm that Palisades was operating in compliance with 10 CFR Part 50, Appendix I, 10 CFR Part 20, and 40 CFR Part 190.

The radiological effects on the environment related to the resumption of power generation at Palisades would be consistent with that observed prior to the shutdown of operations in 2022.

Local Cancer Concerns

During scoping, numerous individuals expressed concerns about the impact of radioactive emissions and cancers on human health at locations near Palisades, specifically related to thyroid cancer (NRC 2024-TN10605). To understand the potential impact of radioactive emissions on the environment, the NRC staff conducted a review of the Palisades Annual Radioactive Effluent Reports (NRC 2024-TN10750) and NRC Office of Enforcement Annual Reports going back to 2006 (NRC 2024-TN10751). The effluent reports indicated that emissions during operation and subsequent shutdown were within compliance with 10 CFR 50 Appendix I requirements (TN249).

The NRC staff investigated the reports of increased rates of cancer using data sources provided by the Michigan Department of Health and Human Services, such as the Centers for Disease Control and Prevention's National Environmental Public Health Tracking Network (CDC 2024-TN10845) and the University of Kentucky's Cancer Incidence and Mortality Inquiry System (University of Kentucky 2014-TN10851). The provided data included total cancer rates and thyroid cancer rates for Van Buren County, the counties surrounding Van Buren County, and the State of Michigan as a whole. This data was used in conjunction with annual effluent reports provided by the operators of Palisades and data collected through the Michigan REMP program. Based on its review of this data, the NRC staff did not identify any higher incident rates of cancer, specifically for thyroid cancer in the counties around Palisades. This information is discussed in further detail in Appendix H, "Discussion of Cancer Risks at and around Palisades Nuclear Plant." While Palisades did have enforcement actions applied during the time period

reviewed (NRC 2024-TN10751), no enforcement actions were related to the radioactive emissions control systems described in Section 3.11.1.1 of this EA.

Additionally, the State of Michigan Department of Health and Human Services, Department of Environmental Health provided the NRC staff with a letter sent to the township of Covert, Michigan on November 15, 2024 (MDHHS 2024-TN10866). The letter summarizes a review of the instances of thyroid cancer in Covert Township from 1985 to 2021. The number of recorded cases of thyroid cancer in permanent residents was 6, a number too low to conduct viable statistical analysis with other comparable locations. No temporal patterns were identified with regards to thyroid cancer for the location during the review.

3.11.1.2 Environmental Impacts from the Preparations for the Resumption of Power Operations

Radiological impacts of normal operations are addressed in the 2006 SEIS (NRC 2006-TN7346) and in Section 4.9 of the 2024 LR GEIS (NRC 2024-TN10161) for continued operation. Any refurbishment activities are expected to be similar to those of a refueling outage. As no radiological releases are expected during the activities for the preparations for the resumption of power operations described in Section 3.1.3 of this EA, there would be no significant radiological impacts to members of the public. Occupational exposures would occur when working within radiation areas in Palisades and would be controlled under 10 CFR Part 20. Thus, radiological human health impacts related to the activities from the preparations for resumption of power operations would be NOT SIGNIFICANT.

3.11.1.3 Environmental Impacts from the Resumption of Power Operation

Radiological impacts of normal operations are addressed in the 2006 SEIS (NRC 2006-TN7346), where the NRC staff noted that there would be no impacts of radiation exposures to the public during the renewal term beyond those discussed in the 2006 SEIS. Given that Palisades would be operated as before with no significantly different radiological environmental impacts, the NRC staff have determined that the environmental impacts of radiological effluent releases from the resumption of power operation at Palisades would be consistent with what was provided in the 2021 and 2022 REMP reports prior to the shutdown of operations in 2022 (HDI 2023-TN10538), and therefore, would be NOT SIGNIFICANT. The operational impacts are minimized by compliance with radiation protection regulations in 10 CFR Part 20 (TN283), 10 CFR Part 50 Appendix I (TN249), and Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1910-TN654) created by the Occupational Safety and Health Act of 1970 (TN4453).

3.11.1.4 Cumulative Effects

This section of the EA considers the incremental cumulative radiological human health impacts of the proposed Federal actions when added to the contributory effects of other past, present, and reasonably foreseeable actions. Appendix G, Table G-1 of the EA identifies past, present, and reasonably foreseeable projects that could cumulatively contribute to the environmental impacts of the proposed Federal actions.

The proposed Federal actions would not have an incremental cumulative effect on the design configuration, operational changes, or radiological monitoring at Palisades. The facility would return to the same operational state prior to decommissioning and would have the same level of impacts. The addition of SMRs, if pursued, must also meet the NRC regulatory requirements for

effluent releases. Additionally, the combination of all nuclear power plants on the site and within 50 mi (80 km) of Palisades would be required to meet the regulations of 40 CFR Part 190 (e.g., maximum annual dose equivalent no greater than 25 mrem for whole body) (TN739).

Therefore, the NRC staff determined that the incremental radiological human health effects of the proposed Federal actions when added to the effects of other past, present, and reasonably foreseeable actions would not have significant cumulative effects.

3.11.2 Nonradiological Human Health

3.11.2.1 Affected Environment

In defining the affected environment for nonradiological human health, the NRC staff assessed previous environmental documents, incorporating by reference where relevant, along with current data.

Chemical Hazards: Federal and State environmental agencies regulate the use, storage, and discharge, and management of chemical spills at the Palisades site as outlined in the 2006 SEIS (NRC 2006-TN7346). Water treatment discharge and management are regulated by an NPDES permit, which is under renewal and discussed further in Section 3.4.2 of this EA. Occupational health impacts are managed through established industrial hygiene practices that comply with OSHA requirements (HDI 2023-TN10538). Between 2018 and 2023, one reportable chemical spill occurred in September 2020, when a leak from a condensate storage tank exceeded the threshold for hydrazine (reportable quantity of 1 lb [0.45 kg]) and was reported to the State of Michigan (Entergy 2021-TN10707). The quantity of hydrazine released (2.7 lb [1.2 kg]) was not significant enough to cause any human health effects.

Microbiological Hazards: As described in the 2024 LR GEIS (NRC 2024-TN10161), microbiological hazards occur when workers or members of the public come into contact with disease-causing microorganisms, also known as etiological agents. Members of the public could be exposed to microorganisms in thermal effluents at nuclear power plants that use cooling ponds, lakes, canals, or that discharge to publicly accessible surface waters. Thermal discharge to surface waters near Palisades has been described in Sections 3.7.2 and 3.7.3 of this EA. As the water temperatures in Lake Michigan near the discharge area are not expected to be inductive to etiological growth, the public health impact is expected to be minimal. As described in 2024 LR GEIS, nuclear power plant workers can be exposed to *Legionella* spp. when performing cooling system maintenance through inhalation of cooling tower vapors because these vapors are often within the optimum temperature range for *Legionella* spp. growth. In the N&S Report, occupational health impacts are managed through established industrial hygiene practices that comply with OSHA requirements (HDI 2023-TN10538). In the 2006 SEIS (NRC 2006-TN7346), NRC concluded that there would be no impacts of microbiological organisms during the license renewal term due to potential impacts being controlled by continued application of industrial hygiene practices.

Physical Hazards: As described in the 2024 LR GEIS (NRC 2024-TN10161), a physical hazard is an action or condition that can cause harm upon contact. Nuclear power plants have many of the typical occupational hazards found at any other electric power generation sites as workers perform electrical and repair work and maintenance activities and may be exposed to potentially hazardous physical conditions (e.g., falls, excessive heat, cold, noise, electric shock, and pressure). In 2023, the U.S. Bureau of Labor Statistics reported that national incidence rates for

nonfatal occupational injuries and illnesses for the utility industry was 1.8 per 100 full-time workers (BLS 2024-TN11032).

Electric shock hazards and chronic exposure to electromagnetic fields that are produced by the power transmission systems are discussed in the 2024 LR GEIS (NRC 2024-TN10161) and the 2006 SEIS (NRC 2006-TN7346). Occupational workers and members of the public could be exposed to acute electric shock from transmission lines or electrical equipment needed to support the facility. Per the N&S Report, in-scope transmission lines at Palisades (i.e., the transmission lines within the protected area from the reactor to the switchyard) were constructed in accordance with the National Electrical Safety Code criteria and standards and no changes have been made since the 2006 SEIS analysis (HDI 2023-TN10538). Holtec follows an industrial safety program that includes electrical safety. There are no Federal standards limiting exposure to electromagnetic fields from power lines in the United States.

As described in detail in the 2024 LR GEIS (NRC 2024-TN10161), noise is an unwanted or unwelcome sound generated by various sources. According to Holtec's N&S Report, the nearest residence is approximately 0.5 mi (0.8 km) to the southwest of the Palisades site (HDI 2023-TN10538). Noise measurements for the Palisades site are unavailable; however, the cooling towers that were replaced in 2012 and 2017 produce a maximum sound of 90 A-weighted decibel at 3 ft (0.9 m) when operational. As the Palisades site is surrounded by sand dunes and vegetation and most equipment is inside the buildings, noise generation at Palisades is mitigated (NRC 2006-TN7346).

3.11.2.2 Environmental Impacts from the Preparations for the Resumption of Power Operations

Based on information in the review of Holtec's N&S Report, (HDI 2023-TN10538), Holtec's response to NRC's RAIs/RCIs, and public scoping (Appendix B to this EA), the NRC staff have determined the proposed Federal actions would not alter resources related to nonradiological human health at Palisades. Section 3.2.2 of this EA describes the activities that Holtec is completing in the preparation of resumption of power operations. Palisades continues to have a comprehensive industrial safety program that addresses all applicable OSHA standards (HDI 2023-TN10538). Therefore, the NRC staff have concluded that the proposed Federal actions related to the preparations for resumption of power operations would not result in a significant impact on nonradiological human health. Based on this, the NRC staff concluded that the impacts from the proposed Federal actions would be NOT SIGNIFICANT.

3.11.2.3 Environmental Impacts from the Resumption of Power Operation

The environmental effects of reactor operations on nonradiological human health resources as a result of license renewal are described in the 2024 LR GEIS (NRC 2024-TN10161). As explained in the 2024 LR GEIS, continued reactor operations and refurbishment activities at nuclear power plants have had little or no environmental effect. The NRC staff expect that Palisades would continue to have a comprehensive industrial safety program that addresses all applicable OSHA standards, as described in HDI 2023-TN10538, including personal protective equipment (29 CFR 1910.132 [TN654]), eye and face protection (29 CFR 1910.133), respiratory protection (29 CFR 1910.134), and hearing protection (29 CFR 1910.95). Based on the review of N&S Report (HDI 2023-TN10538) and Holtec's responses to NRC's RAIs/RCIs (HDI 2024-TN10670, HDI 2024-TN10669), the affected environment related to nonradiological human health resources at Palisades has not changed to any significant degree since the 2006 SEIS (NRC 2006-TN7346). Therefore, the NRC staff have concluded that the proposed Federal

actions related to the resumption of power operations would not result in a significant impact on nonradiological human health. Based on this, the NRC staff concluded that the impacts from the proposed Federal actions would be NOT SIGNIFICANT.

3.11.2.4 Cumulative Effects

This section of the EA considers the incremental nonradiological human health impacts of the proposed Federal actions when added to the contributory effects of other past, present, and reasonably foreseeable actions. Appendix G, Table G-1 of this EA identifies past, present, and reasonably foreseeable projects that could cumulatively contribute to the environmental impacts of the proposed Federal actions.

Planned onsite construction of multiple SMRs (SMR 2024-TN10713), expansion of the ISFSI (HDI 2023-TN10538), and potential SLR in 2031 at Palisades all have the potential to impact nonradiological human health. Most of the nonradiological impacts of preparation and operation would be localized to the vicinity nearby the Palisades site and the effects are expected to be minimal. Therefore, the NRC staff determined that the incremental effects of the proposed Federal actions related to nonradiological human health when added to the effects of other past, present, and reasonably foreseeable projects would not have significant cumulative effects.

3.12 Waste Management

The NRC staff evaluated waste management information in other environmental documents to determine the potential environmental effects from the proposed Federal actions at the Palisades site. Portions of the following documents relevant to the subject area are incorporated by reference in support of the NRC staff's waste management significance effects determination (see Table 1-2 of this EA):

- 2006 SEIS (NRC 2006-TN7346): Sections: 2.1.4, Radioactive Waste Management Systems and Effluent Control Systems; 2.1.5, Nonradioactive Waste Systems
- 2023 N&S Report (HDI 2023-TN10538): Sections: 2.1.1, General Plant Information; 3.10, Waste Management
- 2024 LR GEIS (NRC 2024-TN10161): Section 4.11, Waste Management and Pollution Prevention
- Holtec RAI Response (HDI 2024-TN10670): RAI-GEN-1 (Detailed list of activities related to the Federal actions); RAI-WM-1 (Description of waste management strategy and expected waste generation)

A brief summary of the material incorporated by reference along with the relevance to the current environmental review is provided in the discussion that follows.

3.12.1 Affected Environment

Complete descriptions of the radioactive waste management and effluent control systems are found in the 2006 SEIS (NRC 2006-TN7346). The systems include gaseous and liquid effluent control systems that prevent release of waste emissions to the environment and must meet the regulatory requirements of 10 CFR Part 20 Appendix B (TN283). Additionally, the solid radioactive waste processing system encompasses the systems and processes used to capture and prepare solid waste for transport. As described in the N&S Report (HDI 2023-TN10538),

these systems have not been changed since the issuance of the SEIS and the description from the N&S Report is incorporated by reference.

Mixed waste, regulated under Resource Conservation and Recovery Act of 1976, as amended (Resource Conservation and Recovery Act of 1976-TN1281) and Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.-TN663), include both radioactive and hazardous waste (EPA 2019-TN6956). According to Holtec's N&S Report (HDI 2023-TN10538), Palisades has generated minimal mixed waste from 2018 to 2023.

Section 2.1.5 of the 2006 SEIS (NRC 2006-TN7346) provides a description of the nonradioactive waste generation and waste management at Palisades prior to start of plant decommissioning. Generated nonradioactive waste includes chemical, biocide, sanitary, universal, site stormwater runoff, and lubrication oil waste. Palisades has a nonradioactive waste management program and procedures to handle and dispose of this nonradioactive waste in accordance with Federal, State, and local regulations. Solid wastes are collected and stored onsite, then shipped offsite for disposal.

Sections 2.1.1 and 3.10.2 of Holtec's N&S Report (HDI 2023-TN10538) provides a current review of waste management activities. Nonradioactive waste generated at Palisades are similar to those identified in the 2006 SEIS. However, there has been a reduction in generation of fluorescent light luminaires like fluorescent bulbs and ballasts being replaced with light-emitting diode lighting fixtures. Palisades has typically been classified as a small or very small quantity hazardous waste generator. However, in 2015, 2017, and 2019, Palisades has also been classified as large quantity hazardous waste generator due to occasional episodic events (MEGLE 2021-TN10753). The NRC staff expect that Holtec would continue to implement plans and procedures for management of its waste types including an asbestos abatement or human-made mineral fiber removal plan (HDI 2024-TN10670: RAI-WM-1).

Procedures, such as SPCC-PIPP and the SWPPP are in place for nonradioactive waste management and for the minimization and management of liquid chemical spills. With respect to unplanned, nonradiological releases, the NRC staff's review of the annual nonradiological environmental operating reports over the period of 2018 through 2023 found one documented instance of a reportable chemical spill in September 2020, which is described in Section 3.11.2.1 of this EA. In the unlikely event of generation of a medical incident and generation of medical waste, the State of Michigan Medical Waste Regulatory Program provides procedures for managing medical waste, which would typically be handled by the supporting medical facility.

3.12.2 Environmental Impacts from the Preparations for the Resumption of Power Operations

Section 3.1.3 of this EA lists the planned activities in preparation of resumption of operations. Both radioactive and nonradioactive waste may be generated as a result of these activities.

As discussed in Sections 3.4.1 and 3.4.2 of this EA, if sediments are removed from the mixing basin as a result of the sediment level evaluation, removal would be performed under the appropriate permits, and sediments would be tested for radioactivity and other contaminants prior to disposal offsite. Mixed waste production may result from the cleaning and removal of any residual contaminants that accumulate in the primary coolant system. Holtec maintains plans and procedures for management of radioactive and nonradioactive waste and plans to use existing processes for preparation of reauthorization activities resulting in waste generation

(HDI 2024-TN10670: RAI-GEN-1, RAI-WM-1). Holtec estimated the total amount of radioactive wastes generated during refueling activities as part of the preparations for the resumption of power operations as 44,520 ft³ (1,260 m³) of Class A waste, 240 ft³ (7 m³) of Class B waste, and 1,770 ft³ (50 m³) of Class C waste (HDI 2024-TN10670: RAI-WM-1).

Based on information in the review of Holtec's N&S Report, (HDI 2023-TN10538), Holtec's response to NRC's RAIs (HDI 2024-TN10670: RAI-WM-1), and public scoping (Appendix B to this EA), the NRC staff have determined the proposed Federal actions would not alter radiological or nonradiological waste management processes currently in place at Palisades. Therefore, the NRC staff determined that radioactive and nonradioactive waste management impacts related to the activities from the preparations for resumption of power operations would be NOT SIGNIFICANT.

3.12.3 Environmental Impacts from the Resumption of Power Operations

Hazardous waste generation is not expected to increase during resumption of power operations. As described in the N&S Report, Palisades is expected to continue as a small or very small hazardous waste generator upon renewed operations, but certain events such as cleaning of storage tanks may result in generation of large quantities of hazardous waste (HDI 2023-TN10538).

The radiological and nonradiological waste management impacts of operation would be consistent with those described in the 2006 SEIS (NRC 2006-TN7346). Holtec has confirmed that waste generation rates would also be consistent with those analyzed in the 2006 SEIS (HDI 2024-TN10670: RAI-WM-1).

In addition, the NRC staff have determined that radioactive and nonradiological waste management impacts analyses in the 2024 LR GEIS (NRC 2024-TN10161) are relevant to the proposed Federal actions, including the resumption of power operations of Palisades. The 2024 LR GEIS describes the environmental effects of reactor operations on radiological and nonradiological waste management as a result of license renewal. As explained in the 2024 LR GEIS, continued reactor operations and refurbishment activities at nuclear power plants have had little or no environmental effect on waste management.

Based on the review of the N&S Report (HDI 2023-TN10538) and Holtec's responses to NRC's RAIs/RCIs, the waste management affected environment at Palisades has not changed to any significant degree since the 2006 SEIS (NRC 2006-TN7346). Based on NRC staff's review of the N&S Report and conclusions of the 2006 SEIS and the 2024 LR GEIS (NRC 2024-TN10161), NRC staff conclude that radioactive and nonradioactive waste management impacts from the resumption of reactor power operations would be NOT SIGNIFICANT.

3.12.4 Cumulative Effects

Appendix G, Table G-1 of the EA identifies past, present, and reasonably foreseeable projects that could cumulatively contribute to the environmental impacts of the proposed Federal actions. No significant design configuration or operational changes are expected to impact waste management as a result of the proposed Federal actions. The facility would return to the same operational state prior to decommissioning and would have the same level of impacts as concluded in the 2006 SEIS. The addition of SMRs, if pursued, would be required to meet the NRC regulatory requirements for safe handling and processing of generated waste. Additionally, the combination of all nuclear power plants on the site and within 50 mi (80 km) of Palisades

would be required to meet the applicable 10 CFR Part 20 and Part 72 regulations for waste management. Therefore, the NRC staff determined that the incremental effects of the proposed Federal actions related to waste management when added to the effects of other past, present, and reasonably foreseeable actions would not have significant cumulative effects.

3.13 Uranium Fuel Cycle and Transportation

The NRC staff evaluated previous environmental documents and analyses with regard to uranium fuel cycle and the transportation of fuel and waste with the relevance to potential environmental effects of the proposed Federal actions at the Palisades site. The generic potential impacts of the radiological and nonradiological environmental impacts of the uranium fuel cycle and transportation of nuclear fuel and wastes are described in detail in the 2024 LR GEIS (NRC 2024-TN10161: Section 4.14.1) based, in part, on the generic impacts provided in 10 CFR 51.51(b), Table S-3, "Table of Uranium Fuel Cycle Environmental Data," and in 10 CFR 51.52(c), Table S-4, "Environmental Impact of Transportation of Fuel and Waste to and from One Light-Water-Cooled Nuclear Power Reactor."

Portions of the following documents relevant to the subject area are incorporated by reference in support of the NRC staff's uranium fuel cycle and transportation significance effects determination (see Table 1-2 of this EA):

- 2006 SEIS (NRC 2006-TN7346): Section 6, Environmental Impacts of the Uranium Fuel Cycle and Solid Waste Management
- 2023 N&S Report (HDI 2023-TN10538): Section 4.11, Fuel Cycle
- 2024 LR GEIS (NRC 2024-TN10161): Section 4.14.1.1, Background on Uranium Fuel Cycle Facilities
- Holtec RAI Response (HDI 2024-TN10670): RAI-FC-1 (Description of fuel re-loading plans); RAI-TR-2 (Transportation data related to spent fuel shipments)
- Continued Storage GEIS (NRC 2014-TN4117): in its entirety
- Evaluation of Accident Tolerant Fuels (NRC 2024-TN10333) Sections: 2, Uranium Fuel Cycle; 3, Transportation

A brief summary of the material incorporated by reference along with the relevance to the current environmental review is provided in the discussion that follows.

3.13.1 Affected Environment

With respect to the uranium fuel cycle and transportation impacts, the affected environment is considered to be common to all nuclear power plants. Table S-3 of 10 CFR Part 51.51(b) and Table S-4 of 10 CFR Part 51.51(c) (TN10253) provide bounding estimates of the impacts of the uranium fuel cycle and transportation of fuel and waste to and from a reactor. NUREG-2266 (NRC 2024-TN10333) evaluated the impacts to the uranium fuel cycle for up to 10 weight percent U-235 and transportation of fuel and waste for up to 8 weight percent U-235 and burnup levels up to 80 gigawatt days (GW/d)/metric ton uranium (MTU). The analysis in NUREG-2266 demonstrates that 10 CFR Part 51 Tables S-3 and S-4 are still bounding. Although Holtec is not proposing to use accident tolerant fuels or increased enrichment or burnups as part of its requests related to resumption of operations, the staff relied on NUREG-2266 as it contains the latest analysis and also bounds Holtec's proposal. The information referenced in Holtec's N&S Report (HDI 2023-TN10538) and response to RAI-FC-1 (HDI 2024-TN10670) is consistent with

the assumptions and descriptions found in Section 4.14.1.1 of the 2024 LR GEIS (NRC 2024-TN10161) and incorporated by reference in this EA.

3.13.2 Environmental Impacts from the Preparations for Resumption of Power Operations

Holtec indicates that the operations to load fuel into the reactor would be similar to a typical refueling outage. This is because Holtec plans to continue to use fuel currently onsite along with some new fuel assemblies. This would result in up to 72 new fuel assemblies being transported to Palisades (HDI 2024-TN10670: RAI-FC-1, RAI-TR-2). Impacts from the uranium fuel cycle were analyzed in the 2006 SEIS (NRC 2006-TN7346), the 2024 LR GEIS (NRC 2024-TN10161), and the Continued Storage GEIS (NRC 2014-TN4117). Based on information in the review of Holtec's N&S Report (HDI 2023-TN10538), Holtec's responses to NRC's RAIs/RCIs (HDI 2024-TN10670: RAI-FC-1, RAI-TR-2), and public scoping (Appendix B to this EA), NRC staff have determined the proposed Federal actions would not alter impacts to the uranium fuel cycle and transportation at Palisades. Therefore, uranium fuel cycle and transportation impacts related to the activities from the preparations for resumption of power operations would be NOT SIGNIFICANT.

3.13.3 Environmental Impacts from the Resumption of Power Operations

The impacts to the uranium fuel cycle and subsequent transportation of fresh nuclear fuel and spent nuclear fuel (SNF) and radioactive waste during operation would be consistent with those described in the 2006 SEIS (NRC 2006-TN7346), the 2024 LR GEIS (NRC 2024-TN10161), and the Continued Storage GEIS (NRC 2014-TN4117), along with Evaluation of Accident Tolerant Fuels (NRC 2024-TN10333). These documents describe the impacts bounded by Table S-3 and Table S-4 of 10 CFR Part 51 and impacts of SNF at-reactor and away-from-reactor storage. The documents listed above demonstrate that continued reactor operations of nuclear power plants have had little or no environmental effects due to the uranium fuel cycle, SNF management, and transportation of fuel and waste. No additional nuclear plant-specific analysis is required unless any new and significant information is identified.

Based on the review of the N&S Report (HDI 2023-TN10538) and Holtec's responses to NRC's RAIs/RCIs (HDI 2024-TN10670, HDI 2024-TN10669), the radioactive waste management affected environment at Palisades has not changed to any significant degree nor was new or significant information identified since the 2006 SEIS (NRC 2006-TN7346). Therefore, uranium fuel cycle and the transportation of fuel and waste impacts from the resumption of reactor power operations would also be NOT SIGNIFICANT.

3.13.4 Cumulative Effects

Appendix G, Table G-1 of the EA identifies past, present, and reasonably foreseeable projects that could cumulatively contribute to the environmental impacts of the proposed Federal actions. No significant design configuration or operational changes are expected to impact these resource areas as a result of the proposed Federal actions. The facility would return to the same operational state prior to decommissioning and would have the same level of impacts. Fuel cycle impacts would occur not only at Palisades but also at other locations in the United States. In addition to fuel-cycle impacts from the proposed SMRs, this cumulative analysis also considers fuel-cycle impacts from Palisades. The fuel-cycle impact of the proposed SMRs would be similar to that of Palisades. There is one other nuclear power plant within 50 mi (80 km) of Palisades. The addition of SMRs, if pursued, would result in an increased impact, but would

remain bounded by the impacts described in 10 CFR Part 51 Tables S-3 and S-4 (TN10253). For example, a number of fuel-management improvements have been adopted by nuclear power plants to achieve higher performance and to reduce fuel and separative work (enrichment) requirements. The cumulative effects of reauthorization and subsequent operation are expected to be consistent with conditions described and analyzed in the 2006 SEIS for all nuclear power plants on the site and within 50 mi (80 km) of Palisades. Therefore, the NRC staff determined that the incremental effects of the proposed Federal actions related to uranium fuel cycle and transportation of nuclear fuel and radioactive waste when added to the effects of other past, present, and reasonably foreseeable actions would not have significant cumulative effects.

3.14 Postulated Accidents

The environmental impacts of design basis accidents and severe accidents are considered for all nuclear power plants, including Palisades. The effects of postulated accidents and consideration of severe accident mitigation alternatives (SAMAs) are discussed in Section 4.9.1.2 of the 2024 LR GEIS Volume 1 and in further detail in Appendix E in Volume 3 of the 2024 LR GEIS (NRC 2024-TN10161). A plant-specific analysis of the environmental impacts of postulated accidents, including consideration of SAMAs, was performed for Palisades in Appendix G of the 2006 SEIS (NRC 2006-TN7346). The descriptions in these sections of the 2024 LR GEIS and the 2006 SEIS are discussed below and incorporated by reference.

The impacts described in the 2024 LR GEIS (NRC 2024-TN10161) summarize the estimated impacts of nuclear power plants within the United States and indicate the environmental impacts of design basis accidents (DBAs) and the environmental impacts from the probability-weighted consequences of severe accidents are generic issues with a SMALL environmental impact. Palisades previously considered SAMAs on a site-specific basis in the 2006 SEIS. The NRC staff reviewed Palisades current site-specific information and found no new information that would change either the generic SMALL impact determinations for DBAs and severe accidents in the 2024 LR GEIS or the determination of SMALL impacts for DBAs and severe accidents in the 2006 SEIS for Palisades (HDI 2024-TN10669: RCI-A-1). Holtec confirmed there would be no changes to the design basis which would require a reevaluation of the SAMA analysis (HDI 2024-TN10669: RCI-A-1). Additionally, the NRC has stated in Table B-1 of 10 CFR Part 51 (TN10253) Appendix B, that, so long as a previous SAMA analysis has been performed, SAMAs do not warrant further plant-specific analysis because the demonstrated reductions in population dose risk and continued severe accident regulatory improvements substantially reduce the likelihood of finding cost-effective significant plant improvements.

Palisades is included in the NRC staff's generic evaluation presented in the 2024 LR GEIS (NRC 2024-TN10161), where the impacts of postulated accidents were determined to be SMALL. Estimated population dose values for Palisades are provided in Table E.3-1 of the 2024 LR GEIS. The reported values from the 2006 Palisades SEIS SAMA analysis illustrate the large reduction of the estimated population dose values from those used in the 1996 LR GEIS (NRC 1996-TN288) that resulted in the SMALL impact determination for severe accidents made generically for all plants. Holtec confirmed to NRC staff during the environmental audit that the assumptions used by the NRC staff during the generation of values in Table E.3-1 of the 2024 LR GEIS Volume 3 remain valid. There was no new and significant information regarding the NRC staff's NEPA findings for design basis or severe accidents since the staff's previous environmental analysis of these accidents for Palisades in the 2024 LR GEIS (HDI 2024-TN10669: RCI-A-1).

Holtec confirmed that the 2024 LR GEIS (NRC 2024-TN10161) generic findings for Severe Accidents and SAMAs will remain applicable to Palisades during resumption of power operations for the duration of the RFOL (HDI 2024-TN10669: RCI-A-1). The current updated model of record for internal event and internal flood risk for Palisades is $3.22 \times 10^{-5}/\text{yr}$, which is within the 2024 LR GEIS, Revision 2 Table E.3-2 SAMA CDF range of $3.9 \times 10^{-6}/\text{yr}$ to $5.6 \times 10^{-5}/\text{yr}$ for pressurized water reactors and is a reduction over values used at the time of Palisades license renewal ($4.05 \times 10^{-5}/\text{yr}$). Both internal and external events were evaluated in the 2006 Palisades SEIS.

When identifying potential NEPA cost-beneficial mitigation alternatives, the most limiting probabilistic risk assessment sequences are considered for reducing the risk. As provided in Table 5-3, "Palisades Core Damage Frequency for Internal Events," of the 2006 SEIS, the most significant initiating event was loss of offsite power (including station blackout) with a CDF of 1.24×10^{-5} Per Year (31 percent Contribution to Total internal events CDF). Also, risk estimates for both internal and external events are presented and discussed in Section G.2 of Appendix G of the 2006 SEIS. Potential SAMAs to further reduce external event risk were explored as part of the SAMA evaluation (see Sections G.2.2 and G.3.2 of the 2006 SEIS). As described in Section G.6.2, the risk associated with external events was specifically accounted for in the risk calculations that were used to support the decision regarding potentially cost-beneficial SAMAs at Palisades. Although the treatment of external events in the 2006 SEIS was limited by the unavailability of an external event probabilistic risk assessment, the NRC staff accounted for external event risk by increasing the estimated risk from internal events by a factor of 2 to account for risk from both internal and external events. Several candidate SAMAs related to seismic and fire events were considered using this conservative method which reduced the likelihood of omitting cost-beneficial enhancements or mitigation.

Furthermore, from the 2006 SEIS, the NRC evaluated the risk reduction of the eight remaining potentially cost-beneficial SAMAs that were applicable to Palisades. The SAMA evaluations were performed in a conservative fashion, where the proposed SAMA, if implemented, was assumed to completely eliminate the risk associated with the sequence. Such evaluations overestimate the benefit and therefore are conservative.

On September 9, 2019, the Mitigation of Beyond-Design-Basis Events rule (10 CFR 50.155; TN249) became effective. This rule primarily addresses mitigation strategies for a wide range of potential extreme events, including seismic events, fire, flooding, and other natural phenomena, requiring nuclear power plants to have plans in place to maintain core cooling, containment integrity, and spent fuel pool cooling even when facing events beyond their design basis, including large-scale natural disasters. If the NRC's proposed actions are approved and the 10 CFR 50.82(a)(1) certifications are withdrawn, Palisades will again be required to comply with 10 CFR 50.155 (TN249).

As a result of the NRC's ongoing safety oversight and updates to NRC regulatory requirements the overall risk of a severe accident has been reduced. Because the NRC's regulations and safety oversight have provided additional severe accident mitigation and have further reduced the risk profile of operating reactors since the Palisades SAMA analysis in the 2006 SEIS, further SAMA analyses would be unlikely to find any cost-effective significant plant improvements, as discussed in the 2024 LR GEIS (NRC 2024-TN10161).

Based on information in the review of Holtec's N&S Report (HDI 2023-TN10538), Holtec's response to the NRC's RCI (HDI 2024-TN10669: RCI-A-1), public scoping (Appendix B to this EA), and that the published impacts from postulated accidents are considered bounding, the

NRC staff have determined the proposed Federal actions would not alter the previously determined impacts from design basis accidents and severe accidents, or the previous SAMA conclusions for Palisades in the 2024 LR GEIS (NRC 2024-TN10161); and therefore the environmental impacts of postulated accidents of the proposed Federal actions would be NOT SIGNIFICANT.

3.15 Decommissioning Impact Evaluation

This section describes the environmental impacts associated with the permanent cessation of power operations and the return to decommissioning of Palisades at a future date. All operating nuclear power plants will permanently cease power operations and be decommissioned at the end of their operating life when a decision is made to cease power operations.

As discussed in Section 1 of this EA, Palisades ceased operations and removed fuel from the reactor in 2022. Prior to cessation of power generation activities and removal of all fuel, Holtec submitted a PSDAR to NRC (HDI 2020-TN10539), in accordance with 10 CFR 50.82(a)(4) (TN249), to outline the proposed decommissioning activities and describe potential associated environmental impacts. In the PSDAR submission, Holtec concluded that the environmental impacts associated with the planned Palisades site-specific decommissioning activities would be bounded by appropriate, previously issued environmental impact statements, including:

- Decommissioning GEIS (NRC 2002-TN7254)
- 2006 SEIS (NRC 2006-TN7346)
- 2013 LR GEIS (NRC 2013-TN2654)

The impacts of decommissioning nuclear power plants are evaluated in the Decommissioning GEIS. In the 2006 SEIS, the NRC staff concluded that there were no new and significant impacts beyond those discussed in the 1996 LR GEIS—in the 1996 LR GEIS, the NRC concluded that impacts of license renewal on terminating reactor operations and decommissioning were small for all nuclear plants. Since the 2006 SEIS, the impacts of license renewal on terminating reactor operations and decommissioning were considered to be small for all nuclear plants in the 2013 LR GEIS. Additionally, in the 2024 LR GEIS (NRC 2024-TN10161) the NRC, after review, considered decommissioning impacts to be small for all nuclear plants.

Sections 7.0 through 7.2 of the 2006 SEIS (NRC 2006-TN7346), incorporated by reference, evaluated the impacts of decommissioning with the license renewal term ending in 2031, for the Palisades RFOL (NRC 2007-TN11052). If reauthorization of power operations occurs as a result of the proposed Federal actions, the licensed term of operation would also end in 2031. Based on information in the review of Holtec's N&S Report (HDI 2023-TN10538), the 2013 LR GEIS (NRC 2013-TN2654) and the 2024 LR GEIS (NRC 2024-TN10161), the NRC staff have determined the proposed Federal actions would not alter the previously determined impacts from decommissioning in the 2006 SEIS (NRC 2006-TN7346); and therefore the environmental impacts of decommissioning of the proposed Federal actions would be NOT SIGNIFICANT.

4 CONCLUSIONS

This EA describes the environmental review conducted by NRC and DOE LPO staff for evaluating the environmental effects of granting the licensing and regulatory requests necessary to reauthorize power operations at Palisades through March 24, 2031, which is the end of the current operating license term under the Palisades RFOL. DOE LPO acted as a cooperating agency on this review. Procedurally, this document follows 10 CFR 51.30, “Environmental Assessment” and 10 CFR 51.31, “Determinations Based on Environmental Assessment,” which are the NRC’s regulations for preparing EAs to implement NEPA requirements (National Environmental Policy Act of 1969-TN661). Within this section of the EA, the NRC staff present conclusions and recommendations based on its environmental review. The section is organized as follows:

- Section 4.1 summarizes the environmental impacts of the proposed actions necessary to reauthorize power operations at Palisades.
- Section 4.2 compares the environmental impacts of the proposed Federal actions against reasonable alternatives identified by the NRC staff.

4.1 Environmental Impacts of the Proposed Federal Actions

The proposed set of Federal actions for the reauthorization of power operations at Palisades includes an exemption request, a license transfer request and several LARs (see Section 1.1.1, Table 1-1 of this EA). The purpose and need for these proposed Federal actions are to provide an option for clean energy baseload power generation through the current licensing term of March 24, 2031 (see Section 1.2 of this EA). Section 3 of this EA evaluates the environmental impacts from activities associated with the preparations for resumption of power operations, activities associated with the resumption of reactor power operations, and cumulative effects. The NRC staff evaluated environmental impacts associated with a return to decommissioning in Section 3.15 and for climate change and GHGs in Appendix F to the EA.

As indicated in Section 3, the NRC staff conclude that the potential impacts from both the preparations for and the resumption of power operations, and from the return to decommissioning at a future time at Palisades would be NOT SIGNIFICANT for each potentially affected environmental resource area. Additionally, there were no significant cumulative effects identified. The NRC staff based its conclusions on an independent review of information provided in Holtec’s licensing submittals, as well as other relevant information and sources. Section 1.3.5 and Table 1-2 of this EA provide a summary of the most important sources for the review. Table 4-1 of this EA summarizes the environmental impacts and the NRC staff’s conclusions for each resource considered.

Table 4-1 Summary of Environmental Impacts from the Preparations for Resumption of Power Operations and Resumption of Power Operations on Palisades Nuclear Plant

Resource Area	EA Section	Summary of Impact	Significance Level
Land Use and Visual	3.2	The Palisades site remains 432 ac of industrial zoned property. No land use or visual resources would be significantly impacted as a result of the activities associated with the preparation for the resumption of reactor operations or reactor operations as there are no activities occurring which have the potential to significantly impact these resources.	NOT SIGNIFICANT
Meteorology and Air Quality	3.3	Air emissions of criteria pollutants would be below 100 TPY, and hazardous air pollutants would be below 10 TPY individually and 25 TPY combined. Emissions would comply with non-Title V permitting requirements. Standard control measures would mitigate fugitive dust releases. Minimal criteria pollutant emissions would occur during the preparations for the resumption of power operations.	NOT SIGNIFICANT
Surface Water	3.4	Palisades uses water from Lake Michigan and from the South Haven Municipal Water Authority. BMPs would be employed for soil erosion and sediment control. There is little expected water need for dust suppression. Stormwater, wastewater and treated water are regulated through NPDES permit no. MI0001457 and Storm Water Management Industrial Site Certification I-18257. Total water withdrawal from Lake Michigan is insignificant to the total volume of the lake itself, and since Palisades' water is treated and returned to Lake Michigan, there is no significant consumptive water use or impact on water quality. Potable and sanitary water use will be similar during the resumption of operations as with past operations on Palisades.	NOT SIGNIFICANT

Table 4-1 Summary of Environmental Impacts from the Preparations for Resumption of Power Operations and Resumption of Power Operations on Palisades Nuclear Plant (Continued)

Resource Area	EA Section	Summary of Impact	Significance Level
Geologic Environment and Groundwater Resources	3.5	<p>Preparations for resumption of power operations activities would occur only in previously disturbed areas on the Palisades site, reducing the impact to soil resources, as there are no known geologic resources in the vicinity of Palisades.</p> <p>Construction activities associated with the preparations for the resumption of operations will occur under State and Federal regulations and will be implemented using the “as low as reasonably achievable” program for individual radiation protection. Palisades monitors 39 groundwater wells that are sampled quarterly for gamma activity and tritium. Monitoring well data indicate that tritium releases have impacted onsite groundwater within the upper 10–15 ft of the aquifer. None of the surface water and drinking water samples collected as part of Palisades’ radiological environmental monitoring program contained measurable radiological materials associated with the Palisades site. Site-specific programs (e.g., SPCC-PIPP, SWPP, NPDES) and BMPs are and will continue to be utilized at the site to manage and reduce the occurrence of inadvertent releases of nonradiological contaminants.</p>	NOT SIGNIFICANT
Terrestrial and Aquatic Ecology	3.6 and 3.7	<p>Preparations for resumption of power operations activities would occur only in previously disturbed areas on the Palisades site. These areas support only sparse or ruderal vegetation. The activities are unlikely to alter wildlife use on the site. Palisades is certified under the Coastal Zone Management Act and permits are required under Michigan’s Critical Dune Act for any ground disturbance within designated critical dune areas. The NPDES permit no. MI0001457 regulates thermal discharge and chemical releases into Lake Michigan. The draft NPDES permit has determined the cooling-water intake structure meets best technology available for impingement and entrainment. Palisades uses BMPs during work activities (e.g., stormwater management, erosion, sediment control, and pesticide usage). Brief increases in noise during the preparations for resumption of power operations may affect wildlife, but area wildlife is already exposed to industrial noise. For federally listed terrestrial and aquatic species, activities associated with the preparations for the resumption of operations and the resumption of operations will either have “no</p>	NOT SIGNIFICANT

Table 4-1 Summary of Environmental Impacts from the Preparations for Resumption of Power Operations and Resumption of Power Operations on Palisades Nuclear Plant (Continued)

Resource Area	EA Section	Summary of Impact	Significance Level
		effect” on the species or “may affect, not likely to adversely affect” the species.	
Historic and Cultural Resources	3.8	Historic properties under the NHPA do not occur within the APE, and thus there will be no historic properties affected as part of the preparations for resumption of power operations, and the resumption of operations. Additionally, no historic and cultural resources have been identified within the APE. Ground disturbance will occur in areas of previous ground disturbance, and Palisades-specific procedures provide a control to monitor and protect cultural resources, if encountered on Palisades site during the resumption of power operations (and for activities occurring as part of the preparations for resumption of power operations).	NOT SIGNIFICANT
Socioeconomics	3.9	The number of workers at Palisades will peak at 1,600 during preparations for the resumption of operations (similar to the number of workers needed during refueling outages). Once operations resume, the number of workers will return to 600, similar to the number of workers at Palisades during previous operational periods. Holtec expects property tax payments to return to pre-decommissioning levels (approximately \$10 million per year) starting in 2027. Any other socioeconomic impacts would be minimal.	NOT SIGNIFICANT
Radiological and Nonradiological Human Health	3.11	The NRC staff expect radiological releases, doses to the public, and occupational doses would be less than the limits established for protection of human health and the environment in 10 CFR Part 20 and Occupational Safety and Health Administration (OSHA) regulations. There will not be any significant increased exposure to the population or occupational workers as part of the preparations for the resumption of operations and the resumption of operations. For nonradiological human health, Palisades maintains a safety program that addresses applicable OSHA standards that will be in place for preparations for resumption of power operations and resumption of power operations.	NOT SIGNIFICANT
Waste Management	3.12	Waste management is completed in accordance with facility plans and procedures and in accordance with Federal, State, and local regulations. Management of solid waste, including construction and demolition wastes, would involve waste reduction efforts, recycling, and BMPs. Liquid wastes would be discharged	NOT SIGNIFICANT

Table 4-1 Summary of Environmental Impacts from the Preparations for Resumption of Power Operations and Resumption of Power Operations on Palisades Nuclear Plant (Continued)

Resource Area	EA Section	Summary of Impact	Significance Level
		for municipal treatment at a wastewater treatment plant or trucked offsite for proper disposal. Gaseous emissions would comply with Michigan State regulations. Radioactive effluents would comply with 10 CFR Part 20 Appendix B.	
Uranium Fuel Cycle and Transportation	3.13	A low quantity of uranium would be used during the 7-year operational period (resumption of operations). Fuel processes are bounded by Table S-3 and S-4 of 10 CFR 51.51. Environmental impacts from storage of spent fuel would be less than the environmental impact described by the Continued Storage GEIS. The estimated volume of LLRW is less than or comparable to that of other reactors, and the NRC staff determined that there is adequate capacity for LLRW disposal. The on-site storage of spent fuel would have to meet the same regulatory requirements as currently licensed reactors and the currently stored spent fuel at Palisades. Transportation of fresh fuel to Palisades, and transportation of LLRW from Palisades, would be performed in compliance with DOT and NRC regulations and constitute only a small percentage of the total materials of these types shipped each year.	NOT SIGNIFICANT
Postulated Accidents	3.14	NRC staff completed an independent review of the consequences of accidents which are documented in the 2024 LR GEIS. Review of Palisades-specific information in the 2024 LR GEIS, which is relevant for these proposed Federal actions, indicates that there is no new and significant information that would alter the staff's previous impact determinations for the probability-weighted consequences of severe accidents and design basis accidents, or the previous consideration of severe accident mitigation alternatives. Palisades is undergoing a separate NRC Office of Nuclear Reactor Regulation safety review.	NOT SIGNIFICANT

APE = area of potential effect; BMP = best management practice(s); CFR = *Code of Federal Regulations*, DOT = U.S. Department of Transportation; EA = environmental assessment; GEIS = generic environmental impact statement; LLRW = low-level radioactive waste; LR = license renewal; NPDES = National Pollutant Discharge Elimination System; NRC = U.S. Nuclear Regulatory Commission; OSHA = Occupational Safety and Health Administration; TPY = ton(s) per year

4.2 Comparison of Alternatives

In Section 2.2 of this EA, the NRC staff considered possible alternatives to the proposed Federal actions to reauthorize power operations at Palisades. Only one alternative was carried forward for further analysis, the no-action alternative. The NRC staff independently reviewed information concerning other possible alternatives and determined that none were reasonable alternatives warranting further evaluation. As noted in Section 2.2.1.1 of this EA, taking no action would not meet the clean energy demand driving the purpose and need for the proposed Federal actions and could lead to a need to build new nuclear or non-nuclear power generation facilities. If Holtec were to select the no-action alternative and not build new generation facilities, any avoidance of environmental impacts resulting from not implementing the proposed action would be minimal, as indicated by the analysis of environmental impacts presented in Section 3. However, building new facilities would result in additional environmental impacts related to land disturbance and use of construction equipment. These impacts would be greater than those needed to put the already built Palisades facilities back into operation. Depending on the location or locations ultimately selected for the new facilities, the environmental impacts could potentially be SIGNIFICANT. In contrast, the potential environmental impacts from proposed Federal actions to resume operation of the existing Palisades reactor are known to be NOT SIGNIFICANT. The NRC staff have therefore determined that there are no environmentally preferable alternatives to the proposed Federal actions.

5 FINDING OF NO SIGNIFICANT IMPACT

The proposed Federal actions before the NRC are whether to grant requests for an exemption, a license transfer, and license amendments to reauthorize Palisades for power operations through the remainder of its licensing term (to March 24, 2031). The NRC staff have conducted an environmental review of these actions and prepared an EA. This FONSI incorporates by reference the EA in Sections 1 through 4 of this document. Based on its determinations in the EA that the environmental impacts of the proposed actions would be NOT SIGNIFICANT for each potentially affected resource area, the NRC staff are issuing a determination that the proposed Federal actions would not significantly affect the quality of the human environment. Therefore, the NRC staff have made a determination that preparation of an EIS is not required for the proposed Federal actions and that a FONSI is warranted.

This finding and the related environmental documents referenced throughout the EA are available for public review as discussed in the EA. At the conclusion of the NRC environmental review, DOE LPO would publish a separate Record of Decision or FONSI, as appropriate.

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APPENDIX A

LIST OF PREPARERS

Table A-1 List of Preparers

Name	Education and Experience	Function or Expertise
William Burris, NRC	MS, Environmental Management BA, Geology 32 years of relevant experience	Environmental Project Manager
Jennifer Davis, NRC	BA, Historic Preservation and Classical Civilization (Archaeology) 5 years of archaeological fieldwork; 23 years of experience in NEPA compliance, project management, cultural resources impact analysis, and National Historic Preservation Act Section 106 consultations	Historic and Cultural Resources
Elijah Dickson, NRC	PhD Health Physics Masters of Health Physics BS Health Physics 18 years of conducting radiation protection, probabilistic risk assessment, and radiological consequent analyses	Postulated Accidents
Peyton Doub, NRC	MS Plant Physiology BS Plant Sciences (Botany) Professional Wetland Scientist (PWS) Certified Environmental Professional (CEP) Duke NEPA Certificate 38 years of relevant experience	Alternatives, Terrestrial Resources, Aquatic Resources
Jerry Dozier, NRC	MS Reliability Engineering MBA Business Administration BS Mechanical Engineering 31 years of experience including operations, reliability engineering, technical reviews, and NRC branch management	Postulated Accidents
Brian Glowacki, NRC	BS Environmental Engineering 3 years of relevant experience	Meteorology and Air Quality, Climate Change, Surface Water Resources
Robert Hoffman, NRC	BS, Environmental Resource Management 35 years of experience in NEPA compliance, environmental impact assessment, alternatives identification and development, and energy facility siting	Alternatives
Caroline Hsu, NRC	BS Molecular Biology BA English Literature 13 years of government experience	Aquatic Resources

Table A-1 List of Preparers (Continued)

Name	Education and Experience	Function or Expertise
Donald Palmrose, NRC	PhD Nuclear Engineering MS Nuclear Engineering BS Nuclear Engineering 36 years of experience, including operations on U.S. Navy nuclear powered surface ships, technical and NEPA analyses, nuclear authorization basis support for U.S. Department of Energy (DOE), and NRC project management	Radiological Human Health, Radiological Waste, Postulated Accidents, Decommissioning
Mary Richmond, NRC	BA Biological Sciences MS Environmental Engineering 35+ years of relevant experience	Environmental Project Manager
Jeffrey Rikhoff, NRC	MRP Regional Environmental Planning MS Development Economics BA English 44 years of combined industry and government experience in NEPA compliance for DOE Defense Programs/NNSA and Nuclear Energy, DoD, and DOI; project management; socioeconomics, and historic and cultural resource impact assessments, consultation with American Indian Tribes, and comprehensive land use and development planning studies	Land Use and Visual Resources, Socioeconomics
Gerry Stirewalt, NRC	PhD Structural Geology Registered Professional Geologist (PG) Certified Engineering Geologist (CEG) 50+ years of experience including geologic site characterization for nuclear energy facilities and high-level nuclear waste disposal facilities, 3-D geospatial modeling of subsurface geology, tectonic faults, and contaminated groundwater plumes, environmental geology, and assessment of groundwater	Groundwater Resources and Geologic Environment
Rao Tammera, NRC	MS Chemical/Nuclear Engineering MS Environmental Engineering 50 years of relevant experience Working for consulting firm and for NRC	Nonradiological Human Health, Nonradiological Waste, Transportation
Laura Willingham, NRC	BS Environmental Sciences 18 years of relevant experience	Environmental Project Manager
Dave Anderson, PNNL	MS Forest Economics BS Forest Resources 32 years of experience in NEPA planning, national and regional economic impact modeling, and socioeconomics	Socioeconomics
Teresa Carlon, PNNL	BS Information Technology 30 years of experience as SharePoint administrator, project coordinator, and databases	Reference Coordinator

Table A-1 List of Preparers (Continued)

Name	Education and Experience	Function or Expertise
Cyler Conrad, PNNL	PhD Anthropology (Archaeology) MA Anthropology (Archaeology) BA Anthropology 13 years of relevant experience Over 10 years of experience in archaeology, cultural resource management, National Historic Preservation Act Section 106, NEPA, and project management	Project Management, Land Use and Visual Resources, Historic and Cultural Resources
Tracy Fuentes, PNNL	PhD Urban Design and Planning MS Plant Biology BS Botany Over 15 years of experience, including NEPA planning; environmental impact analysis, environmental resource monitoring, data analysis, and research	Terrestrial Resources
Saikat Ghosh, PNNL	PhD Chemical Engineering MS Environmental Engineering BE Environmental Engineering 15 years of relevant experience in air quality assessments, meteorological data analyses and dispersion modeling	Meteorology and Air Quality
Leah Hare, PNNL	MS Geographic Information Science BS Environmental Studies 10+ years of experience in environmental monitoring, regulatory compliance, project management, and environmental assessment	Deputy Project Management, Nonradiological Human Health, Nonradiological Waste
Rebecka Iveson, PNNL	MS Hydrogeology and Water Resource Management BS Earth and Environmental Science 5+ years in groundwater resource assessment and environmental impact evaluation, contaminated land risk assessment and remediation, and natural resource management and monitoring	Groundwater Resources and Geologic Environment, Climate Change
Hayley McClendon, PNNL	BS Environmental Science 8 years of experience in environmental compliance and technical document preparation and review	Reference Coordinator
Ann Miracle, PNNL	PhD Molecular Immunology MS Molecular Genetics BA Biology Over 15 years of experience in ecological impact analysis, Endangered Species Act Section 7 consultations, and Essential Fish Habitat consultations	Aquatic Resources, Terrestrial Resources
Jon Napier, PNNL	PhD Radiation Health Physics MS Health Physics BS Environmental Science Certified Health Physicist with 9 years of experience in health physics, nuclear materials inspections and licensing, and radiation safety	Radiological Human Health, Radiological Waste, Transportation, Postulated Accidents, Decommissioning

Table A-1 List of Preparers (Continued)

Name	Education and Experience	Function or Expertise
Kendall Parker, PNNL	PhD Mechanical Engineering MS Mechanical Engineering BS Mechanical Engineering 3 years in human impact analysis of energy, electricity, and the environment	Socioeconomics
Mike Parker, PNNL	BA English Literature 25 years of experience copyediting, document design, and formatting and 20 years of experience in technical editing	Production
Nati Phan, PNNL	BS Public Health MS Environmental Health 2 years of experience in GIS	GIS Mapping
Rajiv Prasad, PNNL	PhD Civil and Environmental Engineering MTech Civil Engineering; BE Civil Engineering 28 years of experience in applying hydrologic principles to water-resources engineering, hydrologic design, flooding assessments, environmental engineering, and impacts assessment including 18 years of experience in NEPA environmental assessments of surface water resources	Surface Water Resources
Kacoli Sen, PNNL	PhD Cancer Biology MS Zoology (Specialization Ecology) BS Zoology Diploma in Environmental Law Over 6 years of document editing and production experience	Production Editor
Kazi Tamaddun, PNNL	PhD Civil and Environmental Engineering MSc Civil and Environmental Engineering BSc Civil Engineering 10 years of experience in hydro-climatology, hydraulics, Earth systems modeling, environmental systems engineering, and water-energy nexus; 3 years of experience in NEPA environmental assessments of surface water resources	Surface Water Resources, Climate Change
Seema Verma, PNNL	PhD Biological Sciences MS Biosciences BS Zoology Graduate Certificate in Regulatory Sciences 2.5 years of experience in navigating Federal agency regulations including Title 10 <i>Code of Federal Regulations</i> . Assessment of human health impacts from nonradiological contaminants and etiological agents for nuclear and renewable energy	Nonradiological Human Health, Nonradiological Waste
Caitlin Wessel, PNNL	PhD Marine Science MS Coastal, Marine, and Wetland Science 12 years of relevant experience in ecology, habitat modeling, chemical analysis, physical processes, and environmental assessments	Aquatic Resources, Federally Protected Species

Table A-1 List of Preparers (Continued)

Name	Education and Experience	Function or Expertise
Lin Zeng, PNNL	PhD Environmental Science and Engineering BE Civil Engineering Over 15 years relevant experience in socioeconomic/environmental modeling and analysis, including 10 years of experience in environmental compliance and NEPA environmental impact assessment	Socioeconomics

AM or MA = Master of Arts; BA = Bachelor of Arts; BS = Bachelor of Science; DoD = U.S. Department of Defense; DOE = U.S. Department of Energy; DOI = U.S. Department of Interior; CEG = Certified Engineering Geologist; EA = environmental assessment; GIS = Geographic Information System; MBA = Master of Business Administration; MRP = Master of Regional Planning; MS = Master of Science; NEPA = National Environmental Policy Act of 1969; NNSA = National Nuclear Security Administration; NRC = U.S. Nuclear Regulatory Commission; PG = Professional Geologist; PhD = Doctor of Philosophy; PNNL = Pacific Northwest National Laboratory.

APPENDIX B

COMMENTS RECEIVED THROUGH PUBLIC SCOPING

The U.S. Nuclear Regulatory Commission (NRC or Commission) staff began the scoping process for the environmental review of the Palisades Nuclear Plant (Palisades) in June 2024. On June 27, 2024, the NRC published a Notice of Intent in the *Federal Register* to conduct an environmental scoping process to gather information to prepare an environmental assessment to evaluate environmental impacts related to reauthorizing power operations on Palisades (89 FR 53659-TN10604). In its Notice of Intent, the NRC staff requested that members of the public and stakeholders submit comments on the scope of the Palisades environmental review to the Federal Rulemaking website at [Regulations.gov](https://www.regulations.gov), by email, or postal mail.

The Palisades scoping process also included a hybrid (virtual and in-person) public meeting that was held on July 11, 2024. To advertise this public meeting, the NRC-issued press releases, posted on NRC social media and on the NRC public website, and purchased newspaper advertisements in the *Herald-Palladium*, *Michigan Live-Kalamazoo*, *Michigan Live-Grand Rapids*, *Holland Sentinel*, *Detroit News*, *Chicago Tribune*, and *Chicago Sun-Times*. In addition to the NRC staff, U.S. Department of Energy staff, local officials, and members of the public participated in the public meeting. After the NRC staff presented prepared statements on the reauthorization actions and National Environmental Policy Act process at the public meeting, the staff opened the meeting for public comments. Attendees made oral statements that were recorded and transcribed by a certified court reporter. A summary and a transcript of the public scoping meeting are available in the NRC's Agencywide Documents Access and Management System (ADAMS) under ADAMS Accession No. ML24221A033 (NRC 2024-TN10605). The ADAMS Public Electronic Reading Room is accessible at <http://www.nrc.gov/reading-rm/adams.html>.

At the conclusion of the scoping period, the NRC staff issued the Palisades Scoping Summary Report (NRC 2024-TN10773). The report contains a summary of the comments received during the scoping period grouped by subject area and significant issues of concern that are in scope and considered as part of the environmental review.

B.1 References

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APPENDIX C

APPLICABLE LAWS, REGULATIONS AND OTHER REQUIREMENTS

Several Federal laws and regulations affect environmental protection, health, safety, compliance, and consultation at every U.S. Nuclear Regulatory Commission (NRC or Commission) licensed nuclear power plant. Some of them require permits by or consultation with other Federal agencies or State, Tribal, or local governments. Certain Federal environmental requirements have been delegated to State authorities for enforcement and implementation. Furthermore, States have also enacted laws to protect public health and safety and the environment. It is the NRC's policy to make sure that nuclear power plants are operated in a manner that provides adequate protection of public health and safety and protection of the environment through compliance with applicable Federal and State laws, regulations, and other requirements, as appropriate.

The Atomic Energy Act of 1954, as amended (42 *United States Code* [U.S.C.] 2011 et seq.-TN663), and the Energy Reorganization Act of 1974, as amended (42 U.S.C. 5801 et seq.-TN4466), give the NRC the licensing and regulatory authority for commercial nuclear energy use. They allow the NRC to establish dose and concentration limits for protection of workers and the public for activities under NRC jurisdiction. The NRC implements its responsibilities under these statutes through regulations set forth in Title 10, "Energy," of the *Code of Federal Regulations*. The Atomic Energy Act of 1954, as amended, also authorizes the NRC to enter into an agreement with any State that allows the State to assume regulatory authority for certain activities (see 42 U.S.C. 2021-TN10029). Michigan State has not yet entered into an agreement with the NRC to assume regulatory responsibility over certain byproduct, source, and quantities of special nuclear materials not sufficient to form a critical mass (NRC 2022-TN10754).

Although Michigan is not an agreement State, the Michigan Department of Environment, Great Lakes, and Energy (Michigan EGLE) does maintain a network of environmental monitoring stations around each nuclear power plant site in the State. In addition, the Michigan EGLE maintains a Radiological Emergency Preparedness program to provide response capabilities to radiological accidents or emergencies at any of Michigan's commercial nuclear power plants (MEGLE 2024-TN10755).

In addition to carrying out some Federal programs, State legislatures develop their own laws. State statutes can supplement, as well as implement, Federal laws for the protection of their air, surface water, and groundwater resources. State legislation may address solid waste management programs, locally rare or endangered species, and historic and cultural resources.

The U.S. Environmental Protection Agency (EPA) has the primary responsibility to administer the Federal Water Pollution Control Act of 1972 (33 U.S.C. 1251 et seq., herein referred to as the Clean Water Act [CWA]-TN662). The National Pollutant Discharge Elimination System Program addresses water pollution by regulating the discharge of potential pollutants to waters of the United States. The EPA allows for primary enforcement and administration through State agencies if the State program is at least as stringent as the Federal program.

One important difference between Federal regulations and certain State regulations is the definition of waters regulated by the State. Certain State regulations may include underground waters, whereas the CWA only regulates surface waters. The Michigan EGLE Water Resources Division provides regulatory oversight for all public water supplies, issues permits to regulate the

discharge of industrial and municipal wastewaters—including discharges to groundwater, and monitors State water resources for water quality (MEGLE 2024-TN10756).

C.1 Federal and State Requirements

The Palisades Nuclear Plant (Palisades) is subject to various Federal and State requirements. As a convenient source of references of environmental requirements, Table C-1 below lists principal Federal and State approvals necessary for the resumption of power operations on Palisades.

Table C-1 Federal and State Requirements

Activity	Law/Regulation	Requirements
Current operating license	Atomic Energy Act, (42 U.S.C. 2011 et seq.)	The AEA, and the Energy Reorganization Act of 1974, as amended (42 U.S.C. 5801 et seq.), gives the NRC the licensing and regulatory authority for commercial nuclear energy use. They allow the NRC to establish dose and concentration limits for protection of workers and the public for activities under NRC jurisdiction. The NRC implements its responsibilities under these statutes through regulations set forth in Title 10, “Energy,” of the CFR.
Current operating license	Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11001 et seq.) (also known as “SARA Title III”)	The EPCRA, which is an amendment to the CERCLA (42 U.S.C. 9601 et seq.), establishes the requirements for Federal, State, and local governments; Tribes; and industry regarding emergency planning and “Community Right-to-Know” reporting on hazardous and toxic chemicals. The “Community Right-to-Know” provisions increase the public’s knowledge of and access to information about chemicals at individual facilities, their uses, and releases into the environment. States and communities working with facilities can use the information to improve chemical safety and protect public health and the environment. The EPCRA requires emergency planning and notice to communities and government agencies concerning the presence and release of specific chemicals. The EPA implements the EPCRA under regulations found in 40 CFR Part 355, Part 370, and Part 372.
Current operating license	National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.)	NEPA requires Federal agencies to integrate environmental values into their process by considering the environmental impacts of proposed Federal actions and reasonable alternatives to those actions. NEPA establishes policy, sets goals (in Section 101), and provides means (in Section 102) for carrying out the policy. NEPA Section 102(2) contains action-forcing provisions to ensure that Federal agencies follow the letter and spirit of the Act. For major Federal actions significantly affecting the quality of the human environment, Section 102(2)(C) of NEPA requires Federal agencies to prepare a detailed statement that includes the environmental impacts of the proposed action and other specified information.

Table C-1 Federal and State Requirements (Continued)

Activity	Law/Regulation	Requirements
Current operating license	10 CFR Part 20	Regulations in 10 CFR Part 20, "Standards for Protection Against Radiation," establish standards for protection against ionizing radiation resulting from activities conducted under licenses issued by the NRC. These regulations are issued under the AEA and the Energy Reorganization Act of 1974, as amended. The purpose of these regulations is to control the receipt, possession, use, transfer, and disposal of licensed material by any licensee in such a manner that the total dose to an individual (including doses resulting from licensed and unlicensed radioactive material and from radiation sources other than background radiation) does not exceed the standards for protection against radiation prescribed in the regulations in this part.
Current operating license	10 CFR Part 50	Regulations in 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," are NRC regulations issued under the AEA and Title II of the Energy Reorganization Act of 1974, as amended, to provide for the licensing of production and utilization facilities, including nuclear power reactors.
Current operating license	10 CFR Part 51	Regulations in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," contain the NRC's regulations that implement NEPA.
Air quality protection	Clean Air Act (42 U.S.C. 7401 et seq.)	<p>The CAA is intended to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population. The CAA establishes requirements to ensure maintenance of air quality standards and authorizes individual States to manage permits. Section 118 of the CAA requires each Federal agency with jurisdiction over properties or facilities engaged in any activity that might result in the discharge of air pollutants to comply with all Federal, State, interstate, and local requirements with regard to the control and abatement of air pollution. Section 109 of the CAA directs the EPA to set National Ambient Air Quality Standards for criteria pollutants. The EPA has identified and set National Ambient Air Quality Standards for the following criteria pollutants: particulate matter, sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, and lead. Section 111 of the CAA requires the establishment of national performance standards for new or modified stationary sources of atmospheric pollutants. Section 160 of the CAA requires that specific emission increases must be evaluated before permit approval to prevent significant deterioration of air quality.</p> <p>Section 112 requires specific standards for release of hazardous air pollutants (including radionuclides). These standards are implemented through plans developed by each State and approved by the EPA. The CAA requires sources to meet standards and obtain permits to satisfy those standards. Nuclear power plants may be required to comply with the CAA</p>

Table C-1 Federal and State Requirements (Continued)

Activity	Law/Regulation	Requirements
		Title V, Sections 501–507, for sources subject to new source performance standards or sources subject to national emission standards for hazardous air pollutants.
		The EPA regulates the emissions of air pollutants using 40 CFR Parts 50 to 99.
Air quality protection	Natural Resources and Environmental Protection, Act 451 of 1994, Section 5506(1)	After the established compliance date, any source required to obtain a Title V operating permit under Section 502(a) of the Clean Air Act may not operate unless it holds a valid permit issued by the department.
Air quality protection	Mich. Admin. Code R. 336.1211	Establishes that stationary sources meeting specific thresholds for hazardous air pollutants or regulated air contaminants, as defined by the Clean Air Act, must obtain and operate under a renewable operating permit.
Air quality protection	Natural Resources and Environmental Protection Act, Act 451 of 1994, Section 5508	Under Michigan law, sources or equipment regulated by Federal air toxics standards under Section 112 of the Clean Air Act are exempt from State requirements for best available control technology for toxics or hazardous air pollutants.
Air quality protection	Mich. Admin. Code R. 336.1818	Emission limitations for stationary internal combustion engines.
Nonradiological human health	Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.)	The Occupational Safety and Health Act establishes standards to enhance safe and healthy working conditions in places of employment throughout the United States. The Act is administered and enforced by the Occupational Safety and Health Administration (OSHA), a U.S. Department of Labor agency. Employers who fail to comply with OSHA standards can be penalized by the Federal government. The Act allows States to develop and enforce OSHA standards if such programs have been approved by the U.S. Secretary of Labor.
Nonradiological human health	Noise Control Act of 1972 (42 U.S.C. 4901 et seq.)	The Noise Control Act delegates the responsibility of noise control to State and local governments. Commercial facilities are required to comply with Federal, State, inter-State, and local requirements regarding noise control. Section 4 of the Noise Control Act directs Federal agencies to carry out programs in their jurisdictions “to the fullest extent consistent with their authority” and in a manner that furthers a national policy of promoting an environment free from noise that jeopardizes health and welfare.
Water-resources protection	Clean Water Act, (33 U.S.C. 1251 et seq., and the NPDES [40 CFR Part 122])	The CWA was enacted to restore and maintain the chemical, physical, and biological integrity of the Nation’s water. The CWA requires all branches of the Federal government with jurisdiction over properties or facilities engaged in any activity that might result in a discharge or runoff of pollutants to surface waters to comply with Federal, State, inter-State, and local requirements. As authorized by the CWA, the NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The NPDES program requires all facilities that

Table C-1 Federal and State Requirements (Continued)

Activity	Law/Regulation	Requirements
		<p>discharge pollutants from any point source into waters of the United States to obtain an NPDES permit. A nuclear power plant may also participate in the NPDES General Permit for Industrial Stormwater due to stormwater runoff from industrial or commercial facilities to waters of the United States. The EPA is authorized under the CWA to directly implement the NPDES program; however, the EPA has authorized many States to implement all or parts of the national program.</p> <p>Section 401 of the CWA requires that an applicant for a Federal license or permit to conduct any activity that may result in any discharge into navigable waters must provide the Federal licensing or permitting agency with a certification (or waiver) from the State or appropriate water pollution control agency in which the discharge originates or will originate. This water quality certification implies that discharges from the activity or project to be licensed or permitted will comply with all limitations necessary to meet established State water quality requirements (40 CFR Part 121).</p> <p>The U.S. Army Corps of Engineers is the lead agency for enforcement of CWA wetland requirements (33 CFR Part 320). Under Section 401 of the CWA, the EPA or a delegated State agency has the authority to review and approve, condition, or deny all permits or licenses that might result in a discharge to waters of the State, including wetlands.</p>
Water-resources protection	Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451 et seq.)	Congress enacted the CZMA in 1972 to address the increasing pressures of overdevelopment upon the Nation's coastal resources. The National Oceanic and Atmospheric Administration administers the CZMA. The CZMA encourages States to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife using those habitats. Participation by States is voluntary. To encourage States to participate, the CZMA makes Federal financial assistance available to any coastal State or territory, including those on the Great Lakes, as long as the State or territory is willing to develop and implement a comprehensive coastal management program.
Water-resources protection	Michigan Act 451, Public Acts of 1994 (as amended), Parts 31 and 41; Michigan Executive Orders 1991-31, 1995-4, and 1995-18	These Michigan laws and executive orders are related to implementation of the Clean Water Act requirements within the State.

Table C-1 Federal and State Requirements (Continued)

Activity	Law/Regulation	Requirements
Water-resources protection	Michigan Administrative Code, R 323.1050 of the Part 4 Rules promulgated pursuant to Part 31 of Michigan Act 451, Public Acts of 1994 (as amended)	This rule specifies physical characteristics for surface waters of the State to protect designated use of the waters. Storm Water Management Industrial Site Certification is issued for proper management of the stormwater runoff and inspection program at industrial sites.
Water-resources protection	Safe Drinking Water Act of 1974 (42 U.S.C. 300(f) et seq.)	The SDWA was enacted to protect the quality of public water supplies and sources of drinking water and establishes minimum national standards for public water supply systems in the form of maximum contaminant levels for pollutants, including radionuclides. Other programs established by the SDWA include the Sole Source Aquifer Program, the Wellhead Protection Program, and the Underground Injection Control Program. In addition, the SDWA protects underground sources of drinking water from releases and spills of contaminants.
Water-resources protection	Rivers and Harbors Act of 1899, Section 10 (33 U.S.C. 401 et seq.)	The Rivers and Harbors Act of 1899 (33 U.S.C. 401 et seq.) requires USACE authorization in order to protect navigable waters during the development of harbors and other construction and excavation. Section 10 of the Act prohibits the unauthorized obstruction or alteration of any navigable water of the United States. That section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters is unlawful unless the work has been recommended by the USACE Chief of Engineers and authorized by the Secretary of the Army through the USACE. Activities requiring Section 10 permits include structures (e.g., piers, wharves, breakwaters, bulkheads, jetties, weirs, transmission lines) and work such as dredging or disposal of dredged material, or excavation, filling, or other modifications to the navigable waters of the United States.
Water-resources protection	Wild and Scenic Rivers Act, (16 U.S.C. 1271 et seq.)	The Wild and Scenic Rivers Act created the National Wild and Scenic Rivers System that was established to protect the environmental values of free-flowing streams from degradation by impacting activities, including water-resources projects.
Waste management and pollution prevention	Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq.)	The Resource Conservation and Recovery Act requires the EPA to define and identify hazardous waste; establish standards for its transportation, treatment, storage, and disposal; and require permits for persons engaged in hazardous waste activities. Section 3006, "Authorized State Hazardous Waste Programs" (42 U.S.C. 6926), allows States to establish and administer these permit programs with EPA approval. EPA regulations implementing the Resource Conservation and Recovery Act are found in 40 CFR Parts 260 through 283. Regulations imposed on a generator or on a treatment, storage, and/or disposal facility vary according to the type and quantity of material or waste generated, treated,

Table C-1 Federal and State Requirements (Continued)

Activity	Law/Regulation	Requirements
		stored, and/or disposed. The method of treatment, storage, and/or disposal also impacts the extent and complexity of the requirements.
Waste management and pollution prevention	Pollution Prevention Act (42 U.S.C. 13101 et seq.)	The Pollution Prevention Act establishes a national policy for waste management and pollution control that focuses first on source reduction, then on environmental issues, safe recycling, treatment, and disposal.
Waste management and pollution prevention	Nuclear Waste Policy Act of 1982 (42 U.S.C. 10101 et seq.)	The Nuclear Waste Policy Act provides for the research and development of repositories for the disposal of high-level radioactive waste, spent nuclear fuel, and low-level radioactive waste. Title I includes the provisions for the disposal and storage of high-level radioactive waste and spent nuclear fuel. Subtitle A of Title I delineates the requirements for site characterization and construction of the repository and the participation of States and other local governments in the selection process. Subtitles B, C, and D of Title I deal with the specific issues for interim storage, monitored retrievable storage, and low-level radioactive waste.
Waste management and pollution prevention	Low-Level Radioactive Waste Policy Act of 1980, as amended (42 U.S.C. 2021b et seq.)	The Low-Level Radioactive Waste Policy Act amended the AEA to improve the procedures for implementation of compacts that provide for the establishment and operation of regional low-level radioactive waste disposal facilities. It also allows Congress to grant consent for certain interstate compacts. The amended Act sets forth the responsibilities for disposal of low-level waste by States or inter-State compacts. The Act states the amount of waste that certain low-level waste recipients can receive over a set time period. The amount of low-level radioactive waste generated by both pressurized and boiling water reactor types is allocated over a transition period until a local waste facility becomes operational.
Waste management and pollution prevention	Hazardous Materials Transportation Act, as amended (49 U.S.C. 5101 et seq.)	The Hazardous Materials Transportation Act regulates the transportation of hazardous material (including radioactive material) in and between States. According to the Act, States may regulate the transport of hazardous material as long as their regulation is consistent with provisions of the Act or U.S. Department of Transportation regulations provided in 49 CFR Parts 171 through 177. Other regulations regarding packaging for transportation of radionuclides are contained in 49 CFR Part 173, Subpart I.
Waste management and pollution prevention	Toxic Substances Control Act (15 U.S.C. 2601 et seq.)	The TSCA regulates the manufacture, processing, distribution, and use of certain chemicals not regulated by Resource Conservation and Recovery Act or other statutes, including asbestos-containing material and polychlorinated biphenyls. Any TSCA-regulated waste removed from structures (e.g., polychlorinated biphenyls-contaminated capacitors or asbestos) or discovered during the implementation phase (e.g., contaminated media) would be managed in compliance with TSCA requirements in 40 CFR Part 761.
Uranium Fuel Cycle	Environmental Standards for	These regulations establish maximum doses to the body or organs of members of the public because of normal

Table C-1 Federal and State Requirements (Continued)

Activity	Law/Regulation	Requirements
	Uranium Fuel Cycle (40 CFR Part 190, Subpart B)	operational releases from uranium fuel cycle activities, including uranium enrichment. These regulations were promulgated by the EPA under the authority of the AEA, as amended, and have been incorporated by reference in the NRC regulations in 10 CFR 20.1301(e).
Protected species	Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d et seq.)	The Bald and Golden Eagle Protection Act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald or golden eagles, including their parts (including feathers), nests, or eggs. The Act defines “take” as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. Regulations further define “disturb” as to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.
Protected species	Endangered Species Act (16 U.S.C. 1531 et seq.)	The Endangered Species Act was enacted to prevent the further decline of endangered and threatened species and to restore those species and their critical habitats. Section 7, “Interagency Cooperation,” of the Act requires Federal agencies to consult with the FWS or the NMFS on Federal actions that may affect listed species or designated critical habitats.
Protected species	Fish and Wildlife Coordination Act of 1934, as amended (16 U.S.C. 661–666e)	The Fish and Wildlife Coordination Act requires Federal agencies that construct, license, or permit water resource development projects to consult with the FWS (or NMFS, when applicable) and State wildlife resource agencies for any project that involves an impoundment of more than 10 ac, diversion, channel deepening, or other water body modification regarding the impacts of that action on fish and wildlife and any mitigative measures to reduce adverse impacts.
Protected species	Federal Insecticide, Fungicide, and Rodenticide Act, as amended (7 U.S.C. 136 et seq.)	The Federal Insecticide, Fungicide, and Rodenticide Act, as amended, by the Federal Environmental Pesticide Control Act and subsequent amendments, requires the registration of all new pesticides with the EPA before they are used in the United States.
Protected species	Fish and Wildlife Conservation Act of 1980 (16 U.S.C. 2901 et seq.)	The Fish and Wildlife Conservation Act provides Federal technical and financial assistance to States for the development of conservation plans and programs for nongame fish and wildlife. The Fish and Wildlife Conservation Act conservation plans identify significant problems that may adversely affect nongame fish and wildlife species and their habitats and appropriate conservation actions to protect the identified species. The Act also encourages Federal agencies to conserve and promote the conservation of nongame fish and wildlife and their habitats.
Protected species	Magnuson–Stevens Fishery Conservation and	The Magnuson–Stevens Fishery Conservation and Management Act governs marine fisheries management in Federal waters of the United States. The Act created eight

Table C-1 Federal and State Requirements (Continued)

Activity	Law/Regulation	Requirements
	Management Act, as amended by the Sustainable Fisheries Act of 1996 (16 U.S.C. 1801 et seq.)	regional Fishery Management Councils and includes measures to rebuild overfished fisheries, protect essential fish habitat, and reduce bycatch. Under Section 305 of the Act, Federal agencies are required to consult with the NMFS for any Federal actions that may adversely affect essential fish habitat.
Protected species	Migratory Bird Treaty Act, (16 U.S.C. 703-712 et seq.)	The MBTA implements four international conservation treaties that the U.S. entered with Canada (1916), Mexico (1936), Japan (1972), and Russia (1976). The MBTA has been amended with the signing of each treaty, as well as when any of the treaties were subsequently amended. To ensure that populations of all protected migratory birds are sustained, the MBTA prohibits the take of protected migratory bird species without prior authorization from FWS. Under the MBTA, “take” includes killing, capturing, selling, trading, and transport of protected migratory bird species.
Protected species	National Marine Sanctuaries Act of 1966, as amended (16 U.S.C. 1431 et seq.)	The NMSA establishes provisions for the designation and protection of marine areas that have special national significance. The NMSA authorizes the Secretary of Commerce to designate national marine sanctuaries and establish the National Marine Sanctuary System. Pursuant to Section 304(d) of the NMSA, Federal agencies must consult with the National Oceanic and Atmospheric Administration’s Office of National Marine Sanctuaries when their proposed actions are likely to destroy, cause the loss of, or injure a sanctuary resource.
Protected species	Marine Mammal Protection Act of 1972 (16 U.S.C. 1361 et seq.)	The Marine Mammal Protection Act was enacted to protect and manage marine mammals and to prevent marine mammal populations from declining beyond the point where they ceased to be significant functioning elements of the ecosystems of which they are a part. The primary authority for implementing the Act belongs to the FWS and the NMFS. The FWS manages walruses, polar bears, sea otters, dugongs, marine otters, and the West Indian, Amazonian, and West African manatees. The NMFS manages whales, porpoises, seals, and sea lions. The two agencies may issue permits under Section 104 (16 U.S.C. 1374) to persons, including Federal agencies, that authorize the taking or importing of specific species of marine mammals. After the Secretary of the Interior or the Secretary of Commerce approves a State’s program, the State can take responsibility for managing one or more marine mammals. The Act also established a Marine Mammal Commission whose duties include reviewing laws and international conventions related to marine mammals, studying the condition of these mammals, and recommending steps to Federal officials (e.g., listing a species as endangered) that should be taken to protect marine mammals. Federal agencies are directed by Section 205 (16 U.S.C. 1405) to cooperate with the Commission by permitting it to use their facilities or services.

Table C-1 Federal and State Requirements (Continued)

Activity	Law/Regulation	Requirements
Protected Habitat	Sand Dunes Protection and Management (Part 353 of the Natural Resources and Environmental Protection Act)	To protect sand dunes along the shores of Lake Michigan and Lake Superior, Michigan designated approximately 74,000 ac of dunes as CDAs. Certain activities within CDAs require a permit from Michigan EGLE, including those that change dune contours, or propose new industrial or commercial uses. For shoreline activities within CDAs, applicants should submit a Michigan EGLE/USACE joint permit application.
Historic preservation and cultural resources	National Historic Preservation Act, 54 U.S.C. 300101 et seq.	The National Historic Preservation Act was enacted to create a national historic preservation program, including the National Register of Historic Places and the Advisory Council on Historic Preservation. Section 106 of the Act requires Federal agencies to consider the effects of their undertakings on historic properties. The Advisory Council on Historic Preservation regulations implementing Section 106 of the Act are found in 36 CFR Part 800, "Protection of Historic Properties." The regulations call for public involvement in the Section 106 consultation process, including involvement from Indian Tribes and other interested members of the public, as applicable.

AEA = Atomic Energy Act; CAA = Clean Air Act; CDA = critical dune areas; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = *Code of Federal Regulations*; CWA = Clean Water Act; CZMA = Coastal Zone Management Act; EPA = U.S. Environmental Protection Agency; ERA = Energy Reorganization Act; EPCRA = Emergency Planning and Community Right-to-Know Act; FWS = U.S. Fish and Wildlife Service; Michigan EGLE = Michigan Department of Environment, Great Lakes, and Energy; NAAQS = National Ambient Air Quality Standards; NEPA = National Environmental Policy Act; NMFS = National Marine Fisheries Service; NMSA = National Marine Sanctuaries Act; NPDES = National Pollutant Discharge Elimination System; NRC = U.S. Nuclear Regulatory Commission; OSHA = Occupational Safety and Health Act; SDWA = Safe Drinking Water Act of 1974; TSCA = Toxic Substances Control Act; USACE = United States Army Corp of Engineers; U.S.C. = *United States Code*.

C.2 Operating Permits and Other Requirements

Table C-2 below lists the permits and licenses issued by Federal, State, and local authorities for activities at Palisades, as identified in the response to requests for additional information (HDI 2024-TN10670: RAI-GEN-3, RAI-AE-4).

Table C-2 Operating Permits and Other Requirements for Resumption of Activities at Palisades Nuclear Plant

Permit	Responsible Agency	Number	Expiration Date	Authorized Activity
Renewed Facility Operating License	NRC	DPR-20	03/24/2031	Operation of Palisades ^(a)
NPDES permit	Michigan EGLE	MI0001457	10/01/2018 Extended; under review ^(b)	Discharge into water of the United States

Table C-2 Operating Permits and Other Requirements for Resumption of Activities at Palisades Nuclear Plant (Continued)

Permit	Responsible Agency	Number	Expiration Date	Authorized Activity
Clean Water Act (CWA) Section 401 Water Quality Certification with Condition:	State of Michigan U.S. EPA, Region V	n/a	n/a	Compliance with Section 401 of the CWA. Discharge into waters of the United States under the Michigan NPDES permit ^(c)
Coastal Zone Management Act	State of Michigan	n/a	03/24/2031	Operations are consistent with Michigan coastal zone policies
Registration	U.S. DOT	051122600031EG	06/30/2025	Hazardous material shipment
License to ship radioactive material	TDEC	T-MI003-L25	12/31/2025 Renewed annually	Shipment of radioactive material to a licensed disposal/ processing facility in Tennessee
Hazardous waste generator license	Michigan EGLE	MID098644685	n/a	Authorizes facility to operate as a hazardous waste generator
Storm Water Management Industrial Site Certification	Michigan EGLE	I-18257	07/01/2026	Management of the industrial sites' storm water runoff and storm water inspection program
Renewable operating permit (air quality)	Michigan EGLE	MI-ROP-B2934-2019a	02/04/2024 ^(d) Under timely renewal	Operation of air emission sources
Waste treatment plant operator certification	Michigan EGLE	W 7992 W 8468 W 8469 W 8470 W 8471	07/01/2025 07/01/2028 07/01/2028 07/01/2028 07/01/2028	Operate industrial or commercial waste treatment facility
Dredging permit	Michigan EGLE	WRP020704 v1.0	04/16/2025 ^(e)	Maintain dredging of sand along security infrastructure and stormwater outfall structures
Critical Dune Area Permit	Michigan EGLE	WRP043992 v1	02/13/2030	To conduct ground-disturbing activities in critical dune areas ^(f,g)
Agreement	Texas LLRW Disposal Compact Commission	TLLRWDCC #2-0397-00/ #2-0398-00	08/31/2025 Renewed annually	Agreement for the importation of nonparty LLRW
Above ground storage tank registration	Bureau of Fire Service	Facility ID: 91084220	Registration and yearly fee. ASTs listed as registered with Michigan EGLE	Registration of three diesel ASTs

Table C-2 Operating Permits and Other Requirements for Resumption of Activities at Palisades Nuclear Plant (Continued)

Permit	Responsible Agency	Number	Expiration Date	Authorized Activity
Scientific collector's permit	Michigan DNR-Fisheries Division	FSCP0107202213 0824	12/31/2025 Renewed annually	Authorization to survey, handle, take, catch, kill and/or possess fish species not listed in Michigan as special concern, threatened, or endangered

AST = above ground storage tank; CCR = California Code of Regulations; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980; CFR = *Code of Federal Regulations*; CWA = Clean Water Act; DNR = Department of Natural Resources; DOT = U.S. Department of Transportation; EPA = U.S. Environmental Protection Agency; LLRW = low-level radioactive waste; MBTA = Migratory Bird Treaty Act; Michigan EGLE = Michigan Department of Environmental, Great Lakes, and Energy; MPCA = Minnesota Pollution Control Agency; n/a = not applicable; NEPA = National Environmental Policy Act; NMFS = National Marine Fisheries Service; NPDES = National Pollutant Discharge Elimination System; NRC = U.S. Nuclear Regulatory Commission; Palisades = Palisades Nuclear Plant; SDWA = Safe Drinking Water Act; TDEC = Tennessee Department of Environment and Conservation; U.S. = United States.

- (a) Currently, the Renewed Facility Operating License at Palisades exists but only allows authorization for decommissioning and associated activities, not for power operations or fueling of the reactor.
- (b) Holtec has applied for NPDES permit renewal with Michigan EGLE (MEGLE 2023-TN10739). The discharge of wastewater discharge from Palisades is authorized under NPDES permit no. MI0001457, currently extended by Michigan EGLE (MEGLE 2025-TN11933; MDEQ 2014-TN10665).
- (c) In a letter dated May 5, 2025 (MEGLE 2025-TN11933), Michigan EGLE determined, with condition, that no adverse impacts to receiving water quality are anticipated from the resumption of power operations at the Plant, as described in the Section 401 Water Quality Certification request submitted by Holtec on December 17, 2024, and completed on December 18, 2024. Michigan EGLE's determination is contingent on the basis that all required EGLE permits are issued and complied with by Holtec and the condition that any discharge of wastewater from Palisades to Lake Michigan, or any other navigable waters, shall be authorized under the Palisades' NPDES permit. On May 5, 2025, the NRC provided notification to the U.S. EPA Region V of the NRC's Federal actions and the Michigan EGLE's determination. The EPA responded on May 8, 2025, and notified the NRC that it has decided to not make a "may affect" finding (EPA 2025-TN11930).
- (d) Holtec has applied for a renewal of their Michigan EGLE Air Quality Division MI-ROP-B2934-2019a permit. Holtec is operating under a permit shield as the Michigan EGLE Air Quality Division finalizes their permit renewal.
- (e) Michigan EGLE is currently working with Palisades on processing an application for reauthorization of the previously permitted activities (under a new permit number).
- (f) Michigan EGLE certifies that the activities authorized under this permit are in compliance with the State Coastal Zone Management Program and certifies without conditions under the Federal Clean Water Act, Section 401 (TN662) that the discharge from the activities authorized under this permit will comply with Michigan State's water quality requirements in Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act (Michigan Compiled Law § 31-TN11924) and associated administrative rules, where applicable.
- (g) At Palisades, the permitted activities include excavation of approximately 338 cubic yards (yd³) of material from 0.37 ac of critical dune area to install new electrical utility line connecting the main facility to the cooling towers.

C.3 References

42 U.S.C. § 2021 *et seq.* U.S. Code Title 42, Public Health and Welfare, Section 2021, "Cooperation with States." TN10029.

Atomic Energy Act of 1954. 42 U.S.C. § 2011 *et seq.* Public Law 112-239, as amended. TN663.

Energy Reorganization Act of 1974, as amended. 42 U.S.C. § 5801 *et seq.* TN4466.

EPA (U.S. Environmental Protection Agency). 2025. Email from A. McDavid, Life Scientist, U.S. EPA Region 5, Wetlands and Watersheds Branch, to M. Richmond, Environmental Project Manager, U.S. Nuclear Regulatory Commission, Office of Nuclear Materials Safety and Safeguards (NMSS), Division of Rulemaking, Environmental, and Financial Support (REFS), Environmental Project Management Branch 3 (EPMB3), dated May 8, 2025, regarding “[External_Sender] RE: Clean Water Act (CWA) Section 401 Water Quality Certification with Condition: Palisades Nuclear Power Plant’s Renewed Facility Operating License No. DPR-20, Covert Township, Van Buren County, Michigan.” Chicago, Illinois. ADAMS Accession No. ML25132A241. TN11930.

Federal Water Pollution Control Act of 1972 (commonly referred to as the Clean Water Act). 33 U.S.C. § 1251 *et seq.* TN662.

HDI (Holtec Decommissioning International, LLC). 2024. Letter from J.A. Fleming, Vice President of Licensing and Regulatory Affairs, Holtec International, to NRC Document Control Desk, dated October 4, 2024, regarding “Response to Requests for Additional Information Regarding the Proposed Reauthorization of Power Operations of Palisades Nuclear Plant under Renewed Facility Operating License Number DPR-20.” HDI PNP 2024-037, Covert, Michigan. ADAMS Accession No. ML24278A027. TN10670.

MDEQ (State of Michigan Department of Environmental Quality). 2014. *State of Michigan Department of Environmental Quality, Permit No. MI0001457, Authorization to Discharge Under the National Pollutant Discharge Elimination System*. Lansing, Michigan. TN10665.

MEGLE (Michigan Department of Environment, Great Lakes, and Energy). 2023. *State of Michigan Department of Environment, Great Lakes, and Energy, Draft Permit No. MI0001457, Authorization to Discharge Under the National Pollutant Discharge Elimination System*. Lansing, Michigan. TN10739.

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MEGLE (Michigan Department of Environment, Great Lakes, and Energy). 2024. “Water Resources Division.” Lansing, Michigan. Accessed September 19, 2024, at <https://www.michigan.gov/egle/about/organization/water-resources>. TN10756.

MEGLE (Michigan Department of Environment, Great Lakes, and Energy). 2025. Email from J. Allison, Secretary, Water Quality and Aquatic Nuisance Control Permits Unit, Water Resources Division, to J. Britting, Holtec Decommissioning International, LLC, dated May 12, 2025, regarding “[External_Sender] Palisades 401 Certification Letter.” Lansing, Michigan. ADAMS Accession No. ML25132A244. TN11933.

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NRC (U.S. Nuclear Regulatory Commission). 2022. “Michigan: Non-Agreement State Information.” Washington, D.C. Accessed September 19, 2024, at <https://www.nrc.gov/agreement-states/michigan.html>. TN10754.

APPENDIX D

AGENCIES, ORGANIZATIONS, INDIAN TRIBES, AND INDIVIDUALS CONTACTED

The U.S. Nuclear Regulatory Commission (NRC or Commission) contacted Federal, State, Tribal, regional, and local agencies listed in Table D-1 below during the NRC staff's environmental review of the Palisades Nuclear Plant (Palisades) environmental assessment. This list excludes the U.S. Department of Energy, Loan Programs Office since they are a cooperating agency.

Table D-1 List of Agencies, Organizations, Indian Tribes, and Persons Contacted by NRC during the Environmental Review of the Draft Palisades Nuclear Plant Environmental Assessment

Name	Affiliation	Contact Information
Jaime Loichinger	Advisory Council on Historic Preservation	401 F Street NW, Suite 308, Washington, DC 20001
Chairman Robert Blanchard	Bad River Band of the Lake Superior Tribe of Chippewa Indians	P.O. Box 39, Odanah, Wisconsin 54861
President Whitney Gravelle	Bay Mills Indian Community	12140 West Lakeshore Drive, Brimley, Michigan 49715
Rev. Edward Pinkney	Benton Harbor Community Water Council	275 Pipestone St, Benton Harbor, Michigan 49022
Lisa Cripps-Downey	Berrien Community Foundation	2900 S State St # 2E, St. Joseph, Michigan 49085
Chairwoman Catherine J. Chavers	Bois Forte Band (Nett Lake) of the Minnesota Chippewa Tribe	5344 Lakeshore Drive, Nett Lake, Minnesota 55772
Chairman Bruce Hamlin	Burt Lake Band	P.O. Box 206 3062 Indian Road, Brutus, Michigan 49716
Chairman Harlan Baker	Chippewa Cree Indians of the Rocky Boy's Reservation of Montana	96 Clinic Road, Box Elder, Montana 59521
Chairman John Barret	Citizen Potawatomi Nation	1601 South Gordon Cooper Drive, Shawnee, Oklahoma 74801
Alex Little	City of Benton Harbor	200 E Wall St, Benton Harbor, Michigan 49022
Mayor Annie Brown, Richie Garcia	City of South Haven	539 Phoenix Street, South Haven, Michigan 49090
Christina Frank	Cornerstone Alliance	80 W Main St, Benton Harbor, Michigan 49022
Daywi Cook	Covert Township	73943 Lake St, Covert, Michigan 49043
Chairman Kevin DuPuis Sr.	Fond du Lac Band of Lake Superior Chippewa Indians	1720 Big Lake Road, Cloquet, Minnesota 55720
Chairman James A. Crawford	Forest County Potawatomi	P.O. Box 340, Crandon, Wisconsin 54520

Table D-1 List of Agencies, Organizations, Indian Tribes, and Persons Contacted by NRC during the Environmental Review of the Draft Palisades Nuclear Plant Environmental Assessment (Continued)

Name	Affiliation	Contact Information
Nancy Ann Whaley	Geneva Township	63133 16 th Avenue, Bangor Michigan 49013
Chairman Robert Deschampe	Grand Portage Band of Lake Superior Chippewa Indians	P.O. Box 428, Grand Portage, Minnesota 55605
Chairman Ron Yob	Grand River Bands of Ottawa Indians	P.O. Box 2937 1316 Front NW, Grand Rapids, Michigan 49504
Chairwoman Sandra Witherspoon	Grand Traverse Band of Ottawa and Chippewa Indians	2605 N. West Bay Shore Drive, Peshawbestown, Michigan 49682
Chairperson Kenneth Meshigaud	Hannahville Indian Community	N14911 Hannahville B1 Road, Wilson, Michigan 49896
President Doreen G. Blaker	Keweenaw Bay Indian Community, Lake Superior Band of Chippewa Indians	16429 Beartown Road, Baraga, Michigan 49908
Chairman Louis D. Taylor	Lac Courte Oreilles Band of Lake Superior Chippewa Indians	13394 W. Trepania Road Building #1, Hayward, Wisconsin 54843
President John D. Johnson	Lac du Flambeau Band of Lake Superior Chippewa Indians	P.O. Box 67, Lac du Flambeau, Wisconsin 54538
Chairman James Williams Jr.	Lac Vieux Desert Band of Lake Superior Chippewa Indians	N4698 U.S. HWY 45 P.O. Box 249, Watersmeet, Michigan 49969
Al Pscholka	Lake Michigan College	2755 E Napier Ave Benton Harbor, Michigan 49022
Chairperson Faron Jackson Sr.	Leech Lake Band of Ojibwe	190 Sailstar Drive NW, Cass Lake, Minnesota, 56633
Ogema Larry Romanelli	Little River Band of Ottawa Indians	2608 Government Center Drive, Manistee, Michigan 49660
Chairperson Regina Gasco	Little Traverse Bay Bands of Odawa Indians	7500 Odawa Circle, Harbor Springs, Michigan 49740
Chairperson Lisa Powers	Mackinac Bands of Chippewa and Ottawa Indians	P.O. Box 250, St. Ignace, Michigan 49781
Chairman Bob Peters	Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians (Gun Lake Tribe)	2872 Mission Drive Shelbyville, Michigan 49344
Chairwoman Gena Kakkak	Menominee Indian Tribe of Wisconsin	P.O. Box 910, Keshena, Wisconsin 54135
Chief Douglas G. Lankford	Miami Tribe of Oklahoma	P.O. Box 1326, Miami, Oklahoma 74355
Phillip Roos	Michigan Department of Environment, Great Lakes, and Energy	525 West Allegan Street P.O. Box 30473, Lansing, Michigan 48909
Jeremy Rubio	Michigan Department of Environment, Great Lakes, and Energy	7953 Adobe Road, Kalamazoo, Michigan 49009
Carin Speidel, Kristyn Vang	Michigan Department of Health and Human Services	333 S. Grand Ave P.O. Box 30195, Lansing, Michigan 48909

Table D-1 List of Agencies, Organizations, Indian Tribes, and Persons Contacted by NRC during the Environmental Review of the Draft Palisades Nuclear Plant Environmental Assessment (Continued)

Name	Affiliation	Contact Information
Sara Thompson, Randy Claramunt	Michigan Department of Natural Resources	P.O. Box 30446, Lansing, Michigan 48909
Quentin L. Messer Jr.	Michigan Economic Development Corporation	300 N. Washington Square, Lansing, Michigan 48913
Ryan Schumaker	Michigan State Historic Preservation Office	300 North Washington Square, Lansing, Michigan 48913
Nicholas Weil	Michigan State University, Remote Sensing & Geographic Information System Aerial Archive	1407 S. Harrison Road, East Lansing, Michigan 48823
Chairperson Melanie Benjamin	Mille Lacs Band of Ojibwe	43408 Oodena Drive, Onamia, Minnesota 56359
Andrew Robinson	Mosaic Christian Community Development Association	1804 M-139, Benton Harbor, Michigan 49022
Rebecca Held Knoche	National Oceanic and Atmospheric Administration	3725 Crane Road, Port Republic, Maryland 20676
Chairperson Dorrie Rios	Nottawaseppi Huron Band of Potawatomi Indians	1485 Mno-Bmadzewen Way, Fulton, Michigan 49052
Chief Kalisha Dixon	Ottawa Tribe of Oklahoma	P.O. Box 110, Miami, Oklahoma 74354
Chairperson Rebecca J. Richards	Pokagon Band of Potawatomi Indians	P.O. Box 180, Dowagiac, Michigan 49047
Chairman Joseph Rupnick	Prairie Band Potawatomi Nation	16281 Q Road, Mayetta, Kansas 66509
President Jordan D. Joaquin	Quechan Tribe of the Fort Yuma Indian Reservation	P.O. Box 1899, Yuma, Arizona 85366
Chairperson Nicole Boyd	Red Cliff Band of Lake Superior Chippewa Indians	88455 Pike Road, Bayfield, Wisconsin 54814
Chairperson Darrel Seki Sr.	Red Lake Band of Chippewa Indians	15484 Migizi Drive, Red Lake, Minnesota 56671
Chief Tim Davis	Saginaw Chippewa Indian Tribe of Michigan	7500 Soaring Eagle Boulevard, Mt. Pleasant, Michigan 48858
Chairperson Thomas Fowler	Saint Croix Chippewa Indians of Wisconsin	4663 Angeline Avenue, Webster, Wisconsin 54893
Chairperson Austin Lowes	Sault Sainte Marie Tribe of Chippewa Indians	523 Ashmun Street, Sault Ste. Marie, Michigan 49783
Chairperson Robert VanZile Jr.	Sokaogon Chippewa Community	3051 Sand Lake Road, Crandon, Wisconsin 54520
Angelica Gallegos	South Haven Rotary Club	06321 Blue Star Memorial Highway, South Haven, Michigan 49090
Kim L. Smith Oldham	Southwest Michigan Community Action Agency	185 E Main St, Benton Harbor, Michigan 49022
Arthur Havlicek	Southwest Michigan Regional Chamber	811 Ship St Ste 303 St. Joseph, Michigan 49085

Table D-1 List of Agencies, Organizations, Indian Tribes, and Persons Contacted by NRC during the Environmental Review of the Draft Palisades Nuclear Plant Environmental Assessment (Continued)

Name	Affiliation	Contact Information
Chairman Gerald Gould	Swan Creek Black River Confederated Ojibwa Tribes of Michigan	P.O. Box 2937 1220 Court Street, Saginaw, Michigan 48602
Chairperson Jamie Azure	Turtle Mountain Band of Chippewa Indians	4180 Highway 281, Belcourt, North Dakota 58316
Anna Murphy, Retta Curneal	United Way of Southwest Michigan	2015 Lakeview Ave., St. Joseph, Michigan 49085
Kathy Kowal, Alan Walts	U.S. Environmental Protection Agency, Region 5	77 West Jackson Blvd, Chicago, Illinois 60604
Scott Hicks	U.S. Department of the Interior, Fish and Wildlife Service	2651 Coolidge Road Suite 101, E. Lansing, Michigan 48823
George Friday	Van Buren/Cass District Health Department	260 South Street, Lawrence, Michigan 49054
Sandy Merchant	Van Buren County Historical Museum	58471 Red Arrow Highway, Hartford, Michigan 49057
Erika Morrison	We Care Community Resource Center	1301 M-43 Suite 2B South Haven, Michigan 49090
Chairperson Michael Fairbanks	White Earth Band of Minnesota Chippewa Tribe	35500 Eagle View Road, Ogema, Minnesota 56569
NRC = U.S. Nuclear Regulatory Commission.		

APPENDIX E

CHRONOLOGY OF ENVIRONMENTAL REVIEW CORRESPONDENCE

This appendix contains a chronological listing of correspondence between the U.S. Nuclear Regulatory Commission (NRC or Commission), Holtec Decommissioning International, LLC, and other correspondence related to the NRC staff's environmental review. All documents, with the exception of those containing proprietary information, have been placed in the NRC's Public Document Reading Room at One White Flint North, 11555 Rockville Pike (First Floor), Rockville, Maryland, and are electronically available from the NRC's Agencywide Document Access and Management System (ADAMS). The ADAMS accession numbers for each document are listed below. The docket number for Palisades is 05000255. Table E-1 below lists the environmental review correspondence, by date.

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades

Date	Originator	Correspondence	ADAMS Accession Number (ML)
02/01/2023	Holtec Decommissioning International, LLC	Letter described regulatory path to reauthorize power operations at the Palisades Nuclear Plant	ML23032A399
03/13/2023	Holtec Decommissioning International, LLC	Updated letter describing regulatory path to reauthorize power operations at the Palisades Nuclear Plant	ML23072A404
09/28/2023	Holtec Decommissioning International, LLC	Request for Exemption from Certain Termination of License Requirements of 10 CFR 50.82	ML23271A140
11/27/2023	U.S. Nuclear Regulatory Commission	Memorandum for the Palisades Restart Panel Charter	ML23297A053
12/06/2023	Holtec Decommissioning International, LLC	Application for Order Consenting to Transfer of Control of License and Conforming License Amendments	ML23340A161
12/14/2023	Holtec Decommissioning International, LLC	Request to Revise Operating License and Technical Specifications to Support Resumption of Power Operations	ML23348A148
12/15/2023	Representative Bill Huizenga et al.	Letter regarding the Federal loan funding application for Palisades	ML23349A164
02/05/2024	Chair Christopher T. Hanson, U.S. Nuclear Regulatory Commission	Letter responding to Representative Bill Huizenga et al.	ML24008A004
02/09/2024	Holtec Decommissioning International, LLC	Request to Revise the Administrative Technical Specifications to Support Resumption of Power Operations	ML24040A089

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
04/03/2024	Holtec International	Presentation on Palisades Construction Permit Application: Initial Environmental and Site Characterization for Small Modular Reactors	ML24086A582
04/18/2024	Holtec Decommissioning International, LLC	Notice of Intent to Pursue Subsequent License Renewal	ML24109A162
05/01/2024	Holtec Decommissioning International, LLC	Request to Reinstate the Palisades Emergency Plan to Support Resumption of Power Operations	ML24122C666
05/16/2024	U.S. Nuclear Regulatory Commission	Email to Federally Recognized Indian Tribes notifying of Activities Regarding the Palisades Restart	ML24141A086
05/20/2024	Michigan State Historic Preservation Office	Concurrence letter on U.S. Department of Energy's adoption of 2006 Supplemental Environmental Impact Statement for Palisades	ML24175A002
05/21/2024	U.S. Department of the Interior, Fish and Wildlife Service	List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project	ML24178A000
05/24/2024	Holtec Decommissioning International, LLC	Request to Update the Main Steam Line Break Analysis Methodology	ML24145A145
06/13/2024	U.S. Nuclear Regulatory Commission and U.S. Department of Energy	Memorandum of Understanding Between the U.S. Department of Energy, Loan Programs Office and the U.S. Nuclear Regulatory Commission on Nuclear Energy Projects Under Review by the U.S. Nuclear Regulatory Commission and Seeking Federal Financial Assistance from the Loan Programs Office	ML24172A001
06/21/2024	Match-E-Be-Nash-She-Wish Band of Pottawatomí Indians	Response to U.S. Nuclear Regulatory Commission email Notifying of Activities Regarding the Palisades Restart	ML24214A066
06/24/2024	U.S. Nuclear Regulatory Commission	<i>Federal Register</i> Notice of Intent to conduct scoping	ML24149A002
06/26/2024	U.S. Department of Energy	Letter requesting cooperating agency status on Palisades	ML24219A429

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
06/27/2024	U.S. Nuclear Regulatory Commission	Letter with draft environmental regulatory audit plan and draft request for information to Holtec Decommissioning International, LLC	ML24248A056
06/27/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to Holtec Decommissioning International, LLC	ML24155A026
06/28/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the U.S. Department of Interior, Fish and Wildlife Service	ML24163A147
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to Covert Township, Michigan	ML24151A640
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Michigan Department of Environment, Great Lakes, and Energy	ML24152A013
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to Geneva Township, Michigan	ML24152A134
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Michigan Department of Health and Human Services	ML24152A195
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the City of South Haven, Michigan	ML24152A197
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the City of South Haven Water Filtration Plant, Michigan	ML24152A199
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Van Buren/Cass District Health Department	ML24152A220

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Michigan Economic Development Corporation	ML24155A010
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the U.S. Environmental Protection Agency, Region 5 (Tribal and Multimedia Programs Office)	ML24155A033
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the U.S. Environmental Protection Agency, Region 5 (Environmental Justice, Community Health, and Environmental Review Division)	ML24156A022
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the National Oceanic and Atmospheric Administration	ML24163A055
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Michigan Department of Environment, Great Lakes and Energy (Kalamazoo District Office)	ML24163A192
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Michigan Department of Natural Resources (Wildlife Division)	ML24163A239
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Michigan Department of Natural Resources (Fisheries Division)	ML24163A260
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Michigan State Historic Preservation Office	ML24163A083

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Advisory Council on Historic Preservation	ML24163A082
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Bad River Band of the Lake Superior Tribe of Chippewa Indians	ML24183A127
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Bay Mills Indian Community	ML24183A128
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Bois Forte Band (Nett Lake) of the Minnesota Chippewa Tribe	ML24183A129
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Chippewa Cree Indians of the Rocky Boy's Reservation of Montana	ML24183A130
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Citizen Potawatomi Nation	ML24183A131
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Fond du Lac Band of Lake Superior Chippewa	ML24183A132
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Forest County Potawatomi Community	ML24183A133
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Grand Portage Band of Lake Superior Chippewa	ML24183A134

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Grand Traverse Band of Ottawa and Chippewa Indians	ML24163A109
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Hannahville Indian Community	ML24183A135
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Keweenaw Bay Indian Community	ML24183A136
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Lac Courte Oreilles Band of Lake Superior Chippewa Indians	ML24183A137
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Lac du Flambeau Band of Lake Superior Chippewa Indians	ML24183A138
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Lac Vieux Desert Band of Lake Superior Chippewa Indians	ML24183A139
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Leech Lake Band of Ojibwe	ML24183A140
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Little River Band of Ottawa Indians	ML24183A141
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Little Traverse Bay Bands of Odawa Indians	ML24183A142
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Match-e-be-nash-she-wish Band of Pottawatomi Indians	ML24183A143
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an	ML24183A144

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
		environmental assessment to the Menominee Indian Tribe of Wisconsin	
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Miami Tribe of Oklahoma	ML24183A145
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Mille Lacs Band of Ojibwe	ML24183A146
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Nottawaseppi Huron Band of the Potawatomi	ML24183A147
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Ottawa Tribe of Oklahoma	ML24183A148
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Pokagon Band of Potawatomi Indians	ML24183A149
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Prairie Band Potawatomi Nation	ML24183A150
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Prairie Island Indian Community	ML24183A151
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Quechan Tribe of the Fort Yuma Indian Reservation	ML24183A153
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Red Cliff Band of Lake Superior Chippewa Indians	ML24183A154

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Red Lake Band of Chippewa Indians	ML24183A155
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Saginaw Chippewa Indian Tribe of Michigan	ML24183A156
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Saint Croix Chippewa Indians of Wisconsin	ML24183A157
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Sault Ste. Marie Tribe of Chippewa Indians	ML24183A158
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Sokaogon Chippewa Community	ML24183A159
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Turtle Mountain Band of Chippewa Indians	ML24183A160
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the White Earth Band of Minnesota Chippewa Tribe	ML24183A161
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Burt Lake Band	ML24183A124
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Swan Creek Black River Confederated Ojibwa Tribes of Michigan	ML24183A125

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Mackinac Bands of Chippewa and Ottawa Indians	ML24172A003
07/01/2024	U.S. Nuclear Regulatory Commission	Letter initiating the scoping process to prepare an environmental assessment to the Grand River Bands of Ottawa Indians	ML24183A126
09/04/2024	U.S. Nuclear Regulatory Commission	Email to Holtec Decommissioning International, LLC with the environmental audit draft request for confirmatory information	ML24248A261
09/12/2024	Holtec Decommissioning International, LLC	Email to the U.S. Nuclear Regulatory Commission responding to the request for confirmatory information	ML24260A354
09/18/2024	Michigan State Historic Preservation Office	Response letter on archaeological survey report for Palisades	ML24277A305
09/20/2024	U.S. Nuclear Regulatory Commission	Letter transmitting the request for additional information to Holtec Decommissioning International, LLC	ML24263A171
10/02/2024	U.S. Nuclear Regulatory Commission	Email providing a status update and opportunity to review cultural resource reports to Indian Tribes	ML24344A202
10/02/2024	Michigan State Historic Preservation Office	Response letter on architectural survey report for Palisades	ML24277A307
10/03/2024	Sokaogon Chippewa Community	Email providing consultation status to the U.S. Nuclear Regulatory Commission	ML24277A303
10/23/2024	Michigan State Historic Preservation Office	Response letter regarding Holtec Decommissioning International, LLC Environmental and Cultural Review Procedures	ML24305A143
10/31/2024	Quechan Tribe of the Fort Yuma Indian Reservation	Response letter on consultation for Palisades	ML24306A090
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to the Advisory Council on Historic Preservation	ML24292A007
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Michigan State Historic Preservation Officer	ML24292A026

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Bad River Band of the Lake Superior Tribe of Chippewa Indians	ML24309A049
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Bay Mills Indian Community	ML24309A182
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Bois Forte Band (Nett Lake) of the Minnesota Chippewa Tribe	ML24309A183
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Chippewa Cree Indians of the Rocky Boys Reservation of Montana	ML24309A184
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Citizen Potawatomi Nation	ML24309A185
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Forest County Potawatomi Community	ML24309A186
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Grand Portage Band of Lake Superior Chippewa	ML24309A187
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Grand Traverse Band of Ottawa and Chippewa Indians	ML24309A188
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Hannahville Indian Community	ML24309A189
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Lac Courte Oreilles Band of Lake Superior Chippewa	ML24309A190
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Lac du Flambeau Band of Lake Superior Chippewa Indians	ML24309A191
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Lac Vieux Desert Band of Lake Superior Chippewa Indians	ML24309A192
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Leech Lake Band of Ojibwe	ML24309A193

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Little River Band of Ottawa Indians	ML24309A195
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Little Traverse Bay Bands of Odawa Indians	ML24309A197
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Match-e-be-nash-she-wish Band of Pottawatomi Indians	ML24309A198
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Menominee Indian Tribe of Wisconsin	ML24309A199
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Miami Tribe of Oklahoma	ML24309A200
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Mille Lacs Band of Ojibwe	ML24309A201
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Nottawaseppi Huron Band of the Potawatomi	ML24309A202
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Ottawa Tribe of Oklahoma	ML24309A203
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Pokagon Band of Potawatomi Indians	ML24309A204
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Prairie Band Potawatomi Nation	ML24309A205
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Prairie Island Indian Community	ML24309A206
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Quechan Tribe of the Fort Yuma Indian Reservation	ML24309A207
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Red Cliff Band of Lake Superior Chippewa Indians	ML24309A208
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Red Lake Band of Chippewa Indians	ML24309A209
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Saginaw Chippewa Indian Tribe of Michigan	ML24309A210

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Saint Croix Chippewa Indians of Wisconsin	ML24309A211
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Sault Ste. Marie Tribe of Chippewa Indians	ML24309A212
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Turtle Mountain Band of Chippewa Indians	ML24309A213
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to White Earth Band of Minnesota Chippewa Tribe	ML24309A214
11/04/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Fond du Lac Band of Lake Superior Chippewa	ML24313A146
11/05/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Burt Lake Band	ML24292A157
11/05/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Grand River Bands of Ottawa Indians	ML24310A013
11/05/2024	U.S. Nuclear Regulatory Commission	Letter for Palisades APE Notification to Mackinac Bands of Chippewa and Ottawa Indians	ML24310A014
11/06/2024	Michigan State Historic Preservation Office	Palisades Architectural Survey	ML24312A226
11/15/2024	Michigan State Department of Health and Human Services	Letter on Investigation of Cancer Incidences in Covert Township, Michigan	ML25006A210
12/10/2024	Michigan State Historic Preservation Office	Letter concurring with Palisades APE	ML24345A196
01/29/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Michigan Department of Health and Human Services	ML25007A228
01/29/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to Holtec Decommissioning International, LLC	ML25027A342
01/30/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Michigan Department of Environment, Great Lakes, and Energy	ML25007A216
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the U.S. Department of Interior, Fish and Wildlife Service	ML25007A105

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to Covert Township, Michigan	ML25007A163
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to Geneva Township, Michigan	ML25007A165
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the City of South Haven, Michigan	ML25007A161
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the City of South Haven Water Filtration Plant, Michigan	ML25007A167
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Van Buren/Cass District Health Department	ML25007A164
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Michigan Economic Development Corporation	ML25007A166
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the U.S. Environmental Protection Agency, Region 5 (Tribal and Multimedia Programs Office)	ML25008A199
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the U.S. Environmental Protection Agency, Region 5 (Environmental Justice, Community Health, and Environmental Review Division)	ML25007A162
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the National Oceanic and Atmospheric Administration	ML25007A103
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Michigan Department of Natural Resources (Wildlife Division)	ML25007A106
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Michigan Department of Natural Resources (Fisheries Division)	ML25007A102
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the	ML25006A099

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
		Michigan State Historic Preservation Office	
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Advisory Council on Historic Preservation	ML25006A098
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Bad River Band of the Lake Superior Tribe of Chippewa Indians	ML25031A049
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Bay Mills Indian Community	ML25031A054
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Bois Forte Band (Nett Lake) of the Minnesota Chippewa Tribe	ML25031A028
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Chippewa Cree Indians of the Rocky Boy's Reservation of Montana	ML25031A035
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Citizen Potawatomi Nation	ML25031A039
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Fond du Lac Band of Lake Superior Chippewa	ML25031A027
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Forest County Potawatomi Community	ML25031A036
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Grand Portage Band of Lake Superior Chippewa	ML25031A050
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Grand Traverse Band of Ottawa and Chippewa Indians	ML25031A051
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Hannahville Indian Community	ML25031A043
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the	ML25031A045

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
		Lac Courte Oreilles Band of Lake Superior Chippewa Indians	
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Lac du Flambeau Band of Lake Superior Chippewa Indians	ML25031A040
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Lac Vieux Desert Band of Lake Superior Chippewa Indians	ML25031A037
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Leech Lake Band of Ojibwe	ML25031A031
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Little River Band of Ottawa Indians	ML25031A044
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Little Traverse Bay Bands of Odawa Indians	ML25031A048
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Match-e-be-nash-she-wish Band of Pottawatomi Indians	ML25031A026
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Menominee Indian Tribe of Wisconsin	ML25031A033
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Miami Tribe of Oklahoma	ML25031A055
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Mille Lacs Band of Ojibwe	ML25031A053
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Nottawaseppi Huron Band of the Potawatomi	ML25031A030
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Ottawa Tribe of Oklahoma	ML25031A042
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Pokagon Band of Potawatomi Indians	ML25007A004

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Prairie Band Potawatomi Nation	ML25031A041
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Prairie Island Indian Community	ML25031A034
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Red Cliff Band of Lake Superior Chippewa Indians	ML25031A047
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Red Lake Band of Chippewa Indians	ML25031A029
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Saginaw Chippewa Indian Tribe of Michigan	ML25031A056
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Saint Croix Chippewa Indians of Wisconsin	ML25031A052
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Sault Ste. Marie Tribe of Chippewa Indians	ML25031A025
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Turtle Mountain Band of Chippewa Indians	ML25031A038
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the White Earth Band of Minnesota Chippewa Tribe	ML25031A046
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Burt Lake Band	ML25030A382
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Mackinac Bands of Chippewa and Ottawa Indians	ML25007A010
01/31/2025	U.S. Nuclear Regulatory Commission	Letter for issuance of the draft environmental assessment to the Grand River Bands of Ottawa Indians	ML25030A383
02/24/2025	Michigan State Historic Preservation Office	Letter concurring with Palisades determination of effect	ML25055A099

Table E-1 Environmental Review Correspondence for the Resumption of Power Operations Activities at Palisades (Continued)

Date	Originator	Correspondence	ADAMS Accession Number (ML)
03/12/2025	U.S. Fish and Wildlife Service	E-mail with comments on draft environmental assessment	ML25076A699
04/07/2025	U.S. Environmental Protection Agency	Letter with comments on draft environmental assessment	ML25114A254

ADAMS = Agencywide Documents Access and Management System; APE = area of potential effect; CFR = *Code of Federal Regulations*; LLC = Limited Liability Company.

APPENDIX F

CLIMATE CHANGE AND GREENHOUSE GASES

F.1 Affected Environment

The U.S. Nuclear Regulatory Commission (NRC or Commission) has determined climate change may alter the affected environment described in Section 3 of this environmental assessment (EA) during the period of preparation for the resumption of power operations or actual resumption of power operations on the Palisades Nuclear Plant (Palisades) (the renewed operating license issued in 2007 expires in 2031). Climate change is a global phenomenon, and the activities associated with the continued operation of Palisades are not expected to appreciably alter these trends. However, climate change may create a new environment that could result in changed impacts from the ongoing operations or impose operational restrictions on the site's safety and performance. This section documents the NRC staff's assessment of the potential effects of climate change on its evaluation of the environmental impacts of the proposed continued operation of Palisades.

The interagency U.S. Global Change Research Program (USGCRP) was established under the Global Change Research Act of 1990 (P.L. 101-606) (15 U.S.C. § 2921 et seq. [Global Change Research Act of 1990-TN3330]), "to understand, assess, predict, and respond to human-induced and natural processes of global change." The USGCRP is the authoritative U.S. government source on likely climate change impacts in the United States. The NRC staff reference the latest (i.e., fifth) National Climate Assessment report (NCA5) (USGCRP 2023-TN9762) and other supporting documents to provide the basis for assessing likely climate change impacts around the Palisades site.

Climate change projections in the latest USGCRP reports (i.e., NCA5) cover the period through 2100 and are generally expressed as a change expected for the mid-21st century (e.g., 2036–2065) or late 21st century (e.g., 2071–2099) relative to average conditions existing in the near-present (1991–2020). These projections are relevant to the evaluation of Palisades' continued operation, particularly as the plant proposes to operate until 2031.

The USGCRP's climate change impact reports include projections for various scenarios based on future emissions of heat-trapping gases. These scenarios include a "very high" emissions scenario (with continued increases in emissions throughout the 21st century), an "intermediate" scenario (with emissions increasing somewhat before decreasing midcentury), and a "low" scenario (with emissions rapidly decreasing and turning negative before the end of the century). Climate change projections described below are either for the very high scenario or the intermediate scenario, as applicable.

The NRC staff use climate change projections for the mid-21st century (i.e., 2036–2065) as the bounding climate scenario for the time period covering the resumption of power operations on Palisades until the end of the current operating license (March 24, 2031). The assessment ensures the potential environmental impacts for all resource areas under a changing climatic regime are conservatively considered in the context of NRC's evaluation of Palisades' reauthorization to resume power operations.

F.2 Expected Climatological Changes

In southwest Michigan, where Palisades is located near Lake Michigan in Van Buren County, climate data indicate a warming trend. Observed changes in annual, winter, and summer average temperatures between 1901–1960 and 2002–2021 show increases of 1.5 to 2°F (0.8 to 1.1°C), more than 2°F (1.1°C), and 1 to 1.5°F (0.6 to 0.8°C), respectively. Over the more recent period from 1972 to 2021, annual average near-surface temperatures have risen by approximately 0.5 to 0.6°F (0.27 to 0.33°C) per decade. These temperature changes have implications for energy demand and infrastructure: under a very high emissions scenario, the annual electricity demand is projected to increase by 40–50 percent from 2020 to 2050, while rising air temperatures are expected to reduce summer transmission line capacity by 6 percent in the region.

As global temperatures continue to increase, each degree of warming brings greater temperature rise in many parts of the United States. Over the last decade (2012–2021), global average temperatures have increased around 2°F (1.1°C) above pre-industrial (from 1850 to 1899) levels. Relative to the 1851–1900 baseline, under a very high emission scenario, a projected global temperature increase of 2.7°F (1.5°C), 3.6°F (2°C), 5.4°F (3°C), and 7.2°F (4°C) may increase the southwest Michigan local temperature by 3–4°F (1.7–2.2°C), 5–6°F (2.8–3.3°C), 7–8°F (3.9–4.4°C), and 9–11°F (5.0–6.1°C), respectively. With these rising temperatures, hot days ($\geq 95^{\circ}\text{F}$ [$\geq 35^{\circ}\text{C}$]) are expected to increase by 5–10 days annually, cold days ($\leq 32^{\circ}\text{F}$ [$\leq 0^{\circ}\text{C}$]) to decrease by 15–25 days, and warm nights ($\geq 70^{\circ}\text{F}$ [$\geq 21.1^{\circ}\text{C}$]) to increase by 5–15 days in southwest Michigan as global temperatures reach 2°C (35.6°F) above pre-industrial levels.

Beyond atmospheric warming, Lake Michigan's summer surface water temperatures have also been rising. From 1980 to 2021, the July to September average surface temperature of Lake Michigan increased by about 0.1°F (0.05°C) per year (USGCRP 2023-TN9762), and further increases are anticipated. Other observed changes in the Great Lakes region include increased variability in lake levels, evaporation and water temperatures, more intense precipitation events (including lake-effect snow), and shorter durations of snow and ice cover.

Precipitation patterns in southwest Michigan are evolving as well, with annual precipitation projected to increase by up to 20 percent by midcentury compared to the past five decades under the highest warming scenarios. Extreme precipitation events are also expected to intensify, with the heaviest 1 percent of precipitation days, 5-year maximum daily precipitation, and annual maximum precipitation projected to rise by >40 percent, 10–20 percent, and 10–20 percent, respectively. This projected increase in precipitation, by 1 to 2 in. (2.5 to 5.1 cm) annually by midcentury (2036–2065) relative to 1991–2020, could lead to significant seasonal shifts in water availability. Winter runoff could increase by 15–20 percent, spring runoff by 5–10 percent, while summer runoff may decrease by around 5 percent, with fall runoff remaining steady or slightly increased. Annual actual evapotranspiration and runoff are also expected to rise, as outlined in Table F-1 below.

Table F-1 Projected Precipitation Change by Midcentury (2036–2065 relative to 1991–2020) Under an Intermediate Emissions Scenario (RCP4.5) in Southwest Michigan. Source: USGCRP 2023-TN9762.

Climate Variable	Projected Change (in.) by Midcentury
Annual Precipitation	1 to 2
Annual Actual Evapotranspiration	1 to 2
Maximum Annual Snow Water Equivalent	-0.2 to -1.0
Average Summer (June–August) Soil Moisture	-0.05 to -0.1
Annual Runoff	0.1 to 0.5
Annual Climatic Water Deficit	0.5 to 1

In addition to these precipitation changes, the region is expected to experience a reduction in maximum annual snow water equivalent and a decline in summer soil moisture (June–August). Lower summer moisture levels, combined with higher temperatures, could increase the risk of flash droughts during the summer, while elevated winter and spring runoff could heighten flooding risks. Rapid shifts between extreme wet and dry periods are expected to increase in the Midwest by late century (2071–2100), which may further exacerbate the risk of drought.

Finally, the projected annual climatic water deficit, which measures the gap between available water and vegetation demand, is expected to rise by 0.5 to 1 in. (1.3 to 2.4 cm) by midcentury relative to 1991–2020. This suggests that, although winter and spring flooding may pose significant challenges, drier summer conditions are likely to persist, potentially affecting water availability in the region.

F.3 Environmental Consequences of Preparation for Resumption of Power Operations and the Resumption of Power Operations

The potential effects of climate change were considered for all resources areas using the assessment methodology described in NUREG-2226 (NRC 2019-TN6136: Appendix L). Starting from the table (NRC 2018-TN5405) that identifies plausible connections between nuclear power station resource area concerns and likely climate change caused alterations to the existing environment, the NRC staff generated a resource table specific to the Palisades region by removing irrelevant USGCRP climate impacts and NRC resource area issues from the master table. For example, climate impacts related to sea level rise were removed because of the site’s inland location. The NRC staff used the site-specific resource table (PNNL 2024-TN10878) to assess whether the potential effects of climate change would alter the environmental impacts of the proposed action described in Section 3 of this EA.

The NRC staff concluded the expected impact determinations (not significant) assigned in Section 3 of this EA would not be altered by the projected effects of climate change. The NRC staff provide the following resource-specific justifications.

Land Use and Visual Impacts

Projected climatological changes are not expected to impact land use or visual resources at Palisades. Changes in temperature and humidity could slightly alter the visual appearance or frequency of vapor plumes from the cooling towers, but the NRC staff do not expect that those changes would be noticeable because vapor plumes from operation are an occasional occurrence under certain atmospheric conditions and winds off the lake can dissipate plumes

close to the ground. Other visual impacts of operating the plant would not substantially be affected by climate change. The site's industrial zoning remains appropriate, with no reclassification needed, even as regional ecological plans evolve to address climate changes. Access to land and water resources, including Lake Michigan, will remain stable, with only minor access restrictions possible if lake levels fluctuate. Overall, land use and zoning designations at Palisades are expected to remain consistent, with no major construction anticipated due to climate-related factors. The NRC staff expect that climate change would not alter conclusions made in this EA.

Meteorology and Air Quality

Climatological changes may have a minor impact on air quality and meteorology during the resumption of power operations. Projected increases in temperature, humidity, and lake surface water temperature could lead to a small increase in the aerosol concentrations within the cooling tower plume; however, this impact is expected to be minor as the substantial majority of aerosol concentrations in the plume are directly attributable to plant operations and are not significantly influenced by environmental conditions. Similarly, air quality impacts may see a slight increase in ground level ozone levels but are not significant enough to change the overall impact assessment as the precursor emissions attributable to Palisades are minimal. Therefore, the NRC staff expect that climate change would not alter conclusions made in this EA.

Water Resources

Midcentury climatological changes, including increased winter and spring runoff and warmer Lake Michigan surface temperatures, may slightly alter surface runoff and infiltration patterns in southwest Michigan. However, these changes will be managed under applicable Federal and State water quality standards, such as the National Pollutant Discharge Elimination System permit, with best management practices in place. Although variability in Lake Michigan water levels and ice cover may occur, the volume of effluent discharges from Palisades will remain minimal compared to the lake's capacity, resulting in no significant impact on water quality or ice cover. Water use by Palisades is projected to remain minor relative to Lake Michigan's total availability, with no substantial effect on regional water resources or other users. Climate change is not expected to have a significant change in the consumptive water use for the cooling towers because evaporation from the cooling towers might increase under a warming climate but would not be distinguishable from an inter- and intra-annual variability in current evaporation amounts. Climate change would have a minor impact on the volume of intake water because the warming experienced at the depth of the intake structure, 35 ft (10.7 m) below, would be negligible especially when compared to the heat load removed by plant systems. Thus, despite probable shifts in hydrology due to climate projections, Palisades resumption of power operations are required to comply with environmental regulations, resulting in minimal impact on water quality and availability. The NRC staff expect that climate change would not alter conclusions made in this EA.

Ecological Resources

Projected increases in temperature and precipitation are not expected to substantially alter how Palisades affects the terrestrial habitats on the site and surrounding landscape. Climate changes could potentially alter the hydrology of wetlands in the area, including potentially suitable habitat for the eastern massasauga and several State-listed species, but the Palisades facilities would not substantially influence these changes. The vegetational composition of natural upland habitats in the region could also change, potentially affecting wildlife, but the

presence of the Palisades facilities would not influence those changes. Increased precipitation could eventually allow more mesic vegetation and invasive plants to establish in the specialized open dune habitat presently suitable for Pitcher's thistle, but the Palisades facilities would not alter the dynamics of that change. If climate changes alter the water elevation in Lake Michigan, the width and littoral dynamics of the beaches in the region could change, affecting habitat for the rufa red knot and piping plover. However, the presence of the Palisades facilities would only influence the directly adjoining beaches, which have already been too heavily disturbed by armoring to provide suitable habitat for these species.

Projected increases in temperature and precipitation are not expected to significantly impact Palisades' effect on the aquatic ecology of Lake Michigan. The plant's influence extends to less than 0.0006 percent of the Lake, and potential changes in water levels or minor temperature increases have not historically resulted in notable ecological impacts. While a slight warming of Lake Michigan may affect biodiversity and food web dynamics, the localized discharges from Palisades, which affect a small area, are unlikely to cause noticeable changes to the broader aquatic ecosystem. Additionally, because the volume of water moving through the screen would not noticeably increase, any increases in impingement and entrainment would not be noticeable. Climatological changes may benefit invasive species more tolerant of warmer temperatures, but Palisades' limited area of influence is not expected to significantly alter the presence of such species. Enhanced coordination for aquatic resource protection may be needed, but the overall impact on aquatic ecology remains minimal. Therefore, the NRC staff expect that climate change would not alter conclusions made in this EA.

Historic and Cultural

While rising temperatures and increased runoff during spring and winter could potentially expose additional historical and cultural resources at the Palisades site, no impacts from climatological changes are expected on currently identified resources. There are no historic properties or other historic and cultural resources identified within the area of potential effects. Therefore, the NRC staff expect that climate change would not alter conclusions made in this EA.

Socioeconomics

The resumption of operations on Palisades is not expected to have a significant impact on local socioeconomic factors, including housing, public schools, recreational resources, emergency services, or transportation infrastructure. Although southwest Michigan may face increased rainfall and flood risks midcentury, potentially challenging transportation resilience, the plant's operations are not anticipated to affect these infrastructure systems. Impacts on employment, income, output, and tax revenue are projected to remain stable, with no additional climate change mitigation measures required. Therefore, anticipated climatological changes are unlikely to alter the established socioeconomic impacts for Palisades. The NRC staff expect that climate change would not alter conclusions made in this EA.

Human Health, Waste Management, Transportation and Accidents

Projected midcentury climate changes could influence the prevalence of etiological agents and occupational health risks; however, existing worker protection regulations are expected to remain effective or adapt as necessary. Climate change is not anticipated to alter operational noise levels at Palisades, so noise-related impacts should remain unchanged. While potential impacts from electromagnetic fields are uncertain, regulatory measures are expected to adjust

to maintain occupational and public safety. Overall, nonradiological health impacts, including noise, etiological agents, and occupational risks, are projected to remain minimal. Therefore, the NRC staff expect that climate change would not alter conclusions made in this EA.

Climatological changes are not expected to impact radiological exposure levels or doses for humans or non-human biota at Palisades. Ongoing compliance with radiological regulations will ensure the safety of workers, the public, and the environment through established monitoring protocols and exposure limits. Consequently, the radiation health impacts outlined in this environmental assessment are anticipated to remain unchanged. Therefore, the NRC staff expect that climate change would not alter conclusions made in this EA.

Projected climatological changes are not anticipated to affect nonradiological health, nonradiological waste, transportation of radioactive materials, or the likelihood of accidents at Palisades. Noise, etiological agents, and occupational injury risks will continue to be regulated to ensure the protection of human health, while compliance with applicable Federal, State, and local requirements will govern nonradioactive and mixed waste management. The transportation of radioactive materials will remain mitigated through adherence to U.S. Department of Transportation regulations. Therefore, the NRC staff expect that climate change would not alter conclusions made in this EA.

Furthermore, Palisades' engineered safety features reduce the likelihood and mitigate the consequences of hypothetical accidents, as required by NRC safety regulations. As stated in the 2024 LR GEIS (NRC 2024-TN10161):

Adaptation of nuclear power plants to climate change is addressed through the NRC's existing regulations. NRC regulations require that plant structures, systems, and components important to safety be designed to withstand the effects of natural phenomena, such as flooding, without loss of capability to perform safety functions. Furthermore, nuclear power plants are required to operate within technical specifications in accordance with their NRC-issued operating license, which includes specifications for coping with natural phenomena hazards. Any change in technical specifications would require the NRC to conduct a review before allowing licensees to make operational changes because of changing environmental conditions.

Additionally, the NRC continually evaluates nuclear power plant operating conditions and physical infrastructure through its reactor oversight program to ensure ongoing safe operations... If climate change happens more quickly or changes more substantially than what is currently forecasted, the NRC will evaluate the new information to determine whether any safety-related changes are needed at existing nuclear power plants.

F.4 Greenhouse Gases

As described in the 2024 LR GEIS (NRC 2024-TN10161), gases found in the Earth's atmosphere that trap heat and play a role in the Earth's climate are collectively termed greenhouse gases (GHGs). These GHGs include CO₂, methane (CH₄), nitrous oxide (N₂O), water vapor (H₂O), and fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons, and sulfur hexafluoride. Operations at nuclear power plants release GHGs from stationary combustion sources (e.g., diesel generators, pumps, diesel engines, boilers), refrigeration systems, electrical transmission and distribution systems, and mobile sources

(worker vehicles and delivery vehicles). However, the GHG emissions from nuclear power plants are typically very minor because such plants do not normally combust fossil fuels to generate electricity.

The NRC staff estimated the life-cycle GHG emissions of various activities associated with the preparations for resumption of power operations, resumption of power operations, and return to decommissioning for Palisades. The GHG emission estimates include direct emissions from the nuclear facility and indirect emissions from workforce and fuel transportation, decommissioning, and the uranium fuel cycle. The NRC staff estimated these emissions for the Palisades site using best available data from various sources.

Emissions from truck deliveries and workforce traffic were considered as described in Section 3.3.1 for the preparations for resumption of power operations. Carbon dioxide (CO₂) emissions from supplier trucks was estimated with 3,000 truck deliveries over 18 months related to preparations for the resumption of power operations (HDI 2024-TN10670: RAI-GEN-1). An equivalency factor of 0.991 for CO₂ to total GHG is used to account for the emissions from other GHGs including methane and nitrous oxide (Chapman et al. 2012-TN2644: combined license (COL)/ESP-ISG-026 Appendix A; NRC 2014-TN3768).

During the resumption of operations, CO₂, and a small quantity of methane and N₂O will be emitted from natural gas boilers and diesel equipment as discussed for criteria pollutants. The applicant calculated these emissions for operations using standard emission factors like other pollutants (HDI 2024-TN10670: RAI-MET-6). The GHG emissions for workforce traffic during 40 years of operations have been provided for a 1,000 MW reactor in COL/ESP-ISG-026, Appendix A (NRC 2014-TN3768). These estimates were scaled down for 7 years of operation and 800 MWe power output. Similarly, these emissions were scaled down for the projected 18-month preparations duration.

Section 3.12.1 of the 2024 LR GEIS (NRC 2024-TN10161) discusses other sources of GHG emissions from nuclear power plants, including sulfur hexafluoride used in electric power transmission and distribution applications (substations, circuit breakers, and other switchgear). Fluorinated gas emissions from refrigerant sources and from electrical transmission and distribution systems can result from leakage, servicing, repair, or disposal of sources. While the NRC staff do not have specific information for Palisades, the staff conservatively estimates that these gases are present in the transmission systems at Palisades as these gases are commonly used in transmission systems. However, even if present, they would not be significant contributors to total GHGs for Palisades. This is based on the NRC's analysis presented in Section 4.12.1 of the LR GEIS that shows that the quantified GHG emissions from nuclear power plant operations, when compared to annual State-level GHG emissions, or annual county-level GHG emissions, or replacement power alternatives, are orders of magnitude lower across all nuclear power plant sites presented in Table 3.12-2. Additionally, the 2024 LR GEIS (NRC 2024-TN10161) found that the environmental impacts would be the same or similar at all nuclear plant sites, and that the impacts of GHG emissions on climate change from continued operations and refurbishment during the initial LR and SLR terms would be SMALL.

The indirect GHG emissions from uranium fuel cycle is also provided in COL/ESP-ISG-026 Appendix A that accounts for fossil fuel combustion for centrifuge enrichment and process heat. These emissions were also scaled down for 7 years of operations and 800 MWe for the Palisades unit.

Decommissioning activities include SAFSTOR workforce for a period of 40 years and demolition activities for 10 years that include emissions from fossil fuel fired equipment and workforce. The NRC staff included an estimate of GHG emissions from decommissioning because the potential approval of the Federal actions would delay the impacts of decommissioning by up to 7 years. The decommissioning emissions for 1,000 MW power plant in COL/ESP-ISG-026 was scaled to the 800 MWe capacity of Palisades.

Table F-2 below provides the emissions estimates for each of these activities. The estimated emissions of the proposed actions are 1,444,739 MT CO₂(eq)—this includes emissions from preparation activities and resumption of operations. The total life-cycle emissions (which also include decommissioning) were estimated to be about 1,474,000 MT CO₂(eq).

Table F-2 Nuclear Power Plant Life-Cycle Greenhouse Gas Emissions Estimates for Preparation Activities at Palisades Nuclear Plant (18 months), Operations (7 years) and Decommissioning

Phase	Activities	GHG Emissions (CO ₂ [eq]) MT
Preparation Activities	Truck Deliveries	4,199
Preparation Activities	Preparation Workforce	7,371
Operational Phase	Plant Operations	129
Operational Phase	Uranium Fuel Cycle	1,414,000
Operational Phase	Operations Workforce	19,040
Decommissioning Phase	SAFSTOR Workforce	8,000
Decommissioning Phase	Decommissioning Equipment	15,200
Decommissioning Phase	Decommissioning Workforce	6,400
Total		1,474,339

CO₂eq = carbon dioxide equivalent; GHG = greenhouse gas; MT = metric ton(s).

F.5 Conclusions

The NRC staff conclude that the potential effects of climate change would not alter the impact determinations in this EA for the preparation for the resumption of power operations and for the resumption of power operations on Palisades.

F.6 References

Global Change Research Act of 1990. 15 U.S.C. § 2921 et seq. TN3330.

NRC (U.S Nuclear Regulatory Commission). 2018. "Climate Change Master Table." Washington, D.C. ADAMS Accession No. ML18022A104. TN5405.

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USGCRP (U.S. Global Change Research Program). 2023. *The Fifth National Climate Assessment*. A.R. Crimmins, C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Stewart, and T.K. Maycock, Eds. Washington, D.C. Available at <https://doi.org/10.7930/NCA5.2023>. TN9762.

APPENDIX G

PROJECTS CONSIDERED IN CUMULATIVE EFFECTS

In determining the cumulative effects associated with activities related to the preparation for resumption of power operations and the resumption of power operations of Palisades Nuclear Plant, the U.S. Nuclear Regulatory Commission (NRC or Commission) staff evaluated the combination of the past, present, and reasonably foreseeable actions or projects along with what has been assessed in the 2006 SEIS (NRC 2006-TN7346). The NRC staff's analyses of the potential incremental effects of the proposed Federal actions when added to the environmental effects of other past, present, and reasonably foreseeable actions are presented within the discussion of each resource area in Section 3 of this environmental assessment. Table G-1 below provides a list of projects and actions that the NRC staff considered for its cumulative effects impact analysis. However, because of the uniqueness of each environmental resource area evaluated and its associated geographic area of analysis, Section 3 does not consider or explicitly evaluate every project and action listed in Table G-1.

Table G-1 Projects and Actions U.S. Nuclear Regulatory Commission Staff Considered for Cumulative Effects Impact Analysis for the Resumption of Power Operations Activities at Palisades Nuclear Plant

Name	Summary	Location	Status	Source
Onsite Future Project – ISFSI	Construction of a new spent fuel pad	Onsite	Reasonably Foreseeable	ML23271A140
Onsite Future Project – Subsequent License Renewal	Subsequent license renewal application	Onsite	Application expected no later than March 26, 2026	ML23271A140
Onsite Future Project – Small modular reactors	New construction	Onsite	Future	ML24086A582
Energy Facility – Donald C Cook Nuclear Power Plant	2,161 MWe pressurized water reactor	28 mi S	Operational since 1975	ML051150556
Energy Facility – Covert Generating Plant	1,100 MW combined cycle gas turbine power plant	1 mi E	Operational	Newkirk Electric Associates. Power Generation Covert Generation Plant. https://www.newkirk-electric.com/projects/power-generation/covert-generating-plant/
Energy Facility – 48 th Street Generating Station	Power station with three combustion turbine engines	30 mi N	Operational	Holland Board of Public Works. Reliable Electric. https://hollandbpw.com/en/blog/list-all/33-electric/271-reliable-electric

Table G-1 Projects and Actions U.S. Nuclear Regulatory Commission Staff Considered for Cumulative Effects Impact Analysis for the Resumption of Power Operations Activities at Palisades Nuclear Plant (Continued)

Name	Summary	Location	Status	Source
Energy Facility – Zeeland Generating Station	Power station with two natural gas combined cycle plants and two natural gas simple cycle units	40 mi N	Operational	Consumers Energy. Natural Gas Generation. https://www.consumersenergy.com/about-us/electric-generation/natural-gas
Energy Facility – Holland Energy Park	Power station with two combustion turbine engines and one steam turbine generator	35 mi N	Operational	Holland Board of Public Works. How We Generate Electricity. https://hollandbpw.com/en/how-it-works
Transmission Infrastructure – Benton Harbor - Fair Plain	Upgrade 7 mi of transmission lines	~15 mi S	Expected construction Spring-Summer 2025	AEP Transmission. Benton Harbor – Fair Plain Transmission Line Rebuild Project. https://aeptransmission.com/michigan/BentonHarbor/
Transmission Infrastructure – Hartford Area	Upgrade 32 mi of transmission lines and equipment at a substation	Within 10 to 20 mi radius to the N, E, and S	Ongoing. Expected completion in Summer 2025	AEP Transmission. Hartford Area Improvements Project. https://aeptransmission.com/michigan/HartfordMichigan/
Transmission Infrastructure – Buchanan - Bridgman	Upgrade substation, retiring 2 mi of transmission lines, and upgrade 20 mi of transmission lines	~30 mi S and SE	Construction expected early 2026 through Summer 2027	AEP Transmission. Buchanan - Bridgman Transmission Line Project. https://aeptransmission.com/michigan/buchanan-bridgman/
Transmission Infrastructure – Fourflag	Rebuild ~8 mi of power lines	~35 mi SE	Construction expected early 2026 through Fall 2026	AEP Transmission. Fourflag Transmission Line Project. https://aeptransmission.com/michigan/FourFlag/
Transmission Infrastructure – New Buffalo	Rebuild ~20 mi of power lines	~40 mi SE	Construction expected early 2026 through Fall 2027	AEP Transmission. New Buffalo – Bridgman Transmission Line Rebuild Project. https://aeptransmission.com/michigan/NewBuffalo-Bridgman/
Transmission Infrastructure – Niles	Improvements including upgrades to substations and	~35 mi SE	Construction expected from	AEP Transmission. Niles Area Transmission

Table G-1 Projects and Actions U.S. Nuclear Regulatory Commission Staff Considered for Cumulative Effects Impact Analysis for the Resumption of Power Operations Activities at Palisades Nuclear Plant (Continued)

Name	Summary	Location	Status	Source
	retiring, upgrading and building new transmission lines		2024 through 2026	Improvements Project. https://aeptransmission.com/michigan/NilesArea/
Transmission Infrastructure – South Cass	Building new transmission lines and expanding Substation	~40 mi S	Construction expected early 2025 through early 2026	AEP Transmission. South Cass County Transmission Line Project. https://aeptransmission.com/michigan/SouthCassCounty/
Transmission Infrastructure – South Bend	Rebuilding ~12 mi of transmission lines and upgrading substation	~40 mi S	Construction expected early 2025 through early 2026	AEP Transmission. South Bend – Niles Transmission Line Project. https://aeptransmission.com/indiana/SouthBend-Niles/
Transmission Infrastructure – New substations (Northridge, Jaguar, Meyer)	Multiple substations construction	within 50 mi	-	ITC. ITC Michigan. https://www.itc-holdings.com/project-category/michigan/
Mining – Rosy Mound Site (sand)	Silica mine	~50 mi N (T7N R16W) Ottawa County, Michigan	Active permit since 1982	Department of Environmental, Great Lakes, and Energy. Sand Dune Mining. https://www.michigan.gov/egle/about/organization/geologic-resources-management/mining/sand-dune
Mining – Van Horn Site (sand)	Silica mine	~30 mi N Allegan County, Michigan	Active permit since 2022	Department of Environmental, Great Lakes, and Energy. Sand Dune Mining. https://www.michigan.gov/egle/about/organization/geologic-resources-management/mining/sand-dune

Table G-1 Projects and Actions U.S. Nuclear Regulatory Commission Staff Considered for Cumulative Effects Impact Analysis for the Resumption of Power Operations Activities at Palisades Nuclear Plant (Continued)

Name	Summary	Location	Status	Source
Mining – Nadeau Pit (sand)	Silica mine	~15 mi N (T2S R18W) Van Buren County, Michigan	Active permit since 1979	Department of Environmental, Great Lakes, and Energy. Sand Dune Mining. https://www.michigan.gov/egle/about/organization/geologic-resources-management/mining/sand-dune
Brownfield Project – Redevelopment	Development of a brownfield from coal, lumber, and chemical storage to construction of two residential buildings, a community center, and community garden	40 mi E	Ongoing	Michigan EGLE. RenewMI Project Viewer. https://experience.arcgis.com/experience/a3db431c6b154b87a481e1122f726101/page/Project-Viewer/?utm_campaign=splash&utm_content=RenewMI-Project-Viewer-App&utm_medium=web&utm_source=gis-app
Brownfield Project – Redevelopment	8 ac site contaminated with petroleum and metals to be converted to a mixed use residential/work-live development	40 mi E	Ongoing	Michigan EGLE. RenewMI Project Viewer. https://experience.arcgis.com/experience/a3db431c6b154b87a481e1122f726101/page/Project-Viewer/?utm_campaign=splash&utm_content=RenewMI-Project-Viewer-App&utm_medium=web&utm_source=gis-app
Brownfield Project – Redevelopment	Cleanup of the Pullman Industries Site for future development	25 mi E	Ongoing	Michigan EGLE. RenewMI Project Viewer. https://experience.arcgis.com/experience/a3db431c6b154b87a481e1122f726101/page/Project-Viewer/?utm_campaign=splash&utm_content=RenewMI-Project-Viewer-App&utm_medium=web&utm_source=gis-app

Table G-1 Projects and Actions U.S. Nuclear Regulatory Commission Staff Considered for Cumulative Effects Impact Analysis for the Resumption of Power Operations Activities at Palisades Nuclear Plant (Continued)

Name	Summary	Location	Status	Source
Brownfield Project – Redevelopment	Cleanup of a 0.89 ac site contaminated with petroleum related compounds for future development	40 mi E	Ongoing	App&utm_medium=web&utm_source=gis-app Michigan EGLE. RenewMI Project Viewer. https://experience.arcgis.com/experience/a3db431c6b154b87a481e1122f726101/page/Project-Viewer/?utm_campaign=splash&utm_content=RenewMI-Project-Viewer-App&utm_medium=web&utm_source=gis-app
Brownfield Project – Redevelopment	Cleanup of a manufacturing site contaminated with metals, cyanide, and organic compounds	50 mi NE	Ongoing	Michigan EGLE. RenewMI Project Viewer. https://experience.arcgis.com/experience/a3db431c6b154b87a481e1122f726101/page/Project-Viewer/?utm_campaign=splash&utm_content=RenewMI-Project-Viewer-App&utm_medium=web&utm_source=gis-app
Water Supply and Treatment – Community water supply	Community water supply	Throughout area	-	Michigan EGLE. Michigan Community Public Water Supplies (2019). https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/DWEHD/Community-Water-Supply/Contact-Information-Maps/community-water-supply-list-county.pdf?rev=1a5d0eb9fcd94d388749ac4233c13514
Water Supply and Treatment –	Plants include South Haven,	Throughout area	Operating	Michigan EGLE. Michigan PFAS Action

Table G-1 Projects and Actions U.S. Nuclear Regulatory Commission Staff Considered for Cumulative Effects Impact Analysis for the Resumption of Power Operations Activities at Palisades Nuclear Plant (Continued)

Name	Summary	Location	Status	Source
Wastewater treatment facility plants	Hartford, Benton Harbor-St. Joseph, Dowagiac, Kalamazoo, Holland, Zeeland, Allegan, and Palinwell WWTPs			Response Team. https://www.michigan.gov/pfasresponse/investigations/wastewater
Manufacturing & Air Emission Sources – ANR Pipeline Hamilton CS	Petroleum and Natural Gas Systems	30 mi NE, Hamilton, Michigan	Operational	U.S. Environmental Protection Agency. Greenhouse Gas Reporting Program https://www.epa.gov/ghgreporting/data-sets
Manufacturing & Air Emission Sources – Reckitt/Mead Johnson Nutrition	Pediatric Nutrition Production	45 mi N, Zeeland, Michigan	Operational	U.S. Environmental Protection Agency. Greenhouse Gas Reporting Program https://www.epa.gov/ghgreporting/data-sets
Manufacturing & Air Emission Sources – Otsego Paper, Inc.	Paper Mill	32 mi E, Otsego, Michigan	Operational	U.S. Environmental Protection Agency. Greenhouse Gas Reporting Program https://www.epa.gov/ghgreporting/data-sets
Manufacturing & Air Emission Sources – Pharmacia & Upjohn Company, LLC (Pfizer)	Chemicals	50 mi E, Kalamazoo, Michigan	Operational	U.S. Environmental Protection Agency. Greenhouse Gas Reporting Program https://www.epa.gov/ghgreporting/data-sets
Manufacturing & Air Emission Sources – The Hillshire Brands Company	Food Production	45 mi N, Zeeland, Michigan	Operational	U.S. Environmental Protection Agency. Greenhouse Gas Reporting Program https://www.epa.gov/ghgreporting/data-sets
Manufacturing & Air Emission Sources – Industrial Fabrication	Metal Fabrication	30 mi S, Bridgman, Michigan	Operational since 1983	Industrial Fabrication. Home. https://indfabrication.com/
Manufacturing & Air Emission Sources – VDI Manufacturing	Molding/Tooling	36 mi E, Plainwell, Michigan	Operational since 1980s	VDI Manufacturing. Custom Injection Molding. https://vdimanufacturing.com/

Table G-1 Projects and Actions U.S. Nuclear Regulatory Commission Staff Considered for Cumulative Effects Impact Analysis for the Resumption of Power Operations Activities at Palisades Nuclear Plant (Continued)

Name	Summary	Location	Status	Source
Manufacturing & Air Emission Sources – Advantage Industries	Mechanical Contractor	50 mi NE, Jenison, Michigan	Operational	Advantage Industries Inc. https://www.advind.com/
Manufacturing & Air Emission Sources – Kalamazoo Industries	Machine Manufacturer	42 mi E, Kalamazoo, Michigan	Operational since 1960s	Kalamazoo Industries, Inc. Products. https://kalamazooind.com/products/?srsltid=AfmBOopr507WWPITxT4wKwmlIH1X6Yk5oa2Mfmog7pZtVC1f_k4meI4
Landfill – Autumn Hills Landfill	Solid waste landfill	40 mi NE, Zeeland, Michigan	Operational. Established 1992	WM. Autumn Hills Recycling and Disposal Facility. https://autumnhillslandfill.wm.com/index.jsp
Landfill – South Kent Landfill	Solid waste landfill	45 mi NE, Byron Center, Michigan	Operational. Established 1982	Kent County Public Works. South Kent Recycling & Waste Center. https://www.reimaginetraash.org/south-kent-recycling-waste-center/
Landfill – Orchard Hill Sanitary Landfill	Solid waste landfill	15 mi S, Watervliet, Michigan	Operational. Established 1976	Orchard Hill Landfill. Home. https://myorchardhill.com/
Landfill – Southeast Berrien County Landfill Authority	Solid waste landfill	35 mi S, Niles, Michigan	Operational	SEBCLA. Southeast Berrien County Landfill Authority. https://sebclandfill.com/
Landfill – Elkhart County Solid Waste	Solid waste landfill	50 mi SE, Elkhart, Indiana	Operational	Elkhart County Landfill. Landfill Drop Off Information. https://www.elkhartcountylandfill.com/landfill
Landfill – Westside Security Landfill	Solid waste landfill	43 mi NE, Three Rivers, Michigan	Operational	WM. Westside RDF Management Facility (Disposal). https://www.wmsolutions.com/locations/details/id/89
Transportation – Southwest Michigan Regional Airport	Airport	15 mi, S, Benton Harbor, Michigan	Operational	Southwest Michigan Regional Airport. http://www.swmiairport.com/

Table G-1 Projects and Actions U.S. Nuclear Regulatory Commission Staff Considered for Cumulative Effects Impact Analysis for the Resumption of Power Operations Activities at Palisades Nuclear Plant (Continued)

Name	Summary	Location	Status	Source
Transportation – Gerald R. Ford International Airport	Airport	55 mi NE, Grand Rapids, Michigan	Operational	Gerald R. Ford International Airport. https://www.grr.org/
Transportation – Kalamazoo/Battle Creek International Airport	Airport	50 mi, E, Kalamazoo, Michigan	Operational	Kalamazoo/Battle Creek International Airport. https://flyazo.com/
Transportation – Kirsch Municipal Airport	Airport	10 mi SE, Sturgis, Michigan	Operational	City of Sturgis, Michigan. Kirsch Municipal Airport. http://www.sturgismi.gov/airport/
Transportation – South Haven Regional Airport	Airport	<5 mi NE	Operational	https://www.southhaven.org/directory/south-haven-regional-airport/
Transportation – Rebuilding I-94 from west of I-94 Business Loop to Britain Avenue	Rebuild 8 miles of freeway, replace 4 bridges, and repair 9 bridges	10 mi S, Berrien County, Michigan	Scheduled August 2023–November 2026	Michigan Department of Transportation – I-94 rebuilding project-Berrien County. https://www.michigan.gov/mdot/projects-studies/i94-rebuilding-project-berrien-county
Transportation – Rebuilding U.S.-131 from 76 th Street to 100th St in Byron Township	Rebuild freeway	50 mi, NE, Grand Rapids, Michigan	Scheduled May 2024–November 2024	Michigan Department of Transportation – U.S.-131 rebuilding-Kent County. https://www.michigan.gov/mdot/projects-studies/us-131-kent-county
Parks/Recreation – Van Buren State Park	Day use and camping area with miles of trails	<5 mi, Van Buren County, Michigan	Operational	Pure Michigan. Van Buren State Park. https://www.michigan.org/property/van-buren-state-park
Parks/Recreation – Nature Conservancy's Ross Preserve	1,448 ac preserve	<5 mi, Van Buren County, Michigan	Operational	The Nature Conservancy. Ross coastal Plain Marsh Preserve. https://www.nature.org/en-us/get-involved/how-to-help/places-we-protect/ross-coastal-plain-marsh-preserve/
Parks/Recreation –	50 ac with campsites	<5 mi, Van Buren County, Michigan	Operational	Pure Michigan. Covert Park Beach and

Table G-1 Projects and Actions U.S. Nuclear Regulatory Commission Staff Considered for Cumulative Effects Impact Analysis for the Resumption of Power Operations Activities at Palisades Nuclear Plant (Continued)

Name	Summary	Location	Status	Source
Covert Township Park				Campground. https://www.michigan.org/property/covert-park-beach-and-campground
Parks/Recreation – Pilgrim Haven Natural Area	27 ac shoreline preserve	<5 mi, Van Buren County, Michigan	Operational	Southwest Michigan Land Conservancy. Pilgrim Haven Natural Area. https://swmlc.org/project/pilgrim-haven-natural-area/
Parks/Recreation – North Point Conservation Area	17 ac conservation area	<5 mi, Van Buren County, Michigan	Operational	Van Buren County. North Point Conservation area. https://www.vanburencountymi.gov/438/North-Point-Conservation-Area
Parks/Recreation – Black River Preserve	120 ac preserve	6 mi NE, Van Buren County, Michigan	Operational	Southwest Michigan Land Conservancy. Black River Preserve. https://swmlc.org/project/black-river-preserve/
Parks/Recreation – Casco Township Nature Preserve	8 ac preserve	10 mi N, Allegan County, Michigan	Operational	Casco Township. Casco Township Parks. http://www.cascotownship.info/parks.html
Parks/Recreation – Saugatuck Harbor Natural Area	173 ac conservation area	20 mi N, Allegan County, Michigan	Operational	Land Conservancy of West Michigan. Saugatuck Harbor Natural Area. https://naturenearby.org/portfolio_page/explore/saugatuck-harbor-natural-area/
Parks/Recreation – Saugatuck Dunes State Park	1,000 ac day use and trail area	25 mi N, Allegan County, Michigan	Operational	Department of Natural Resources Michigan. Saugatuck Dunes State Park https://www2.dnr.state.mi.us/parksandtrails/Details.aspx?id=491&type=SPRK
Parks/Recreation – Grand Mere State Park	1,100 ac park	25 mi S, Berrien County, Michigan	Operational	Department of Natural Resources Michigan. Grand Mere State Park.

Table G-1 Projects and Actions U.S. Nuclear Regulatory Commission Staff Considered for Cumulative Effects Impact Analysis for the Resumption of Power Operations Activities at Palisades Nuclear Plant (Continued)

Name	Summary	Location	Status	Source
				https://www2.dnr.state.mi.us/parksandtrails/Details.aspx?id=450&type=SPRK
Parks/Recreation – Warren Dunes State Park	1,500 ac park	32 mi S, Berrien County, Michigan	Operational	Department of Natural Resources Michigan. Warren Dunes State Park. https://www2.dnr.state.mi.us/parksandtrails/Details.aspx?id=504&type=SPRK
Parks/Recreation – Holland State Park	142 ac park with two campgrounds	32 mi, N, Ottawa County, Michigan	Operational	Department of Natural Resources Michigan. Holland State Park. https://www.michiganandnr.com/parksandtrails/Details.aspx?id=458&type=SPRK
Parks/Recreation – Warren Woods State Park	311 ac park	38 mi S, Berrien County, Michigan	Operational	Department of Natural Resources Michigan. Warren Woods State Park. https://www2.dnr.state.mi.us/parksandtrails/Details.aspx?id=505&type=SPRK
Parks/Recreation – Various private campgrounds and parks on Lake Michigan shoreline and nearby	-	-	Operational	-

E = east; GHGRP = Greenhouse Gas Reporting Program; ISFSI = Independent spent fuel storage installation; Michigan EGLE = Michigan Department of Environment, Great Lakes, and Energy; N = north; NE = northeast; PFAS = polyfluoroalkyl substances; S = south; SE = southeast.

Note: Source lists contains company/organization name and page title. All links were accessed in September 2024.

G.1 References

NRC (U.S. Nuclear Regulatory Commission). 2006. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants Supplement 27: Regarding Palisades Nuclear Plant, Final Report*. NUREG-1437, Supplement 27, Washington, D.C. ADAMS Accession No. ML062710300. TN7346.

APPENDIX H

DISCUSSION OF CANCER RISKS AT AND AROUND PALISADES NUCLEAR PLANT

The U.S. Nuclear Regulatory Commission (NRC or Commission) staff developed this appendix in response to the number of the public comments received during the NRC's scoping process concerning thyroid cancer in the immediate vicinity of Palisades Nuclear Plant (Palisades). These comments concern potential human health effects such as cancer from radiation exposure and are described in the scoping meeting summary (NRC 2024-TN10605).

To ensure a complete and independent assessment of cancer risks near Palisades was performed, the NRC staff coordinated with the Michigan Department of Health and Human Services to obtain the most up-to-date information regarding cancer incidence and mortality rates in the State of Michigan and the nearby areas surrounding Palisades. The NRC's mission is to protect the public health and safety and the environment from the effects of radiation from nuclear reactors, materials, and waste facilities. The NRC's regulations in Title 10 *Code of Federal Regulations* (10 CFR) Part 20 (TN283) set forth regulatory standards for radiological protection to protect workers and the public from the harmful health effects (i.e., cancer and other biological impacts) of radiation on humans. The standards are based, in part, on the recommendations of standards-setting organizations. Radiation standards reflect extensive scientific study by national and international organizations. The NRC actively participates in and monitors the work of these organizations to keep current on the latest trends in radiation protection. If the NRC determines that there is a need to revise its radiation protection regulations, it will initiate a rulemaking. The models recognized by the NRC are for use by nuclear power reactors to calculate dose, incorporate conservative assumptions, and account for differences in gender and age to ensure that workers and members of the public are adequately protected from radiation.

Radiation may cause cancers. However, radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold, dose response model is used to describe the relationship between radiation dose and adverse impacts such as incidence of cancer. Simply stated, in this model, any increase in dose, no matter how small, results in an incremental increase in health risk. This theory is accepted by the NRC as a conservative model for estimating health risks from radiation exposure, recognizing that the model probably overestimates those risks. Based on this theory, the NRC conservatively establishes regulatory limits for radioactive effluents and radiation exposures for workers and members of the public. Although the public dose limit in 10 CFR Part 20 (TN283) is 100 millirem (mrem) (1 millisievert [mSv]) for all facilities licensed by the NRC, the NRC has imposed additional constraints on nuclear power reactors. Additionally, 10 CFR 20.1301(e) requires each nuclear power reactor to comply with applicable environmental radiation standards in 40 CFR Part 190 (TN739), such as the total annual whole body dose to a member of the public outside the facility does not exceed 25 mrem (0.25 mSv). The amount of radioactive material released from nuclear power facilities is well-measured, well-monitored, and known to be very small. Light-water--cooled nuclear reactor effluent must meet the as low as reasonably achievable requirements of 10 CFR Part 50 Appendix I (TN249). The doses of radiation that are received by members of the public as a result of exposure to nuclear power facilities are so low (i.e., less than a few millirem) that resulting cancers attributed to the radiation have not been observed and would not be expected.

In addition to NRC's requirements to monitor radioactive effluents (routine and inadvertent) discharged into the environment, the NRC requires each nuclear power plant to maintain a monitoring and surveillance program under the regulations at 10 CFR Part 50, Appendix I (TN249), such as with a radiological environmental monitoring program (REMP). The regulations in 10 CFR Part 50, Appendix I require the quantification of the environmental impacts associated with radioactive effluent releases from the plant as reported in the annual environmental operating report. Implementation of the REMP requires continuous monitoring of the environment, starting before the plant operates to establish background radiation levels and continuing throughout its operating lifetime to monitor radioactivity in the local environment. This provides a mechanism for determining the levels of radioactivity in the environment to ensure that any accumulation of radionuclides released into the environment will not become significant as a result of plant operations. This implementation also measures radioactivity from other nuclear facilities that may be in the area (i.e., other nuclear power plants, hospitals using radioactive material, research facilities, or any other facility licensed to use radioactive material). Thus, 10 CFR Part 50, Appendix I requires monitoring of the cumulative effects from all sources of radioactivity in the vicinity of the power plant. To obtain information on radioactivity around the plant, samples of environmental media (e.g., surface water, groundwater, drinking water, air, milk, locally grown crops, locally produced food products, river, ocean, or lake sediment, and fish and other aquatic biota) are collected from areas surrounding the plant for analysis to measure the amount of radioactivity, if any, in the samples. The media samples reflect the radiation exposure pathways (i.e., inhalation, ingestion, and physical location near the plant) to the public from radioactive effluents released by the nuclear power plant and from background radiation (i.e., cosmic sources and naturally occurring radioactive material, including radon and global fallout). The 10 CFR Part 20, Appendix B standards limit the amount of radioactivity in the sample media, which, if exceeded, must be reported to the NRC, and the licensee must conduct an investigation. The REMP verifies that measurable concentrations of radioactive materials and levels of radiation in the environment are not higher than expected when compared against data on the amount of radioactive effluent discharged. As part of its environmental review, the NRC staff review REMP reports to look for adverse data or evidence of a buildup of radioactivity in the environment.

The State of Michigan conducts an independent REMP program through the Michigan Department of Environment, Great Lakes, and Energy (MEGLE 2016-TN10744). The Michigan Radiation Environmental Monitoring Program monitors ambient radiation levels, and collects air, water, precipitation, and milk samples from areas surrounding all of the nuclear power plants in Michigan, including Palisades. This program has been operated by the State since 1958. The collected and analyzed data is published periodically and is currently reported through 2016. The NRC staff reviewed the data from Michigan Environment, Great Lakes, and Energy pertaining to Palisades and compared it to the information contained within annual REMP reports published by the facility's operators and reported to the NRC. The NRC staff did not find an observable difference between the values reported by the facility operators and the data determined by Michigan Radiation Environmental Monitoring Program.

Cancer statistics are tracked at the national, State, and county level. The U.S. Centers for Disease Control, National Environmental Health Public Health Tracking Network (CDC 2024-TN10845) and the University of Kentucky Cancer Surveillance Program (University of Kentucky 2014-TN10851) provide publicly available graphical information systems to visualize health statistics. The health statistics for Van Buren, Berrien, Cass, Kalamazoo, and Allegan counties, along with statistics for the State of Michigan, were reviewed by NRC staff. Total cancer rates and thyroid cancer rates were reviewed on these levels from 2006 (the year of publication of the license renewal) to the most recent data available. These statistics are shown in Table H-1

below and indicate that occurrences of cancer and thyroid cancer in the area surrounding Palisades do not vary from rates regionally.

Table H-1 Age-Adjusted Incidence Rate of Thyroid Cancer Per 100,000 Individuals in a Population in Select Michigan Counties in Over 5 Years. Source: CDC 2024-TN10845.

County	Start Year	End Year	5 Year Thyroid Cancer Incidence Rate Per 100,000 Persons
Allegan	2001	2005	5.1
Allegan	2006	2010	9.8
Allegan	2011	2015	9.8
Allegan	2016	2020	11.1
Berrien	2001	2005	6.4
Berrien	2006	2010	9.3
Berrien	2011	2015	9.5
Berrien	2016	2020	8.4
Cass	2001	2005	n/a
Cass	2006	2010	n/a
Cass	2011	2015	10.8
Cass	2016	2020	9.5
Kalamazoo	2001	2005	8.1
Kalamazoo	2006	2010	12.6
Kalamazoo	2011	2015	11.8
Kalamazoo	2016	2020	9.2
Van Buren	2001	2005	7.6
Van Buren	2006	2010	5.8
Van Buren	2011	2015	8.5
Van Buren	2016	2020	9.9
Michigan State Average	2001	2005	8.4
Michigan State Average	2006	2010	11.7
Michigan State Average	2011	2015	13.4
Michigan State Average	2016	2020	11.6

n/a = not available

Although a number of studies of cancer incidence in the vicinity of nuclear power facilities have been conducted, there are no studies to date that definitively demonstrate a correlation between radiation dose from nuclear power facilities and cancer incidence in the general public. The following is a listing of radiation health studies that the NRC recognizes:

- In 1990, at the request of Congress, the National Cancer Institute conducted a study of cancer mortality rates around 52 nuclear power plants and 10 other nuclear facilities. The study covered the period from 1950 to 1984 and evaluated the change in mortality rates before and during facility operations. The study concluded there was no evidence that nuclear facilities may be linked causally with excess deaths from leukemia or from other cancers in populations living nearby (NCI 2011-TN10889).
- In June 2000, investigators from the University of Pittsburgh found no link between radiation released during the 1979 accident at the Three Mile Island Nuclear Generating Station and

cancer deaths among nearby residents. Their study followed 32,000 people who lived within 5 mi (8 km) of the plant at the time of the accident (Talbot et al. 2000-TN10890).

- The American Cancer Society in 2001 concluded that although reports about cancer clusters in some communities have raised public concern, studies show that clusters do not occur more often near nuclear plants than they do by chance elsewhere in the population. Likewise, there is no evidence that links strontium-90 with increases in breast cancer, prostate cancer, or childhood cancer rates. Radiation emissions from nuclear power plants are closely controlled and involve negligible levels of exposure for nearby communities (ACS 2001-TN10891).
- In 2000, the Illinois Public Health Department compared childhood cancer statistics for counties with nuclear power plants to similar counties without nuclear plants and found no statistically significant difference (IDPH 2000-TN10895).
- The Connecticut Academy of Sciences and Engineering, in January 2001, issued a report on a study around the Haddam Neck Nuclear Power Plant in Connecticut and concluded radiation emissions were so low as to be negligible and found no meaningful associations to the cancers studied (CASE 2001-TN10892).
- In 2001, the Florida Bureau of Environmental Epidemiology reviewed claims that there are striking increases in cancer rates in southeastern Florida counties caused by increased radiation exposures from nuclear power plants. However, using the same data to reconstruct the calculations on which the claims were based, Florida officials were not able to identify unusually high rates of cancers in these counties compared with the rest of the State of Florida and the Nation (FDOH 2001-TN10894).
- The United Nations Scientific Committee on the Effects of Atomic Radiation analyzed radiation exposures as a result of the Fukushima Daichi Nuclear Power Station accident in March of 2011. The report concluded that no adverse health effects among Fukushima residents have been documented that are directly attributable to radiation exposure from the accident. Furthermore, the report identifies that an increase of thyroid cancers detected in exposed children is the result of ultrasensitive screening procedures revealing thyroid abnormalities not previously documented in the population and not from the exposure itself (UNSCEAR 2022-TN10916).
- Nuclear workers provide valuable information on the effects of ionizing radiation in contemporary exposure scenarios relevant to workers and the public. A 2023 article presented in the International Journal of Epidemiology titled, "Ionizing Radiation and Solid Cancer Mortality Among U.S. Nuclear Facility Workers," included an analysis of greater than 100,000 nuclear workers in the United States, exposed to an average 2,650 mrem (26.5 mSv) of external penetrating ionizing radiation. This study notes that higher rates of solid cancers including lung cancers were observed for workers of five nuclear facilities between the years of 1944 to 2016. The analysis given in the article bolsters the body of evidence suggesting there are radiogenic risks associated with several types of solid cancers (Kelly-Reif et al. 2023-TN10917).
- In 1957 a fire at the Sellafield Windscale reactor site resulted in an emission of nearly 50,000 Curies (Ci) (1,800 Terabecquerel) of iodine-131 to the atmosphere. This resulted in doses to children up to 10 rads (100 milligray). A longitudinal study was conducted to track individuals impacted during the release. The study tracked 193,500 individuals born between 1950 and 1980 in areas both impacted and not impacted by the release. The study determined that there were no increased rates of thyroid cancer in the impacted individuals

when compared to those born in non-impacted areas or in impacted areas after the release (McNally et al. 2024-TN10893).

- The State of Michigan Department of Health and Human Services, Department of Environmental Health conducted a review of the thyroid cancer statistics for the area of Covert Township in Michigan (MDHHS 2024-TN10866). The State identified six instances of thyroid cancer in Covert Township from 1985 to 2021. The small number of recorded cases in a population of 2,510 was too low to conduct viable statistical analysis with other comparable locations. No temporal patterns were identified with regards to thyroid cancer for the location during the review. The data was obtained from the Michigan Cancer Surveillance Program. It is important to note that part-time residents with a separate primary residence or individuals that were diagnosed after moving away from the county would not be identified as individuals diagnosed in Covert Township.

As discussed in Section 3.11.1 of this environmental assessment, in the 2006 supplemental environmental impact statement (NRC 2006-TN7346) the maximum annual total effective dose equivalent (TEDE) for the maximally exposed individual (over the 5-year period of 2000–2005) was reported as 7.53×10^{-3} mrem, with the TEDE including estimates for liquid and gaseous effluents. The average occupational radiation exposure TEDE dose for the operational years 2006 to 2021 ranged from 0.09 rem to 0.39 rem (NRC 2024-TN9915). These dose results confirm that Palisades was operating in compliance with 10 CFR Part 50 (TN249), Appendix I, 10 CFR Part 20 (TN283), and 40 CFR Part 190 (TN739) for members of the public and occupational dose limits.

The monitoring program under NRC regulation and those conducted by the State of Michigan indicate that the emissions from Palisades are very low and a small fraction of the regulatory limits. That program data in conjunction with the above studies indicate that nuclear plant emissions are unlikely to contribute to cancer rates in the location population.

H.1 References

10 CFR Part 50. *Code of Federal Regulations*, Title 10, *Energy*, Part 50, “Domestic Licensing of Production and Utilization Facilities.” TN249.

40 CFR Part 190. *Code of Federal Regulations*, Title 40, *Protection of Environment*, Part 190, “Environmental Radiation Protection Standards for Nuclear Power Operations.” TN739.

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MDHHS (Michigan Department of Health and Human Services). 2024. Letter from K. Vang, Unit Manager, Health Statistics Surveillance Unit, Environmental Health Surveillance Section, Division of Environmental Health, to D. Persky, Health Officer, Van Buren/Cass District Health Department, dated November 15, 2024, regarding "Findings of investigation of cancer incidence among residents of Covert Township, Michigan." Lansing, Michigan. ADAMS Accession No. ML25006A210. TN10866.

MEGLE (Michigan Department of Environment, Great Lakes, and Energy). 2016. "Radiological Monitoring & Reporting." Lansing, Michigan. Accessed September 18, 2024, at <https://www.michigan.gov/egle/about/organization/materials-management/radiological/monitoring#:~:text=The%20state%20of%20Michigan%20established,environment%20are%20not%20adversely%20impacted>. TN10744.

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NRC (U.S. Nuclear Regulatory Commission). 2006. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants Supplement 27: Regarding Palisades Nuclear Plant, Final Report*. NUREG-1437, Supplement 27, Washington, D.C. ADAMS Accession No. ML062710300. TN7346.

NRC (U.S. Nuclear Regulatory Commission). 2024. Memorandum from L. Willingham, Project Manager, Environmental Project Management Branch 3, Division of Rulemaking, Environmental, and Financial Support, Office of Nuclear Material Safety and Safeguards, to D. Barnhurst, Branch Chief, Environmental Project Management Branch 3, Division of Rulemaking, Environmental, and Financial Support, Office of Nuclear Material Safety and Safeguards, dated August 12, 2024, regarding "Summary of Public Scoping Meeting Related to the Potential Reauthorization of Power Operations for the Palisades Nuclear Plant (EPID Number: L-2024-LNE-0003) (Docket Number: 50-0255)." Washington, D.C. ADAMS Accession Package No. ML24221A033. TN10605.

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APPENDIX I

SUPPLEMENTAL INFORMATION PERTINENT TO SECTION 106 CONSULTATION AND THE HISTORIC AND CULTURAL RESOURCES REVIEW

I.1 National Historic Preservation Act Section 106 Consultation

The National Historic Preservation Act of 1966, as amended (NHPA) (TN4157), requires Federal agencies to consider the effects of their undertakings on historic properties and consult with applicable Federal, State, Tribal, local groups or agencies, individuals, and organizations with demonstrated interest in the undertaking before taking the action. Historic properties are defined as resources that are eligible for listing on the National Register of Historic Places. The historic preservation review process (Section 106 of the NHPA) is outlined in regulations issued by the Advisory Council on Historic Preservation (ACHP) in 36 *Code of Federal Regulations* (CFR) Part 800 (TN513), "Protection of Historic Properties." In accordance with 36 CFR Part 800.8(c), "Use of the NEPA Process for Section 106 Purposes," the U.S. Nuclear Regulatory Commission (NRC or Commission) has elected to use the National Environmental Policy Act of 1969 process to comply with its obligations under Section 106 of the NHPA.

Federal, government-to-government consultation as part of the 2006 SEIS (NRC 2006-TN7346) focused on engaging with the Advisory Council on Historic Preservation, Michigan State Historic Preservation Office (Michigan SHPO), and 12 federally recognized Indian Tribes. The NRC notified the ACHP and consulted with the Michigan SHPO and 35 federally recognized Indian Tribes via a letter dated July 1, 2024. All consultation letters are presented in Appendix E to this environmental assessment (EA), with individual contacts presented in Appendix D to this EA.

On July 10, 2024, NRC staff met the Michigan SHPO to provide an overview and discuss the proposed undertaking and answer questions from the letter dated July 1, 2024.

On July 16, 2024, the NRC held a non-public, virtual, Tribal information meeting. Seven federally recognized Indian Tribes participated. The purpose of this meeting was to share details about the proposed undertaking and the scoping process (which was still open and the NRC was still accepting comments at that time).

On September 11, 2024, the NRC held an in-person site visit and information session at Palisades Nuclear Plant (Palisades) for federally recognized Indian Tribes. Two Indian Tribes participated in-person with virtual attendees present. The information session included a presentation outlining the proposed project, undertaking and Federal actions, Federal agencies involved, past land disturbance at Palisades, the anticipated area of potential effects, the NRC's environmental review schedule, and potential future projects at the Palisades site (SLR and small modular reactor project) which would be captured in the NRC's cumulative effects review. Additionally, the NRC relayed that these potential future projects would be separate undertakings under Section 106 of the NHPA. The NRC held a separate in-person tour and information session with the Michigan SHPO on September 12, 2024. The NRC sent a summary of the in-person site visit and information session with all federally recognized Indian Tribes on October 31, 2024.

By emails dated September 18, 2024, and October 2, 2024 (NRC 2025-TN10879), the NRC sent Holtec's archaeological survey report (SEARCH 2024-TN10846) to federally recognized Tribes for review and comment. To date, no comments regarding the archaeological report have been received. On November 4, 2024 (NRC 2025-TN10879), Holtec sent its historic and cultural resource procedures to address inadvertent discoveries and notification protocols to federally recognized Indian Tribes. To date, no comments have been received.

As identified in the NRC's initial consultation letter dated July 1, 2024, the NRC staff transmitted a second consultation letter identifying the Palisades area of potential effects to the Michigan SHPO, ACHP, and federally recognized Indian Tribes on November 5, 2024 (see Appendix E to this EA).

Further communication and consultation occurred with the Michigan SHPO on August 13, 2024, when Holtec transmitted copies of their cultural resource procedures to the Michigan SHPO for review. The Michigan SHPO responded by letter and provided comments on these procedures on October 23, 2024. Holtec also submitted its archaeological survey report (SEARCH 2024-TN10846) and architectural survey report (Theriot and Travisano 2024-TN10847) for review and concurrence to the Michigan SHPO.

On September 18, 2024, the Michigan SHPO concurred with the archaeological survey identifications and eligibility determinations for Palisades (MI SHPO 2024-TN10850). On October 2, 2024, the Michigan SHPO responded by letter and requested additional information for the architectural survey report for their review (MI SHPO 2024-TN10873). Holtec updated its architectural survey and resubmitted it to Michigan SHPO on October 22, 2024. On November 6, 2024, Michigan SHPO determined that the containment building could not be considered separately from the remaining parts of the Palisades facility and did not rise to the level of significance required for listing in the NRHP under Criteria C for Architecture/Engineering (MI SHPO 2024-TN10844).

By letter dated January 31, 2025, the NRC notified the Michigan SHPO, ACHP, and federally recognized Tribes of issuance of the draft EA, draft Finding of No Significant Impact, and draft Section 106 determination (see Table E-1). Following issuance of this letter, the NRC conducted a virtual Tribal information meeting on February 11, 2025. The NRC shared the presentation slides and sent a summary of the meeting with all federally recognized Indian Tribes on February 18, 2025.

On February 24, 2025, the Michigan SHPO concurred with the NRC's Section 106 determination of effect, specifically that the project will have no adverse effect on historic properties within the area of potential effect. No additional comments were received from consulting parties.

I.2 Historic Land Disturbance Photographs and Maps

In 1965, Consumers Power Company and the Detroit Edison Company completed a joint study to identify suitable locations in Michigan for a proposed nuclear power plant (AEC 1972-TN10603). Of the locations studied, Consumers Power Company selected Palisades due to its location being: (1) immediately adjacent to Lake Michigan, (2) near existing and nearby railroad facilities, and (3) close to existing transmission line infrastructure. Palisades was also selected because it was the location of a former sand quarry. In 1966, grading and vegetation clearing activities began at Palisades.

The following set of historical photographs and maps visually depict the land disturbance that occurred at Palisades between 1966 and 1971 (Figure I-1 through Figure I-17). Two historic aerial photographs depict the landscape at Palisades prior to construction in 1955 and 1960 (Figure I-1 and Figure I-2). These historical photographs help visualize the previous disturbance that occurred in sand dune locations to the south and southeast of the Palisades reactor vessel building, and in the immediate area where both cooling towers exist today.



Figure I-1 The Palisades Nuclear Plant Site Boundary Overlain with a 1955 Historic Aerial Photograph from the RS&GIS Aerial Imagery Archive, Michigan State University. Source: www.rsgis.msu.edu.

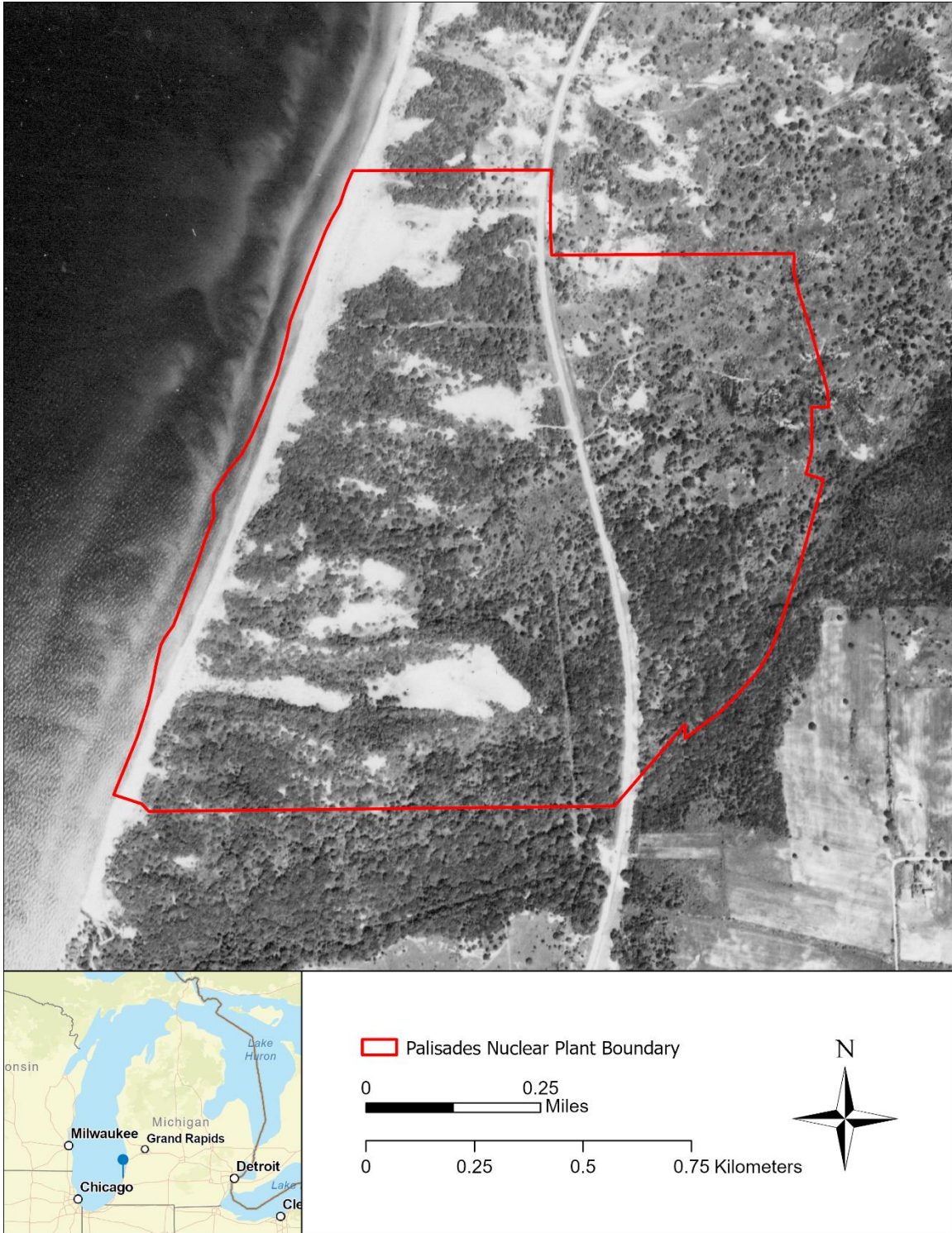


Figure I-2 The Palisades Nuclear Plant Site Boundary Overlain with a 1960 Historic Aerial Photograph from the RS&GIS Aerial Imagery Archive, Michigan State University. Source: www.rsgis.msu.edu.

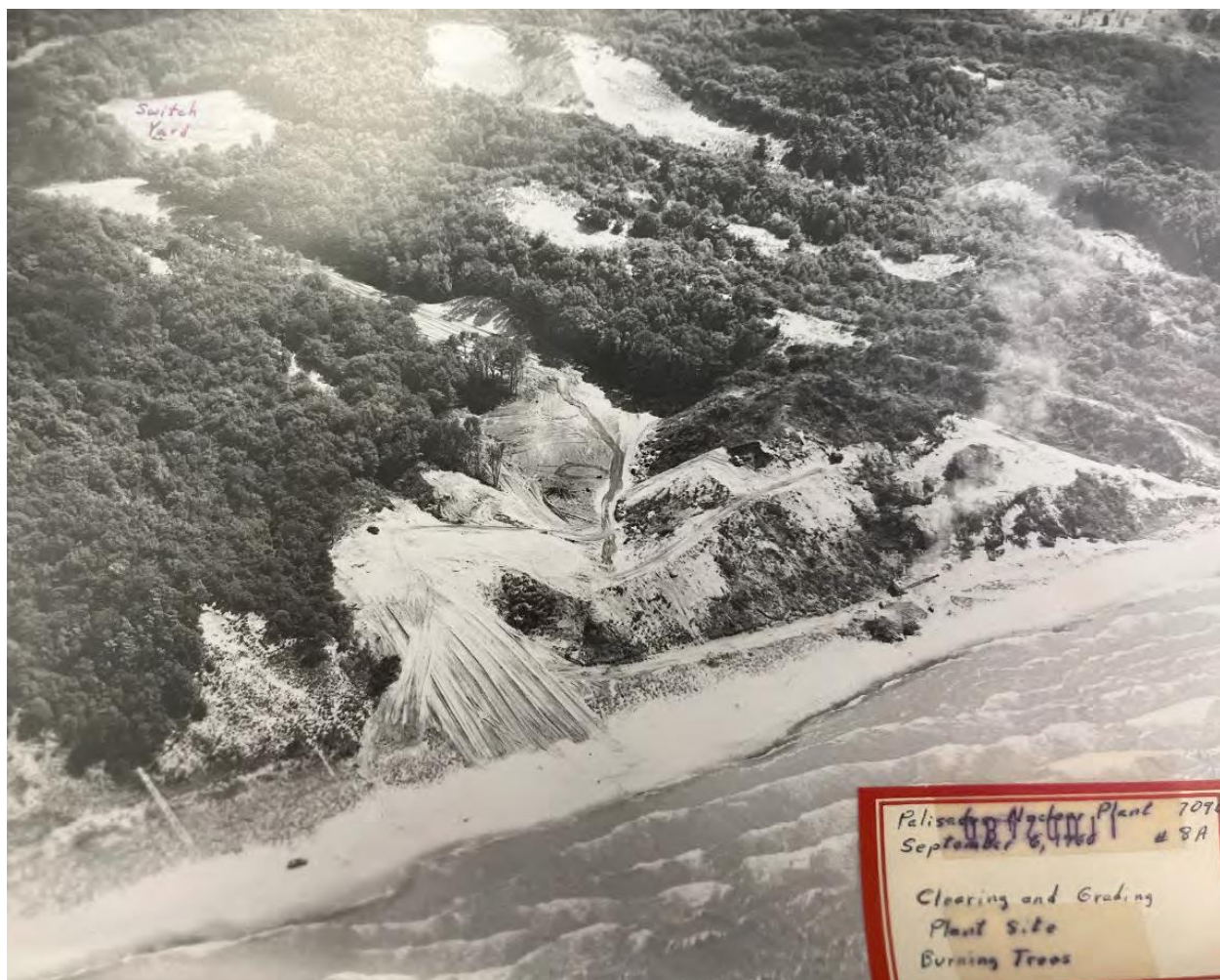


Figure I-3 The Palisades Nuclear Plant Site on September 6, 1966, Showing the Early Stages of Vegetation Clearing and Grading. The Original Photograph Caption States, "burning trees." Source: SEARCH 2024-TN10846.



Figure I-4 Heavy Equipment Operating on the Beach on the Northern Portion of the Palisades Nuclear Plant Site on September 22, 1966. Photograph Looking to the Northwest. Source: HDI 2024-TN10670.



Figure I-5 Heavy Equipment Grading the Beach at the Palisades Nuclear Plant Site on October 17, 1966. Photograph Looking to the North. Source: HDI 2024-TN10670.



Figure I-6 A Photograph from December 1966 Looking Southwest across the Palisades Nuclear Plant Site Showing the Extent of Land Grading Activities at That Time. Note the Cleared Vegetation and Road Cut into the Sand Dune behind the Crane. Source: HDI 2024-TN10670.

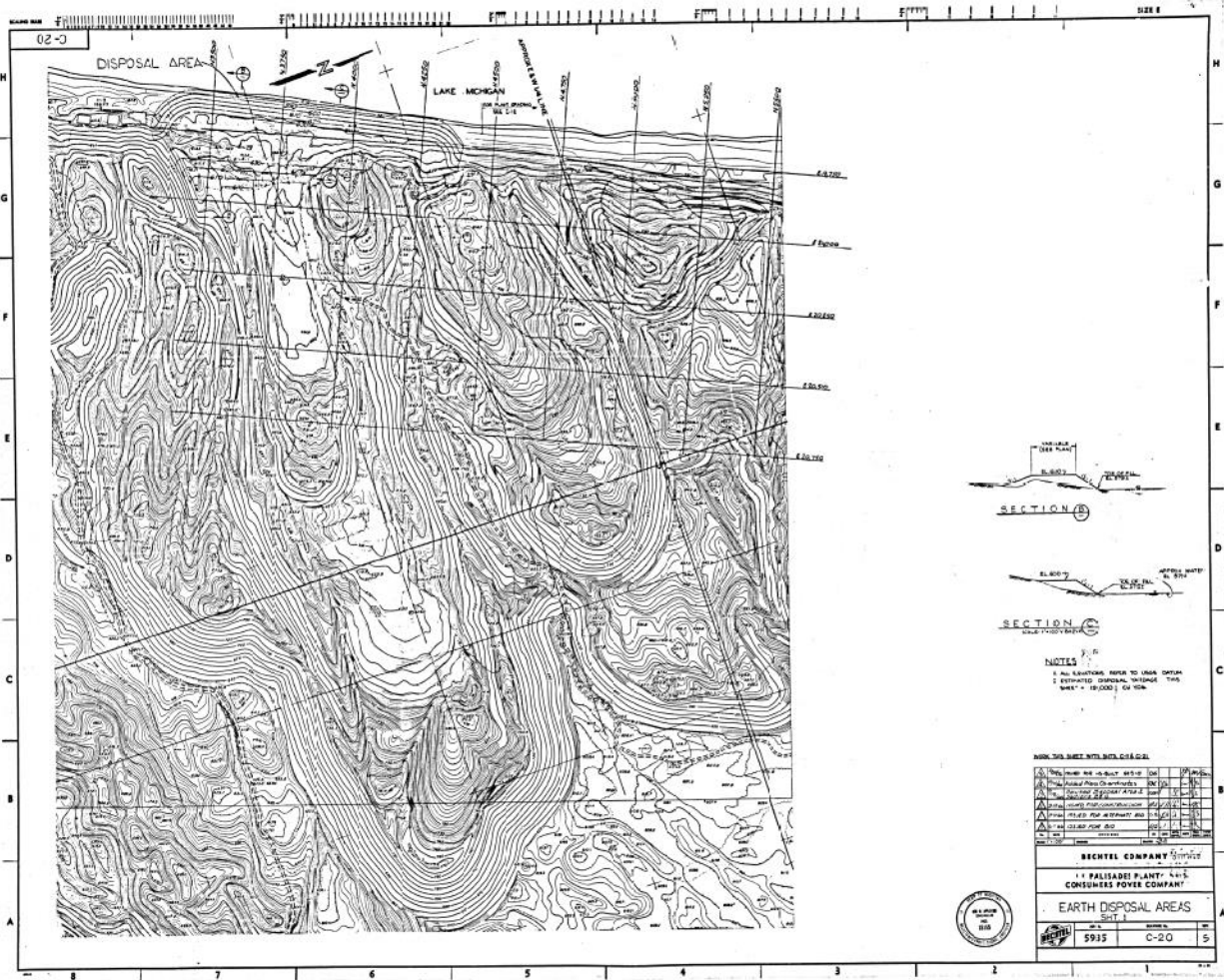


Figure I-7 A Topographic Map Highlighting the Disposal Area along the Shore of Lake Michigan for Construction of Palisades Nuclear Plant. Source: HDI 2024-TN10670.

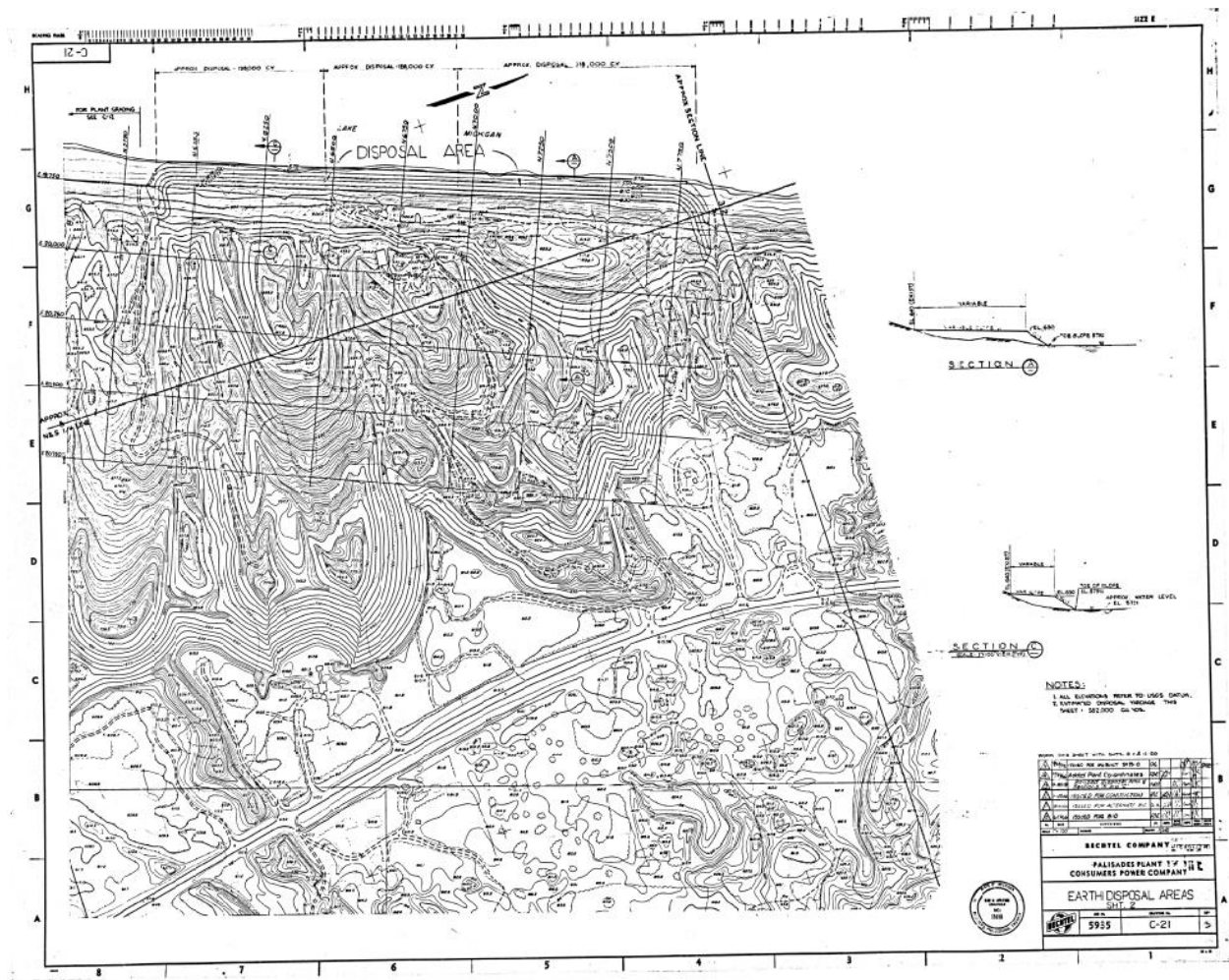


Figure I-8 A Topographic Map Highlighting the Disposal Area along the Shore of Lake Michigan for Construction of Palisades Nuclear Plant. Source: HDI 2024-TN10670.

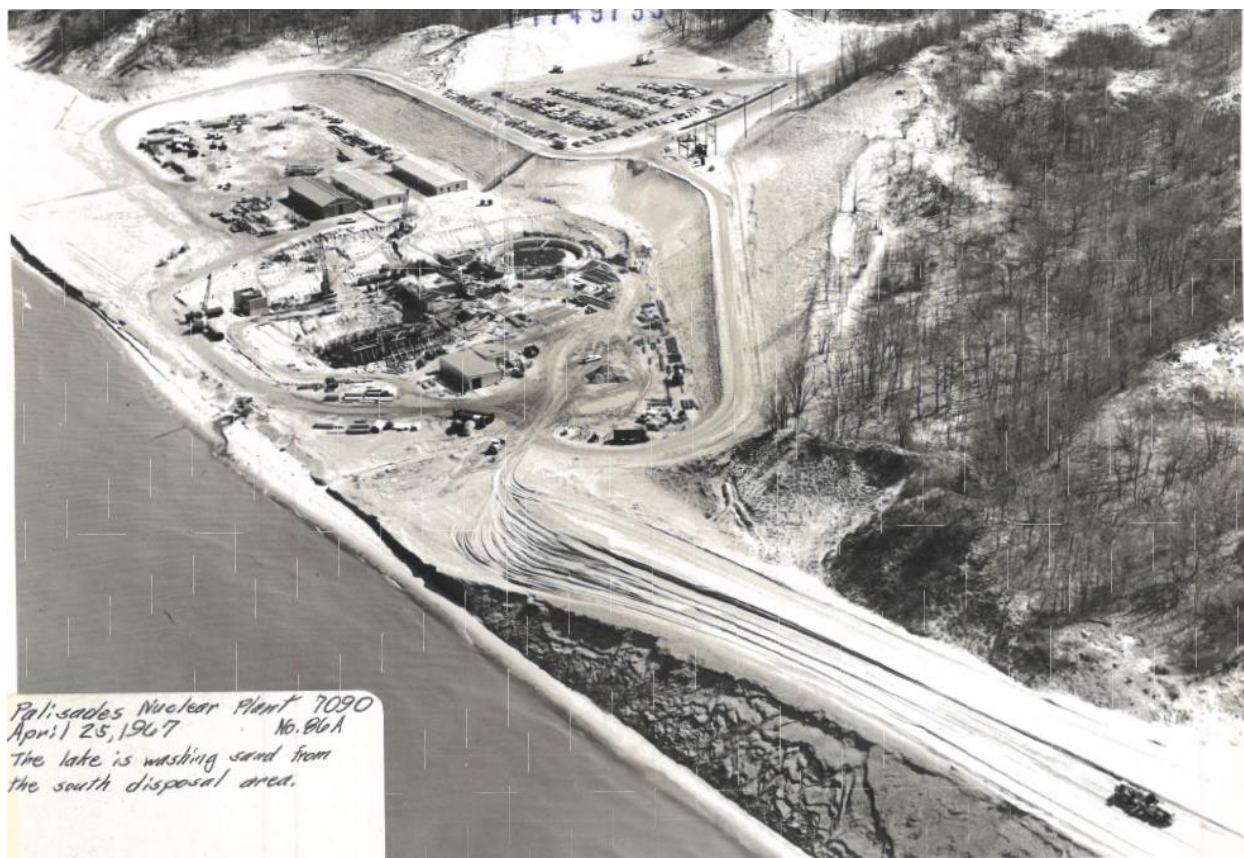


Figure I-9 A Photograph from April 25, 1967, Looking Northeast over the Palisades Nuclear Plant Site. Note the Cleared Vegetation and Road Cut into the Sand Dune to the Right of the Circular Footprint of the Future Reactor Vessel Building and the Land Grading and Vegetation Clearing along the Beach to the South of the Site. The Original Photograph Caption States, "The lake is washing sand from the south disposal area." Source: HDI 2024-TN10670.



Figure I-10 A Photograph from April 25, 1967, Looking Southeast over Palisades Nuclear Plant Site. Note the Cleared Vegetation and Road Cut into the Sand Dune to the Left of the Circular Footprint of the Future Reactor Vessel Building and the Land Grading and Vegetation Clearing along the Beach to the South of the Site. Source: HDI 2024-TN10670.



Figure I-11 A Photograph from June 1968, Looking East over the Palisades Nuclear Plant Site. Note the Cleared Vegetation and Road Cut into the Sand Dune to the Right of the Reactor Vessel Building and the Land Grading and Vegetation Clearing along the Beach to the South of the Site. Source: HDI 2024-TN10670.



Figure I-12 A Photograph from August 31, 1967, Looking Southeast from the Auxiliary Building Foundation of Palisades Nuclear Plant. Note the Cleared Vegetation and Road Cut into the Sand Dune behind the Crane. The Existing Transmission Pole on Top of the Sand Dune Is Located Where the Current Transmission Lines and Structures Are Located Today. The Sand Dune Has Already Undergone Revegetation. Source: HDI 2024-TN10670.

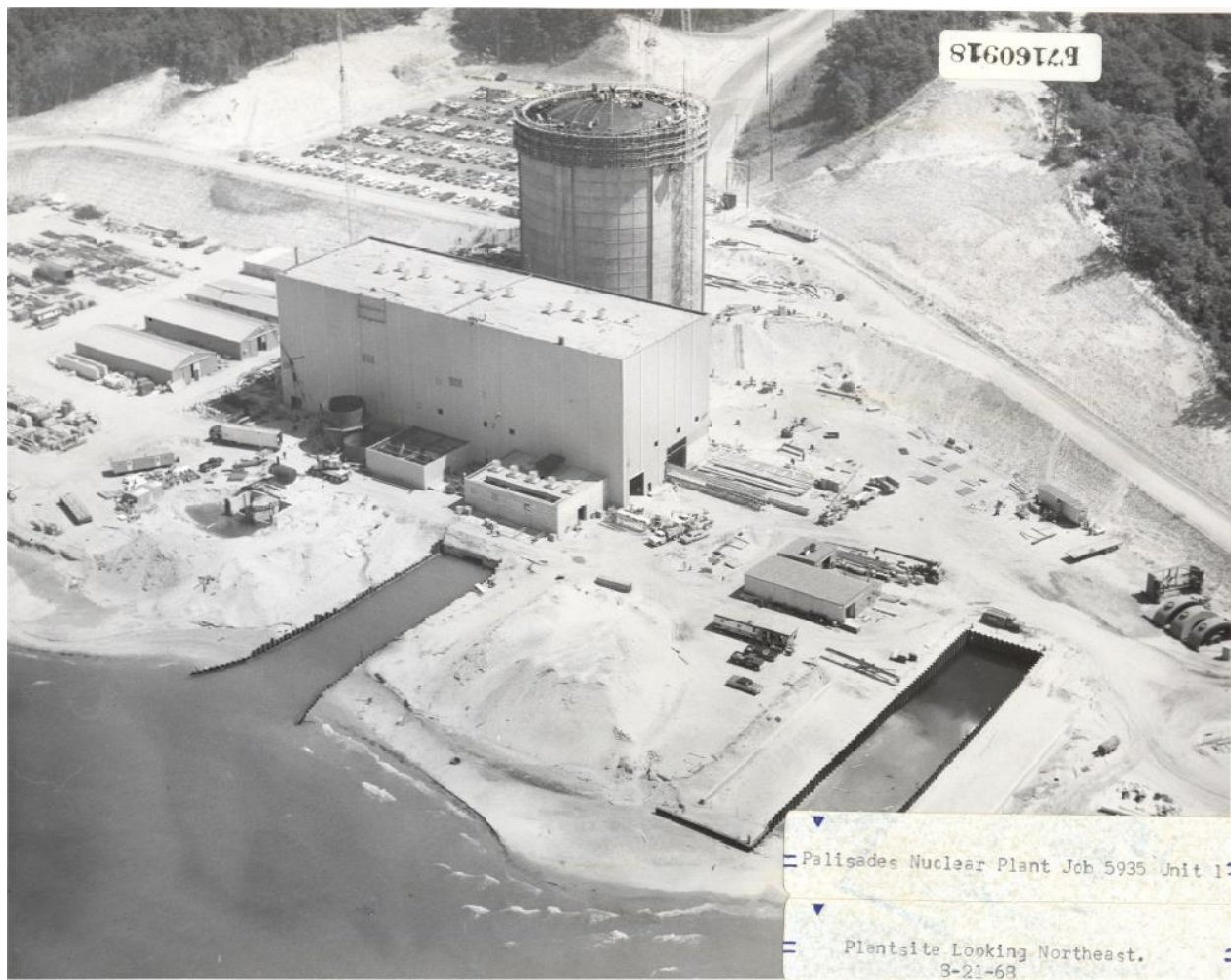


Figure I-13 A Photograph from March 21, 1968, Looking Northeast. Note the Cleared Vegetation and Road Cut into the Sand Dune on the upper right.
Source: HDI 2024-TN10670.

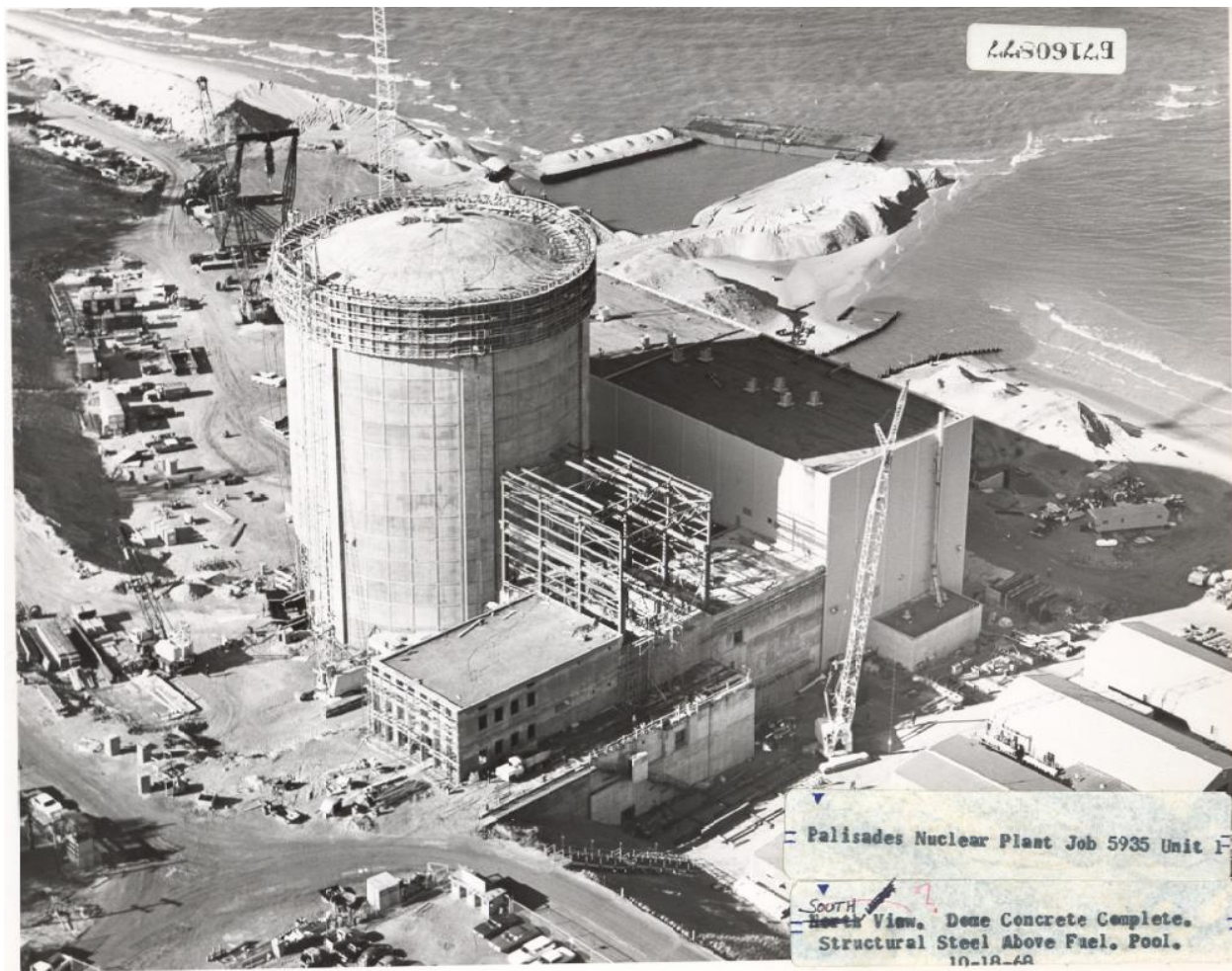


Figure I-14 A Photograph from October 18, 1968, Looking Southwest over Palisades Nuclear Plant Site. Source: HDI 2024-TN10670.

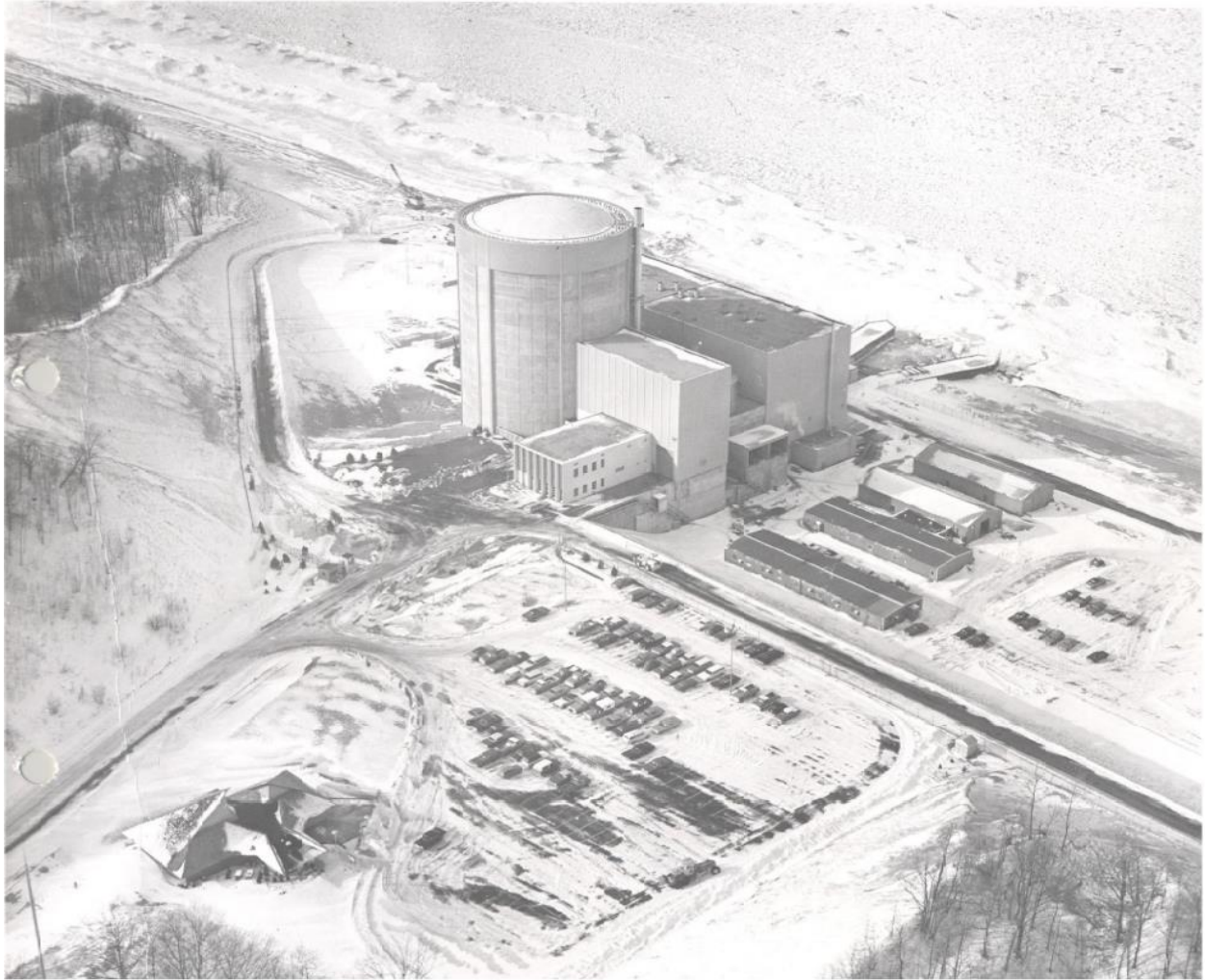


Figure I-15 An Undated Photograph Looking Southwest over Palisades Nuclear Plant Site. Note the Cleared Vegetation and Road Cut into the Sand Dune to the Left of the Reactor Vessel Building. Source: HDI 2024-TN10670.



Figure I-16 A Photograph from June 28, 1969, Looking Southeast over the Palisades Nuclear Plant Site. Note the Cleared Vegetation and Road Cut into the Sand Dune to the Left of the Reactor Vessel Building and the Land Grading and Vegetation Clearing along the Beach to the South of the Site. This Location Is Where Both Cooling Towers Exist Today. Source: HDI 2024-TN10670.



Figure I-17 A Photograph from November 22, 1969, Looking Northeast over the Palisades Nuclear Plant Site. Note the Cleared Vegetation and Road Cut into the Sand Dune to the Right of the Reactor Vessel Building and the Land Grading and Vegetation Clearing along the Beach to the South of the Site. Source: HDI 2024-TN10670.

I.3 References

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APPENDIX J

ECOLOGY ANALYSES AND TABLES

J.1 State-Listed Terrestrial Species

The U.S. Nuclear Regulatory Commission (NRC or Commission) reviewed the information in the 2006 supplemental environmental impact statement regarding State-listed species, Holtec Decommissioning International's exemption request (HDI 2023-TN10538), updated lists of species known to occur in Van Buren and Berrien Counties (MSU 2024-TN10861, MSU 2024-TN10862), and other information provided by the applicant (HDI 2024-TN10670: RAI-GEN-3, Attachment 2) and incorporates these species lists by reference. Table J-1 and Table J-2 below present the 58 State-listed species that have been observed in these two counties since 2000.

Two State-listed species have been observed at the Palisades site: the endangered prairie vole and the threatened eastern box turtle (HDI 2024-TN10670: RAI-GEN-3, Attachment 2). The prairie vole is a small rodent that has not been seen in Van Buren County since 1960 and Berrien County since 1962 (MSU 2021-TN10874).

Table J-1 State-listed Endangered and Threatened Terrestrial Species That Are Not Federally Listed and That Have Been Observed in Berrien or Van Buren County, Michigan since 2000 and Are Not Amphibians or Reptiles

Group	Scientific Name	Common Name	State Status ^(a)	Habitats ^(b)	Year Last Observed in Van Buren or Berrien County
Bird	<i>Centronyx henslowii</i>	Henslow's sparrow	E	Old field and pasture habitats such as weedy or grassy fields and meadows often in low-lying or damp areas with widely scattered shrubs.	2007
Bird	<i>Ixobrychus exilis</i>	Least bittern	T	Tall, dense stands of emergent vegetation over water 4–30 in. deep and are typically only a few meters from a nearby opening.	2014
Bird	<i>Parkesia motacilla</i>	Louisiana waterthrush	T	Broad forested areas along clear streams and may nest right on the stream bank in exposed roots.	2021

Table J-1 State-listed Endangered and Threatened Terrestrial Species That Are Not Federally Listed and That Have Been Observed in Berrien or Van Buren County, Michigan since 2000 and Are Not Amphibians or Reptiles (Continued)

Group	Scientific Name	Common Name	State Status ^(a)	Habitats ^(b)	Year Last Observed in Van Buren or Berrien County
Mammal	<i>Myotis lucifugus</i>	Little brown bat	T	Often forage around streams, ponds, and lakes. Maternity roosts in human-made structures (barns, houses, large buildings, and the underside of bridges), tree hollows and under loose bark.	2005
Vascular plant	<i>Asclepias purpurascens</i>	Purple milkweed	T	Occurs in dry to mesic prairies and savannas, dry open roadsides, along railroads, and in fencerows.	2008
Vascular plant	<i>Baptisia lactea</i>	White or prairie false indigo	T	Associated with patterned fen complexes, the margins of shallow lakes/intermittent wetlands, within coastal plain marshes, and lakeplain wet-mesic prairies.	2017
Vascular plant	<i>Boechera dentata</i>	Rock cress	T	Floodplain forests and adjacent steep banks and high bluffs, usually in sites with thick canopies and less than 20% ground cover.	2021
Vascular plant	<i>Carex crus-corvi</i>	Raven's-foot sedge	E	Wet floodplain forests and buttonbush depressions.	2015
Vascular plant	<i>Carex seorsa</i>	Sedge	T	Pine barrens, other savanna and prairie types, openings within coniferous and oak forests, and on limestone pavement.	2006

Table J-1 State-listed Endangered and Threatened Terrestrial Species That Are Not Federally Listed and That Have Been Observed in Berrien or Van Buren County, Michigan since 2000 and Are Not Amphibians or Reptiles (Continued)

Group	Scientific Name	Common Name	State Status ^(a)	Habitats ^(b)	Year Last Observed in Van Buren or Berrien County
Vascular plant	<i>Collinsia verna</i>	Blue-eyed Mary	T	Moist soil rich beech-maple forests with a rich humus layer, and on levees and terraces within floodplain forests.	2021
Vascular plant	<i>Corydalis flavula</i>	Yellow fumewort	T	Floodplain forests and mesic hardwood forests in southwestern Lower Michigan.	2022
Vascular plant	<i>Cypripedium candidum</i>	White lady slipper	T	Alkaline wetlands in southern Lower Michigan, particularly prairie fens and occasionally in lakeplain wet and wet-mesic prairies along coastal areas in Michigan's Thumb region.	2022
Vascular plant	<i>Dichanthelium leibergii</i>	Leiberg's panic-grass	T	Found in dry to wet-mesic prairies, savannas, and openings in oak forest.	2013
Vascular plant	<i>Dichanthelium microcarpon</i>	Small-fruited panic-grass	X	Moist woods and thickets in or near forested and unforested wetlands.	2019
Vascular plant	<i>Dichanthelium polyanthes</i>	Round-seed panic-grass	E	Seasonally flooded wetlands formed in shallow depressions and potholes in glacial lakeplain and outwash landscapes.	2019
Vascular plant	<i>Eryngium yuccifolium</i>	Rattlesnake-master or button snakeroot	E	Sedge and grass-dominated portions of prairie fen complexes, including thickets along stream drainage; sandy soils and wet prairies in former oak savannas and oak barrens, often	2016

Table J-1 State-listed Endangered and Threatened Terrestrial Species That Are Not Federally Listed and That Have Been Observed in Berrien or Van Buren County, Michigan since 2000 and Are Not Amphibians or Reptiles (Continued)

Group	Scientific Name	Common Name	State Status ^(a)	Habitats ^(b)	Year Last Observed in Van Buren or Berrien County
				in small remnants along power lines and railroad rights-of-way.	
Vascular plant	<i>Eutrochium fistulosum</i>	Hollow-stemmed Joe-pye weed	T	Low, sunny, rich woods and floodplains	2021
Vascular plant	<i>Filipendula rubra</i>	Queen-of-the-prairie	T	Known primarily within the State distribution from prairie fens in southwest Lower Michigan, principally in glacial interlobate areas where these alkaline, groundwater fed systems usually occur, especially in association with lake and river complexes and other large drainages.	2004
Vascular plant	<i>Fraxinus profunda</i>	Pumpkin ash	T	Floodplain forests in southern Lower Michigan, usually in lower bottoms. Also found in deciduous swamps.	2006
Vascular plant	<i>Hieracium paniculatum</i>	Panicked hawkweed	T	Associated with sandy oak woods, particularly on old dunes.	2021
Vascular plant	<i>Hydrastis canadensis</i>	Goldenseal	T	Southern hardwood forests, as well as moist ravines and portions of riparian forests.	2006
Vascular plant	<i>Ipomoea pandurata</i>	Wild potato vine or man-of-the-earth	T	Woods and thickets, open fields, roadsides, and sandy ground.	2019
Vascular plant	<i>Isotria verticillata</i>	Whorled pogonia	T	Successional bogs, successional oak and red maple forest in lower slope position and in seasonally	2022

Table J-1 State-listed Endangered and Threatened Terrestrial Species That Are Not Federally Listed and That Have Been Observed in Berrien or Van Buren County, Michigan since 2000 and Are Not Amphibians or Reptiles (Continued)

Group	Scientific Name	Common Name	State Status ^(a)	Habitats ^(b)	Year Last Observed in Van Buren or Berrien County
				inundated, acid hardwood swamps with diverse microtopography (hummocks and hollows), within a matrix of upland oak forest.	
Vascular plant	<i>Juncus brachycarpus</i>	Short-fruited rush	T	Areas with a fluctuating water table such as coastal plain marshes, sandy lake edges, dune swales, seepages, sandy marshes, sandy and peaty edges of wetlands, and intermittent wetlands.	2011
Vascular plant	<i>Juncus scirpoides</i>	Scirpus-like rush	T	Found in areas with a fluctuating water table such as coastal plain marshes, sandy lake edges, dune swales, seepages, sandy marshes, sandy and peaty edges of wetlands, and intermittent wetlands.	2021
Vascular plant	<i>Lechea pulchella</i>	Leggett's pinweed	T	Edges of seasonally inundated intermittent wetlands.	2015
Vascular plant	<i>Lygodium palmatum</i>	Climbing fern	E	Michigan's single known locality for this disjunct species is a larch and poison sumac thicket on the edge of a sedge marsh. Elsewhere occurs in moist thickets and woods in acid soil.	2015
Vascular plant	<i>Mertensia virginica</i>	Virginia bluebells	T	First and second bottoms of riparian forests.	2016

Table J-1 State-listed Endangered and Threatened Terrestrial Species That Are Not Federally Listed and That Have Been Observed in Berrien or Van Buren County, Michigan since 2000 and Are Not Amphibians or Reptiles (Continued)

Group	Scientific Name	Common Name	State Status ^(a)	Habitats ^(b)	Year Last Observed in Van Buren or Berrien County
Vascular plant	<i>Mimulus alatus</i>	Winged monkey flower	T	Moist open woods and stream banks.	2015
Vascular plant	<i>Morus rubra</i>	Red mulberry	T	Forested floodplains, wet-mesic swamps, and bluffs, including wooded dunes.	2010
Vascular plant	<i>Panax quinquefolius</i>	Ginseng	T	Rich shaded forests with loamy soils and heavy canopies.	2023
Vascular plant	<i>Panicum verrucosum</i>	Warty panic-grass	T	Areas with a fluctuating water table such as coastal plain marshes, sandy lake edges, dune swales, seepages, sandy marshes, sandy and peaty edges of wetlands, and intermittent wetlands.	2014
Vascular plant	<i>Phlox maculata</i>	Wild sweet William	T	Moist prairies and fens.	2013
Vascular plant	<i>Polemonium reptans</i>	Jacob's ladder	T	Frequently inhabits prairie fens, wet prairies, and mesic floodplains.	2005
Vascular plant	<i>Primula meadia</i>	Shooting star	E	Wet-mesic to mesic prairies and prairie fens.	2013
Vascular plant	<i>Rhexia mariana</i>	Maryland meadow beauty	T	Areas with a fluctuating water table such as coastal plain marshes, sandy lake edges, dune swales, seepages, sandy marshes, sandy and peaty edges of wetlands, and intermittent wetlands.	2021
Vascular plant	<i>Scleria reticularis</i>	Netted nut rush	T	Seasonally flooded wetlands formed in shallow depressions	2015

Table J-1 State-listed Endangered and Threatened Terrestrial Species That Are Not Federally Listed and That Have Been Observed in Berrien or Van Buren County, Michigan since 2000 and Are Not Amphibians or Reptiles (Continued)

Group	Scientific Name	Common Name	State Status ^(a)	Habitats ^(b)	Year Last Observed in Van Buren or Berrien County
				and potholes in glacial lakeplain landscapes.	
Vascular plant	<i>Silene stellata</i>	Starry campion	T	Dry, open woodlands on sandy soils, dry-mesic forest on or just above the upper margin of river floodplains, and savanna and prairie remnants.	2015
Vascular plant	<i>Silphium integrifolium</i>	Rosinweed	T	Prairie remnants along roads and railroad tracks or in cemeteries, in wet-mesic prairies and fens on peaty mucks and loams, and on dry-mesic to mesic loams and sandy loams.	2009
Vascular plant	<i>Silphium laciniatum</i>	Compass plant	E	Mesic and dry-mesic prairie remnants, and degraded habitats along rights-of-way outside the core range of the species.	2009
Vascular plant	<i>Silphium perfoliatum</i>	Cup plant	T	River floodplains in forest openings and edges.	2010
Vascular plant	<i>Smallanthus uvedalia</i>	Yellow-flowered leafcup	T	Rich woods and moist borders of swamps.	2018
Vascular plant	<i>Symphyotrichum sericeum</i>	Western silvery aster	T	Found in openings within oak-pine barrens, often in bowl prairies, dry banks, and old fields.	2009
Vascular plant	<i>Tipularia discolor</i>	Crane-fly orchid	E	Beech groves or rich mesic forests dominated by hemlock, sugar maple, yellow birch, and beech. It is often found at the base	2019

Table J-1 State-listed Endangered and Threatened Terrestrial Species That Are Not Federally Listed and That Have Been Observed in Berrien or Van Buren County, Michigan since 2000 and Are Not Amphibians or Reptiles (Continued)

Group	Scientific Name	Common Name	State Status ^(a)	Habitats ^(b)	Year Last Observed in Van Buren or Berrien County
				of slopes or flats along streams.	
Vascular plant	<i>Trichostema dichotomum</i>	Bastard pennyroyal	T	Oak savanna areas in southern Lower Michigan.	2008
Vascular plant	<i>Triphora trianthophora</i>	Nodding pogonia or three birds orchid	T	Rich beech-maple forests and old wooded dune forests with well-developed humus layers.	2023
Vascular plant	<i>Valeriana edulis</i> var. <i>ciliata</i>	Edible valerian	T	Alkaline fens in southern Lower Michigan.	2013

(a) State Status (MDNR 2025-TN11681): E = State Endangered, T = State Threatened; X = Presumed Extirpated but would be treated as State Threatened.

(b) Habitat information compiled from Michigan Natural Features Inventory (MSU 2023-TN10757, MSU 2023-TN10758).

Table J-2 Amphibians and Reptiles Listed as State Endangered or Threatened That Have Been Observed in Berrien and Van Buren Counties Before 2000 or That are Listed as Species of Special Concern and Have Been Observed in Berrien and Van Buren Counties

Group	Scientific Name	Common Name	State Status ^(a)	Habitats ^(b)	Last Seen in Counties
Amphibian	<i>Acris blanchardi</i>	Blanchard's cricket frog	T	Open edges of permanent and temporary ponds, lakes, floodings, bogs, seeps, slow-moving streams, and rivers.	2021
Amphibian	<i>Ambystoma opacum</i>	Marbled salamander	-	Most common in moist lowland forests but also can occur in upland forests and dry, forested rocky hillsides.	1966

Table J-2 Amphibians and Reptiles Listed as State Endangered or Threatened That Have Been Observed in Berrien and Van Buren Counties Before 2000 or That are Listed as Species of Special Concern and Have Been Observed in Berrien and Van Buren Counties (Continued)

Group	Scientific Name	Common Name	State Status ^(a)	Habitats ^(b)	Last Seen in Counties
Amphibian	<i>Lithobates palustris</i>	Pickerel frog	SC	Freshwater aquatic and wetland habitats, including fens, bogs, marshes, shrubby/open wet meadows, forested wetlands, ponds, slow-moving streams, springs, and backwater sloughs or swamps.	2018
Reptile	<i>Clemmys guttata</i>	Spotted turtle	T	Clean, shallow bodies of standing or slow-flowing water with muddy or mucky bottoms and aquatic or emergent vegetation. Frequently found on land in open habitats, especially during mating and nesting seasons.	2020
Amphibian	<i>Necturus maculosus</i>	Mudpuppy	SC	Permanent waters including rivers, perennial streams, ponds, inland lakes, Great Lakes bays and shallows, reservoirs, canals, and ditches.	2009
Amphibian	<i>Siren intermedia nettingi</i>	Western lesser siren	E	Ponds, ditches, sluggish streams, shallow lakes, and backwater sloughs.	2021
Reptile	<i>Clonophis kirtlandii</i>	Kirtland's snake	T	Open wetlands such as wet prairies, prairie fens, wet meadows and marshes, but they also occur in openings or along the edges of forested wetlands and floodplains.	1965
Reptile	<i>Emydoidea blandingii</i>	Blanding's turtle	SC	Clean, shallow waters with abundant aquatic vegetation and soft muddy bottoms and adjacent terrestrial habitats: ponds, marshes, swamps, bogs, wet prairies, river backwaters, embayments, sloughs, slow-moving rivers, and lake shallows and inlets.	2021

Table J-2 Amphibians and Reptiles Listed as State Endangered or Threatened That Have Been Observed in Berrien and Van Buren Counties Before 2000 or That are Listed as Species of Special Concern and Have Been Observed in Berrien and Van Buren Counties (Continued)

Group	Scientific Name	Common Name	State Status ^(a)	Habitats ^(b)	Last Seen in Counties
Reptile	<i>Opheodrys vernalis</i>	Smooth green snake	SC	Moist, grassy habitats, including prairies, savannas, meadows, old fields, pastures, roadsides, vacant lots, stream borders, and marsh and lake edges. Also can be found in open moist deciduous and pine forests and along forest edges.	2001
Reptile	<i>Pantherophis spiloides</i>	Gray rat snake	SC	Usually occur in forests, primarily deciduous forests. Also use adjacent open habitats including shrubby fields, prairies and marsh and bog edges. Often found in or around barns, outbuildings, old foundations and trash dumps.	2019
Reptile	<i>Terrapene carolina carolina</i>	Eastern box turtle	T	Known from site (HDI 2024-TN10670 Enclosure 3, Attachment 2). Forested habitats with sandy soils near a source of water such as a stream, pond, lake, marsh or swamp; adjacent thickets, old fields, pastures, or vegetated dunes. Access to unshaded nesting sites in sandy, open areas, is critical for successful reproduction.	2021

(a) State Status: T = State Threatened; SC = Species of Concern.

(b) Habitat information compiled from Michigan Natural Features Inventory (MSU 2023-TN10758).

“-” denotes no data in table cell.

J.2 Eagles and Migratory Birds

The Palisades site is located in the Mississippi flyway, an important bird migration route which extends from the Gulf Coast to the Arctic Circle. Migrant birds often fly at night, landing to rest early in the morning. Suitable habitats that allow migratory birds to feed, rest, and avoid predators are called stopovers. Large natural barriers may create crowded stopover locations because flights over the barriers mean long stretches without opportunities to rest or feed. Along

the Mississippi flyway, Hudson Bay and the Great Lakes are major barriers. Many species of migratory birds likely use the Palisades site and vicinity during the spring and fall migrations.

Two regulations govern management of eagles and other migratory birds. The Bald and Golden Eagle Protection Act (TN1447) extends regulatory protections to the bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*). The Act prohibits anyone without a permit from the U.S. Secretary of the Interior from “taking” bald eagles or golden eagles, including their parts, nests, or eggs. The Migratory Bird Treaty Act (TN3331) makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale any migratory bird or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued under Federal regulations.

J.3 Terrestrial Invasive Species

The Southwest by Southwest Corner Cooperative Invasive Species Management Area, which includes the location of the Palisades site, has identified 12 terrestrial species as specific targets for detecting and controlling if found (Van Buren CD 2024-TN10877): three insects (Asian long-horned beetle [*Anoplophora glabripennis*], hemlock wooly adelgid [*Adelges tsugae*] and spotted lanternfly [*Lycorma delicatula*]), one fungal disease (oak wilt [*Bretziella fagacearum*]), and eight plants (black swallowwort [*Cynanchum louiseae*]; pale swallowwort [*Cynanchum rossicum*]; Chinese yam [*Dioscorea polystachya*]; flowering rush [*Butomus umbellatus*], Japanese knotweed [*Fallopia japonica*]; Japanese stiltgrass [*Microstegium vimineum*]; kudzu [*Pueraria montana* var. *lobata*]; and common reed [*Phragmites australis*]).

J.4 Aquatic Biota Community Descriptions

Plankton

Plankton are small and often microscopic organisms that drift or float in the water column. In some nearshore areas, there is excessive growth of the nuisance algae *Cladophora* spp. and toxic blooms of cyanobacteria occur in Green Bay, Wisconsin. While cyanobacteria that produces cyanotoxins have been found in inland lakes in Michigan there were no reported blooms in Lake Michigan during 2022 or 2023 (MEGLE 2024-TN10716). Overall, in the last 10 years invasive mussels have reduced the amount of algae present, altering the food web and decreasing the amount of food available to higher trophic levels (State of the Great Lakes 2022-TN10759) (Table J-3 of this environmental assessment [EA]). A decline in spring phytoplankton levels has also been observed, primarily caused by a decrease in diatoms that are selectively consumed by invasive zebra and quagga mussels (EPA 2024-TN10717). In the 2000s, zooplankton biomass rapidly declined, including the loss of cladocerans in 2004, and has since stabilized at reduced levels (Table J-3 of this EA), resulting in a dominance of calanoid copepods as the oligotrophic zooplankton community (State of the Great Lakes 2022-TN10719). This long-term decline of zooplankton has contributed to a lower overall abundance of prey fish, which are discussed later.

Macrophytes

Aquatic macrophytes are large plants, both emergent and submerged, that inhabit shallow water areas. Macrophytes within Lake Michigan include duckweed, cattails, and rushes. The U.S. Environmental Protection Agency Coastal Wetland Monitoring Program considers the coastal wetland vegetation in the southeast side of Lake Michigan to be degraded but less so

when compared to plant communities in Lakes Ontario and Erie (EPA 2023-TN9721). The U.S. Environmental Protection Agency attributes this to less nutrient runoff and less invasive species as compared to the other Great Lakes. The areas directly adjacent to Palisades Nuclear Plant (Palisades) are sandy beaches, suggesting a relatively high-energy shoreline without much, if any, terrestrial vegetation.

Benthic Invertebrates

Benthic invertebrates inhabit the bottom of the water column and its substrates. They include macroinvertebrates (clams, crabs, oysters, and other shellfish) as well as certain zooplankton. Researchers have studied Lake Michigan benthic invertebrates since 1931 (Robertson and Alley 1966-TN10786). The invasion by first the zebra mussels in 1993 (*Dreissena polymorpha*) and then quagga mussels in 2004 (*Dreissena rostriformis bugensis*) led to further declines in phytoplankton during the last 20 years (Nalepa et al. 2009-TN10720). During that time *Diporeia* spp. and Sphaeriida (bivalves) declined in abundance; however, Oligochaeta (aquatic worms) increased (Mehler et al. 2020-TN10760). Over this same period quagga mussels outcompeted zebra mussels and became the dominant benthic macroinvertebrate in the Lake Michigan southern basin by density (65 percent), followed by Oligochaeta (29 percent), Chironomidae (4.7 percent), *Diporeia* sp. (1.7 percent), and Sphaeriidae (0.3 percent) (Mehler et al. 2020-TN10760; Nalepa et al. 2010-TN10960). Overall changes in the primary production in the southern basin have been driven by changes in phosphorus loading and the invasion of zebra and quagga mussels (Mehler et al. 2020-TN10760). Zebra and quagga mussels are invasive, filter feeders that densely colonized benthic environments, causing significant changes to ecosystem functions, such as increased light penetration, altered nutrient cycles, and reduced phytoplankton abundance (EPA 2024-TN10721). Quagga mussels are now the most abundant benthic organisms in Lake Michigan, contributing to overall lower phosphorus levels and decreased phytoplankton biomass. *Diporeia* is a benthic amphipod that feeds on algae, mainly diatoms, that settle to the lake floor (Nalepa et al. 2000-TN10722). This benthic amphipod is prey to most of the fish species in Lake Michigan (State of the Great Lakes 2022-TN10723). *Diporeia*, once the most abundant benthic organism at depths below 98 ft (30 m), have been in decline since invasive *Dreissena* mussels (the genus that contains quagga and zebra mussels) arrived and outcompeted them by depleting food sources in the water column (Edlund et al. 2021-TN10761). Samples taken in 2015 showed that *Diporeia* abundances at depths below 295 ft (90 m) have decreased by 58 percent in the last decade and are rare at depths above 295 ft (90 m) (Table J-3 of this EA) (State of the Great Lakes 2022-TN10723).

Juvenile and Adult Fish

The Michigan Department of Natural Resources (MDNR) is responsible for managing fisheries in the State and Palisades is located within the Southern Lake Michigan Management Unit. Managed fisheries in the vicinity of the plant include trout (brown [*Salmo trutta*], non-native rainbow [*Oncorhynchus mykiss*], and steelhead [*Oncorhynchus mykiss irideus*]), salmon (Salmonidae), largemouth bass (*Micropterus salmoides*), perch (*Perca* spp.), walleye (*Sander vitreus*), and whitefish (*Coregonus* spp.). Walleye are stocked into waterbodies in the Southern Lake Michigan Management Unit in early spring, late spring, and fall by MDNR (MDNR 2019-TN10724).

MDNR along with U.S. Geological Survey and U.S. Fish and Wildlife Service (FWS) conduct yearly prey fish sampling in Lake Michigan using bottom trawling and acoustic surveys of the mid and upper water column each year. In 2021 the bottom trawl collected alewife

(*Alosa pseudoharengus*, non-native), bloater (*Coregonus hoyi*), rainbow smelt (*Osmerus mordax*, non-native), deepwater sculpin (*Myoxocephalus thompsonii*), slimy sculpin (*Cottus cognatus*), ninespine stickleback (*Pungitius pungitius*), and round goby (*Neogobius melanostomus*, invasive) (Warner et al. 2021-TN10725). The survey estimated total biomass of prey fish at 2.14 lb/ac (2.4 kg/ha), the fifth lowest recorded result since 1972, concurring with a trend of biomass density below 8.9 lb/ac (10 kg/ha) since 2010 (Warner et al. 2021-TN10725). The 2021 prey fish community was dominated by alewives (28 percent), round gobies (27 percent), and bloaters (24 percent) (Warner et al. 2021-TN10725). The acoustic survey was dominated by bloaters (67 percent) (Table J-3 below), although the dominant prey fish species vary, and in recent years the overall abundance has not (Warner et al. 2021-TN10725). However, there have been considerable declines in alewife, rainbow smelt, and yellow perch populations in Lake Michigan since the 1970s and 80s.

J.5 State of the Great Lakes Aquatic Habitat and Species Assessment

Table J-3 State of the Great Lakes Aquatic Habitat and Species Assessment, 2010–2020

Indicator	Status	10-Year Trend	Details
Phytoplankton	Fair	Deteriorating	A reduction in phytoplankton and consequent diminution in seasonality has occurred. Lower levels of primary production could be reducing resources for higher trophic levels.
Zooplankton	Good	Unchanging	The oligotrophic zooplankton community has been dominated by calanoid copepods since the early 2000s. Decreases in zooplankton biomass with loss of cladocerans was evident in 2004.
Benthos	Good	Unchanging	Overall oligotrophic condition, no significant long-term or 10-year trends observed in the trophic condition of the lake.
<i>Diporeia</i> spp.	Poor	Deteriorating	<i>Diporeia</i> spp. abundances continue to decline in Lake Michigan.
Native Prey Fish Diversity	Fair	Unchanging	78% of prey fish community are native fish species (data from the period 2018–2020).

Source: Data presented in table here adapted from the State of the Great Lakes (State of the Great Lakes 2022-TN10726).

J.6 State-listed Aquatic Species

Table J-4 State-listed Aquatic Species That May Occur Within 1 mi (1.6 km) of Palisades Nuclear Plant

Scientific Name	Common Name	Type	Habitat	State Status	Last Observed
<i>Faxonius immunis</i>	calico crayfish	Crayfish	Calico crayfish often inhabit slow-moving or stagnant waters and are resistant to conditions with low dissolved oxygen and high turbidity.	Special Concern	2015

Table J-4 State-listed Aquatic Species That May Occur Within 1 mi of Palisades Nuclear Plant (Continued)

Scientific Name	Common Name	Type	Habitat	State Status	Last Observed
<i>Coregonus artedii</i>	lake herring or cisco	Fish	Lake herring are found in deep inland lakes as well as the Great Lakes at depths ranging from 18 to 53 m. They can be found in shallower depths (9–12 m) when spawning over rocky substrates.	Threatened	1995
<i>Coregonus zenithicus</i>	shortjaw cisco	Fish	The shortjaw cisco is a deep, cold water species that spawns at depths of 36 to 73 m over clay substrates.	Endangered	1994
<i>Fundulus dispar</i>	starhead topminnow	Fish	Starhead topminnows occur in quiet vegetated waters.	Special Concern	2016
<i>Lepisosteus oculatus</i>	spotted gar	Fish	The spotted gar requires clear, quiet water with abundant aquatic vegetation. It occurs in backwater areas of rivers, lakes and wetlands. Like other gar species, it is tolerant of warm water with low dissolved oxygen levels. They spawn in shallow, warm water.	Special Concern	2013
<i>Alasmidonta viridis</i>	slippershell	Mussel	The slippershell typically occurs in creeks and headwaters of rivers in sand or gravel substrates. Occasionally, they occur in larger rivers and lakes and in mud substrates.	Threatened	2022
<i>Lasmigona compressa</i>	creek heelsplitter	Mussel	The creek heelsplitter is found in creeks and small rivers in a variety of substrates.	Special Concern	2009
<i>Lasmigona costata</i>	flutedshell	Mussel	The flutedshell is found in small and medium rivers, and in Lake St. Clair and Lake Erie. They are often found in	Special Concern	2022

Table J-4 State-listed Aquatic Species That May Occur Within 1 mi of Palisades Nuclear Plant (Continued)

Scientific Name	Common Name	Type	Habitat	State Status	Last Observed
			sandy mud and cobble substrates.		
<i>Pleurobema sintoxia</i>	round pigtoe	Mussel	The round pigtoe occurs in mud, sand, or gravel substrates of medium to large rivers.	Special Concern	2009

Sources: Data presented in table from MSU 2024-TN10861, MSU 2024-TN10862, MSU 2024-TN10734.

J.7 Biological Evaluation

J.7.1 Endangered Species Act Section 7 Consultation

As a Federal agency, the NRC must comply with the Endangered Species Act of 1973 (ESA), as amended (TN1010), for any action authorized, funded, or carried out by the agency. The NRC proposed action is to reauthorize nuclear power operations on Palisades in Covert Township, Michigan and refueling of the reactor. Under Section 7 of the ESA, the NRC must consult with the FWS and the National Marine Fisheries Service (NMFS) (“the Services” [collectively] or “Service” [individually]), as appropriate, to ensure that the proposed action is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. The U.S. Department of Energy (DOE) is also consulting at this time with the FWS under Section 7 for the Palisades project. The DOE proposed action is a decision whether to provide Federal financial assistance for refueling and resumption of power generation activities at Palisades pursuant to Holtec’s loan guarantee agreement with DOE that was issued pursuant to the Energy Policy Act of 2005.

The ESA, and the regulations that implement ESA Section 7 at Title 50 of the *Code of Federal Regulations* (CFR) Part 402 (50 CFR Part 402-TN4312), describe the consultation process that Federal agencies must follow in support of agency actions. As part of this process, the Federal agency proposing the action (the action agency) must request that the Services (1) provide a list of any listed or proposed species or designated or proposed critical habitats that may be present in the action area, or (2) request that the Services concur with a list of species and critical habitats that the Federal agency has created (50 CFR 402.12(c)). In recent years, most action agencies, including NRC, have used an online database developed by the FWS, termed Information for Planning and Consultation, to obtain this preliminary information rather than directly communicating with FWS. If the preliminary information reveals that listed species or critical habitats may be present, the action agency then typically prepares a biological assessment or biological evaluation to evaluate the potential effects of the action and determine whether the species or critical habitats are likely to be adversely affected (50 CFR Part 402-TN4312; 16 U.S.C. § 1536-TN4459).

Biological assessments are required for any Federal agency action that is a “major construction activity” (50 CFR 402.12(b)) (TN4312). A major construction activity is a construction project or other undertaking having construction-type impacts that is a major Federal action significantly affecting the quality of the human environment under the National Environmental Policy Act of 1969, as amended (TN661; 51 FR 19926-TN7600). However, the proposed action to reauthorize Palisades is not a major construction activity and therefore does not require the

preparation of a biological assessment. Nonetheless, the NRC staff still must consider the impacts of this action on federally listed species and designated critical habitats. This consideration is presented below as a biological evaluation. Whether through a biological assessment or biological evaluation, if an action agency such as NRC finds that a proposed action “may affect” ESA-protected species or habitats, it must seek written concurrence from the relevant service(s) under ESA Section 7.

To provide a biological evaluation to support its consultation, the NRC staff have incorporated its analysis of the potential impacts of the Palisades action into Table J-5, below. The NRC staff define preparation for resumption of operations on Palisades to be those proposed activities listed in Table 3-1 of this EA, and operational impacts at Palisades to be those associated with operating and maintaining a nuclear facility (as described in NRC 2024-TN10161). The NRC staff based its biological evaluation on information received using Information for Planning and Consultation, with the most recent update on April 24, 2025.

The NRC staff structured its biological evaluation in accordance with definitions from 50 CFR 402.12(f) (TN4312). Sections 3.6.1 and 3.7.1 of this EA define and describe the action area and state that no critical habitat for listed species occurs within it. Table J-5 describes each ESA-protected species potentially present in the action area, assesses the potential effects of the proposed action on each species, and presents the NRC’s effect determination for each of species. Table J-6 compares the conclusions from this 2024 biological evaluation with those developed for a supplemental environmental impact statement prepared by NRC in 2006 for license renewal of the Palisades plant. Table J-7 presents a chronology of ESA Section 7 consultation with FWS. Finally, Section 4.2 addresses the potential effects of the no-action alternative.

The NRC staff sent a copy of the draft EA, including the biological evaluation, to the Michigan Ecological Field Office of the FWS and requested concurrence on the conclusions “may affect, not likely to adversely affect” in the biological evaluation. On May 9, 2025, the Michigan Field Office of the FWS concurred with the NRC staff with the “may affect, not likely to adversely affect” conclusions for the eastern massasauga rattlesnake and Pitcher’s thistle (FWS 2025-TN11931). On May 14, 2025, the Office clarified that their concurrence extends to the other conclusions of “may affect, not likely to adversely affect” contained in the biological evaluation (FWS 2025-TN11932).

Table J-5 Biological Evaluation of Federally Listed Species under the Jurisdiction of the U.S. Fish and Wildlife Service to Occur within the Action Area of Palisades Nuclear Plant

Common Name	NRC Staff Evaluation ^(a,b)	NRC 2024 Staff Conclusions ^(c,d)
Indiana bat	<p>Baseline Information: According to the recovery plan (FWS 2007-TN934), the Indiana bat is a flying, insectivorous mammal that hibernates in caves and mines and forms maternity roosts in mature trees over 5 in. diameter at breast height, especially trees with exfoliating bark. It roosts and forages in forested or semi-forested areas. Threats include disturbance to the hibernacula, loss and fragmentation of forested swarming and roosting habitat, chemical contaminants, collision with wind turbines, and white-nose syndrome.</p> <p>Site Occurrence: The Indiana bat is not known to occur on the Palisades site. Individuals may be present in the area in spring, summer, and fall in very low numbers. Forest habitat that could potentially be used by federally listed bat species does occur in undeveloped areas of the site (HDI 2023-TN10538: pp. 94–95), which the applicant has modeled to be on the site's eastern and southern portions (SMR 2024-TN10713: p. 8).</p> <p>Preparation Impacts:^{(b)(1-5)} Proposed activities would occur only in previously developed areas of site, and no forest would be disturbed (Figure 3-5 of this EA). Preparation activities are expected to occur over an 18-month period. The applicant has estimated that approximately 3,000 truck deliveries would take place over this period (HDI 2024-TN10670: RAI-GEN-1). Temporary increases in noise and traffic over this time period are unlikely to alter Indiana bat use of the site. Bat collisions with vehicles and human-made structures at nuclear power plants are not well documented but are likely rare based on available information (NRC 2024-TN10161: p. 3-63).</p> <p>Operations Impacts:^{(b)(1-5)} For the 2006 SEIS (NRC 2006-TN7346), operational impacts were determined to be NLAA. Proposed operational activities are anticipated to be similar in magnitude and frequency as the previous operations characterized in the SEIS. No forest would be disturbed. Indiana bats, if present in the area, have likely already acclimated to the noise, vibration, and general human disturbances associated with site maintenance, infrastructure repairs, and other site activities. Holtec reports no bat incidents at the Palisades site and states that it would consult with FWS as an administrative control for any unanticipated construction or tree removal activities during operations (HDI 2023-TN10538: pp. 94–95). The NRC staff recognize that individuals may have to reacclimate to the operational conditions, but based on the relatively short duration between the shutdown and the resumption of operations, it is the staff's professional judgment that the adverse effects would not be substantial.</p>	NLAA

Table J-5 Biological Evaluation of Federally Listed Species under the Jurisdiction of the U.S. Fish and Wildlife Service to Occur within the Action Area (Continued)

Common Name	NRC Staff Evaluation ^(a,b)	NRC 2024 Staff Conclusions ^(c,d)
northern long-eared bat	<p>Baseline Information: According to the final rule (80 FR 17974-TN4216), the northern long eared bat is a flying, insectivorous mammal found across much of the eastern and north-central United States and all Canadian provinces (80 FR 17974-TN4216). It predominantly overwinters in hibernacula including underground caves and mines. In spring, summer, and fall it uses forest habitats and roosts individually or in colonies underneath tree bark or in cavities or crevices of live trees and snags greater than 3 in. in diameter at breast height. Threats include white-nose syndrome, human disturbances of hibernacula and roosts, collision with wind turbines, chemical contaminants, and loss of summer habitat from forest management and conversion.</p> <p>Site Occurrence: Same as Indiana bat.</p> <p>Preparation and Operations Impacts:^{(b)(1-5)} Same as Indiana bat for preparation activities. Although not evaluated in the 2006 SEIS (NRC 2006-TN7346), the NRC staff expect that operational impacts would be as for Indiana bat, based on the similar species biology, habitat uses, and expected types, magnitude, and frequency of operational activities.</p>	NLAA
tricolored bat	<p>Baseline Information: According to a status assessment (FWS 2021-TN8589), the tricolored bat is a flying insectivorous mammal found across much of the eastern and north central United States in parts of southern Canada, Mexico, and Central America. It overwinters in caves and abandoned mines, but also in road culverts. In the spring, summer, and fall it occupies forest habitats and roosts in foliage of live and dead trees. Threats include white-nose syndrome, human disturbances of hibernacula and roosts, collision with wind turbines, loss of summer habitat from forest management and conversion, and climate change.</p> <p>Site Occurrence: Same as Indiana bat.</p> <p>Preparation and Operations Impacts:^{(b)(1-4)} Same as Indiana bat for preparation activities. Although not evaluated in the 2006 SEIS (NRC 2006-TN7346), the NRC staff expect that operational impacts would be the same as for Indiana bat, based on similar species biology, habitat use, and expected types, magnitude, and frequency of operational activities.</p>	NLAA
eastern massasauga	<p>Baseline Information: According to a species status assessment (FWS 2016-TN10881), the eastern massasauga is a small venomous rattlesnake that prefers wetland and prairie habitats. An ambush predator, it preys on small mammals, amphibians, and reptiles. Threats include wetland habitat loss and fragmentation from development and agriculture, establishment of woody species and invasive plants, hydrologic alteration, habitat management practices (e.g., prescribed fire, mowing), vehicle mortality, human persecution, collection, predation, and disease.</p> <p>Site Occurrence: The species is not known from the Palisades site but is known to occur nearby, within 1 mi of the site; NRC 2006-TN7346: p. 2-47). Potential occurrence during the species' active season includes habitats occurring in undeveloped areas of the site, including wetlands, dunes, forest edges, scrub-shrub forest, and open woodlands.</p> <p>Preparation Impacts:^{(b)(1-5)} No activities are proposed in or adjacent to wetlands or other suitable habitats. It is possible that individuals in undeveloped areas of the site could experience infrequent injury or mortality</p>	NLAA

Table J-5 Biological Evaluation of Federally Listed Species under the Jurisdiction of the U.S. Fish and Wildlife Service to Occur within the Action Area (Continued)

Common Name	NRC Staff Evaluation ^(a,b)	NRC 2024 Staff Conclusions ^(c,d)
	<p>from vehicles using adjoining roadways. However, the roadways on the site are separated from favorable eastern massasauga habitats by roadside clearings several feet in width, and the potential for snake collisions are no greater than for other arterial roadways in the surrounding rural landscape. Holtec has committed to adopt the FWS BMPs for this species (HDI 2025-TN11906).</p> <p>Operations Impacts: Impacts from operational activities were determined to be NLAA in the 2006 SEIS (NRC 2006-TN7346). Proposed operational activities are anticipated to be of the same magnitude and frequency as anticipated in 2006.</p>	
rufa red knot	<p>Baseline Information: According to a species status assessment (FWS 2020-TN8850), the rufa red knot is a medium-sized shorebird known for long distance migration between its breeding habitats in the Canadian Arctic and non-breeding habitats in southeastern United States, northeastern Gulf of Mexico, and South America. It forages on aquatic invertebrate prey in shoreline habitats with large areas of exposed sediments. Threats include habitat loss from coastal development, disturbance from human activities, reduced prey availability, and increasing frequency and severity of mismatches in the timing of the annual migratory cycle relative to favorable food and weather conditions.</p> <p>Site Occurrence: The rufa red knot has been observed along an undeveloped beach in Van Buren State Park in July 2020, just north of site boundary (eBird 2024-TN10777). While undeveloped beaches in action area may provide habitat, the developed beaches adjoining the Palisades plant facilities would not. Those beaches have been narrowed and altered by past armoring, which remains in place (site observations by NRC ecologists in 2024). Adults may pass through the Palisades site moving among areas of more suitable foraging habitat along Lake Michigan before migrating to or from breeding habitat.</p> <p>Preparation Impacts:^([b]1-5) Proposed activities would be limited to developed portions of site and would not affect habitat for red knots. Undeveloped, unarmored beaches on or near site with potential habitat would not be disturbed or altered by activities. Increased noise and human disturbance during activities along the shoreline could cause red knots to avoid the developed shoreline, if those activities were to occur during the migratory window (May 1–September 30) (FWS 2024-TN10697). However, the birds would simply avoid the developed areas and move to suitable habitat in undeveloped areas, and therefore not be adversely affected. Collisions from increased traffic would be unlikely, especially given that vehicles at Palisades would only use existing roads and not the beach. The NRC staff also recognize in the LR GEIS that federally listed shorebirds are unlikely to collide with vehicles, given their flying speed (NRC 2024-TN10161: Section 3.6.3.1, p. 3-72). Implementation of permit requirements, environmental protection plans, and BMPs for activities would be protective of the shoreline environment.</p> <p>Operations Impacts:^([b]1-5) The rufa red knot was not previously evaluated in 2006 SEIS (NRC 2006-TN7346; NMCCO 2005-TN10839). Undeveloped, unarmored beaches on or near site could potentially provide habitat but would not be disturbed or altered by operational activities. Holtec has a</p>	NLAA

Table J-5 Biological Evaluation of Federally Listed Species under the Jurisdiction of the U.S. Fish and Wildlife Service to Occur within the Action Area (Continued)

Common Name	NRC Staff Evaluation ^(a,b)	NRC 2024 Staff Conclusions ^(c,d)
	current permit (MEGLE 2020-TN10696) allowing for maintenance dredging of sand and placement of dredged materials on the beach (Section 3.6.1.1). Dredging locations occur only in previously disturbed areas (HDI 2023-TN10538: p. 95). Holtec reports no new and significant information regarding bird collisions with plant structures or transmission lines (HDI 2023-TN10538: p. 4.3-2). Continued implementation of permit requirements, environmental protection plans, and BMPs for operational activities would be protective of the terrestrial habitats used by this species.	
piping plover (Great Lakes DPS)	<p>Baseline Information: According to the recovery plan (FWS 2003-TN8841), the piping plover is a small, plump shorebird. The FWS recognizes three geographically distinct breeding populations and treats them separately in the final rule listing the species. Piping plovers of the Great Lakes Distinct Population Segment breed and raise young mainly on sparsely vegetated beaches, cobble pans, and sand spits of glacial sand dune ecosystems along the Great Lakes shoreline. They forage on exposed beach substrates for invertebrates near the surface of the sand. Foraging habitat and food availability affect chick survival, with mudflats and ephemeral pools providing higher chick survival in some locations, possibly due to greater insect prey availability. Threats include habitat loss and alteration (particularly shoreline development of breeding grounds along Great Lakes and wintering grounds along Atlantic coast), predation, and surface water contamination have contributed to further population declines after initial decline from hunting.</p> <p>Site Occurrence: The piping plover is not known from the Palisades site. The beach fronting the developed area has been too narrowed by past armoring to offer potentially suitable piping plover habitat (site observations by NRC ecologists in 2024). Undeveloped beaches on or near site could potentially provide habitat. Adults may pass through the area when moving to more suitable habitat along Lake Michigan.</p> <p>Preparation and Operations Impacts: Work would not take place in areas expected to function as breeding or foraging habitats for the piping plover. Operational impacts were not evaluated in the 2006 SEIS (NRC 2006-TN7346; NMCCO 2005-TN10839). Preparation and operational impacts would be similar to those described above for the red knot, based on similar species biology, habitat use, and expected types, magnitude, and frequency of activities.</p>	NLAA
whooping crane	<p>Baseline Information: According to a species assessment (FWS 2023-TN8854), the whooping crane is a large wading bird, standing more than 5 ft tall. It presently occurs in wild at three locations and in captivity at 12 sites. The Aransas–Wood Buffalo National Park population is only self-sustaining population (nests in Wood Buffalo National Park and adjacent areas in Canada and winters in the coastal marshes of Aransas County, Texas). Migrants travel during the day along narrow corridors in small groups under limited cloud cover, tail winds, and otherwise favorable conditions. At night, whooping cranes roost in palustrine and riverine wetlands. The species typically selects stopover sites with wide, open views that are isolated from human disturbance (NGPC 2023-TN8876). Whooping cranes tend to stop wherever they happen to be later in the day when conditions are no longer suitable for migration, therefore stopover use patterns are often unpredictable (FWS 2009-TN8856). Thus, whooping cranes could use a</p>	NE

Table J-5 Biological Evaluation of Federally Listed Species under the Jurisdiction of the U.S. Fish and Wildlife Service to Occur within the Action Area (Continued)

Common Name	NRC Staff Evaluation ^(a,b)	NRC 2024 Staff Conclusions ^(c,d)
	<p>particular wetland pond regularly, rarely, or even just once over the course of several years of migrations. Threats include direct mortality from hunting and wetland habitat loss and fragmentation.</p> <p>Site Occurrence: The whooping crane is not known from the Palisades site. Individuals from experimental populations are possible in Michigan, and even those are unlikely. Furthermore, none of the large marshes favored by the species occur on or near the Palisades site (Section 3.6.1 of the EA).</p> <p>Preparation and Operations Impacts: ^{(b)(1-5)} No potential stopover habitat is proposed for disturbance. The whooping crane was not previously evaluated in 2006 SEIS (NRC 2006-TN7346; NMCCO 2005-TN10839). Holtec reports no new and significant information regarding bird collisions with plant structures or transmission lines (HDI 2023-TN10538: p. 4.3-2). Continued implementation of permit requirements, environmental protection plans, and BMPs for operational activities would be protective of habitats used by this species.</p>	
Karner blue butterfly (KBB)	<p>Baseline Information: The KBB is a flying insect that favors oak savanna and pine barren habitat containing blue lupine (<i>Lupinus perennis</i>) (FWS 2024-TN10778). Recent (2025) IPaC searches did not mention this species, but the NRC staff are evaluating it because it was addressed in the 2006 SEIS.</p> <p>Site Occurrence: The KBB is not known to occur on the Palisades site, and the specialized habitat it requires is not present on the site or in the surrounding landscape.</p> <p>Preparation and Operations Impacts: No preparation or operational activities would take place in or adjacent to habitat for the KBB.</p>	NE
Mitchell's satyr butterfly (MSB)	<p>Baseline Information: The MSB is a flying insect with nine known populations in Michigan (FWS 2021-TN10883), and otherwise known or suspected to occur in Alabama, Indiana, Michigan, Mississippi, Ohio, and Virginia (FWS 2021-TN10882). Primary habitat is sedge-dominated wetlands, including fens and wetland edges of beaver ponds, swamps, and seeps (FWS 1998-TN10884, FWS 2021-TN10883). Threats include wetland habitat loss from urban development and adjacent human activities, hydrologic alteration, over-collection by butterfly collectors, inadequacy of existing regulatory mechanisms, limited ability to colonize new habitat patches, infection with the reproductive bacterial parasite <i>Wolbachia</i> sp., and climate change (FWS 2021-TN10883: p.19-24).</p> <p>Site Occurrence: The MSB is not known to occur on the Palisades site. No sedge-dominated fens favored by the MSB are present onsite (NRC 2006-TN7346: p. 4-34).</p> <p>Preparation and Operations Impacts: No preparation or operational activities will occur in or adjacent to habitat for this species.</p>	NE
monarch butterfly	<p>Baseline Information: According to the candidate review (87 FR 26152-TN8591), the monarch butterfly is a flying insect with bright orange wings and black veins and wing borders. It is dependent on milkweeds (primarily <i>Asclepias</i> spp.) for egg-laying and larval food. North America populations migrate to Mexico or California in the fall and return in early spring. Adult monarchs feed on nectar from milkweeds and from a variety of plant species. Threats include habitat loss and degradation of habitat from</p>	NLAA

Table J-5 Biological Evaluation of Federally Listed Species under the Jurisdiction of the U.S. Fish and Wildlife Service to Occur within the Action Area (Continued)

Common Name	NRC Staff Evaluation ^(a,b)	NRC 2024 Staff Conclusions ^(c,d)
	<p>conversion of grasslands to agriculture, widespread use of herbicides, logging/thinning at overwintering sites in Mexico, senescence and incompatible management of overwintering sites in California, urban development, drought, insecticides, and climate change effects.</p> <p>Site Occurrence: Flying adults were observed by NRC staff in September 2024 visiting the Palisades site. Widely scattered, occasional milkweed (<i>Asclepias</i> spp.) plants were observed by NRC staff in 2024 south of Van Buren State Park, on vegetated dunes close to the beach, and on dunes along the access road.</p> <p>Monarchs and milkweeds are known from Van Buren State Park and site vicinity based on a review of iNaturalist in 2024 (https://www.inaturalist.org/). Larvae are potentially present wherever milkweeds are present.</p> <p>Preparation Impacts:^{(b)(1-5)} Ground disturbance as part of preparation could disturb widely scattered milkweed plants growing amid sparse and ruderal vegetation in areas of previously disturbed soils. However, milkweed is a common, quick-growing herbaceous plant that is present at least sparsely in most areas of non-forest vegetation in the area. None of the affected areas contain dense or extensive patches of milkweed. While it is possible that a few milkweed plants containing monarch larvae could be killed, it is unlikely that the losses would noticeably affect monarch populations in the region. If a few milkweed stems are killed by herbicide applications, the losses are likewise not likely to result in noticeable effects on the regional population. Any insecticide applications would likely be limited to in or around buildings or paved areas where milkweed is not present.</p> <p>Operations Impacts:^{(b)(1,4,5)} Same as above.</p>	
Pitcher's thistle	<p>Baseline Information: Pitcher's thistle is a herbaceous perennial plant endemic to the Great Lakes region, occupying open sand dunes and low, open beach ridges along the shorelines of Lakes Michigan, Superior, and Huron (FWS 2024-TN10700). FWS has characterized Pitcher's thistle in a recovery plan prepared under the ESA (FWS 2002-TN10885). The plant, which has a deep taproot, is dependent on the ability to continually colonize patches of open, windblown dune habitat, and populations decline as vegetation density in the habitat increases through natural succession. Seedlings grow in a juvenile rosette stage before developing flower stalks at 5 to 8 years of age. Threats include development and disturbance of dune habitat, fragmentation of dune habitat, encroachment into dune habitat by invasive plants, and increased droughts caused by climate change. Additionally, purposefully introduced non-native insects used as biological control agents to control other invasive thistle species could also be adversely affecting Pitcher's thistle populations.</p> <p>Site Occurrence: Pitcher's thistle has been observed in undeveloped dune areas on the site, on open sand dune and flats (NRC 2006-TN7346: p. 2-45; HDI 2024-TN10670). The species was known from 1980s and 1990s to occur near the cooling towers. However, none was reported near the cooling towers in 2005. But 113 individuals (9 mature and 104 first year plants) were reported in 2005 in the northern end of the site on a beach grass stabilized dune community and flats adjacent to Van Buren State Park. In a field survey in 2024, 64 individuals were observed approximately 1,000 ft east of the south cooling tower, in a naturally occurring dune clearing surrounded by</p>	NLAA

Table J-5 Biological Evaluation of Federally Listed Species under the Jurisdiction of the U.S. Fish and Wildlife Service to Occur within the Action Area (Continued)

Common Name	NRC Staff Evaluation ^(a,b)	NRC 2024 Staff Conclusions ^(c,d)
	<p>deciduous forest, but none were observed in the previous locations where it had been once seen on the site (HDI 2024-TN1069: RCI-TE-2, HDI 2025-TN11910).</p> <p>Preparation Impacts:^(b)1,4,5) No activities such as land disturbances, mowing, or herbicide application would take place in or adjacent to areas where Pitcher's thistle is known to occur or previously occur.</p> <p>Operations Impacts:^(b)1,4,5) In the 2006 SEIS (NRC 2006-TN7346), operational impacts were determined to be NLAA based on the following: (1) Pitcher's thistle did not occur in locations where it would be affected by operations, (2) no refurbishment or ground-disturbing activities were proposed during the LR period, (3) the applicant had pre-disturbance procedures in place to evaluate impacts to federally listed species, and (4) Michigan EGLE regulates the dune habitats, so any ground disturbance in habitat for this species would require a permit. The same assessment applies to resumption of operations on the present time. The population found in 2024 would not be affected by routine site operation or management, for the following reasons: (1) No disturbances, mowing, or herbicide application to areas where populations are known to exist; (2) continued operations and maintenance activities would be similar and be of same magnitude and frequency as previous operations; (3) dredging (MEGLE 2020-TN10696) would continue to disturb beach and dune areas, likely preventing establishment of new plants; (4) applicant has pre-disturbance procedures in place to evaluate impacts to federally listed species; (5) Michigan EGLE regulates dune habitats, so any ground disturbance in habitat for this species would require a permit; and (6) population found in 2024 separated from the mechanical cooling towers by approximately 1,000 ft of mature deciduous forest. The cooling towers are equipped with drift eliminators. Any drift would be unlikely to penetrate the dense forest, even in leaf-off conditions. See Section 3.6.3 of the EA for a discussion of cooling tower impacts on terrestrial plants.</p>	

BMP = best management practice; DPS = Distinct Population Segment; EA = environmental assessment; Michigan EGLE = Environment, Great Lakes, and Energy; FWS = U.S. Fish and Wildlife Service; Holtec = Holtec Decommissioning International, LLC; IPaC = Information for Planning and Consultation; KBB = Karner blue butterfly; LR = license renewal; LR GEIS = license renewal generic environmental impact statement; MSB = Michell's satyr butterfly; NLAA = not likely to adversely affect; NRC = U.S. Nuclear Regulatory Commission; SEIS = supplemental environmental impact statement.

- (a) All species in this table identified as potentially occurring within the action area via FWS IPAC reports (FWS 2024-TN10697).
- (b) Applicable generic impacts considered, along with species specific factors: (1) habitat loss, degradation, disturbance, or fragmentation; and associated effects; (2) behavioral changes resulting from preparation, refurbishment or other site activities; (3) mortality or injury from collisions with nuclear power plant structures and vehicles; (4) vegetation management and pesticide application; and (5) other landscape maintenance activities, stormwater management, other ongoing operations and maintenance activities.
- (c) The NRC staff make its effect determinations for federally listed species in accordance with the language and definitions specified in the FWS and National Marine Fisheries Service (NMFS) Endangered Species Consultation Handbook (FWS and NMFS 1998-TN1031). NLAA = may affect, not likely to adversely affect. NE = No effect. The Michigan Ecological Field Office of FWS concurred in May 2025 on each of the NLAA conclusions in this table (FWS 2025-TN11931, FWS 2025-TN11932).
- (d) Conclusions address both preparations for resumption of power operations and resumption of power operations.

Table J-6 Effect Determinations for Federally Listed Species Under U.S. Fish and Wildlife Service Jurisdiction for Palisades Nuclear Plant for this proposed action and for the 2006 License Renewal

Species	Federal Status ^(a)	Potentially Present in the Action Area?	2006 Effect Determination ^(b)	2024 Effect Determination ^(b)	FWS Concurrence Date ^(c)
northern long-eared bat	FE	Yes	n/a	NLAA	5/14/25
Indiana bat	FE	Yes	NLAA	NLAA	5/14/25
tricolored bat	PFE	Yes	n/a	NLAA	5/14/25
rufa red knot	FT	Yes	n/a	NLAA	5/14/25
piping plover	FE	Yes	n/a	NLAA	5/14/25
whooping crane	FE (NEP)	No	n/a	NE	n/a
eastern massasauga	FT	Yes	NLAA	NLAA	5/9/25
Karner blue butterfly	FE	No	NE	NE	n/a
Mitchell's satyr butterfly	FE	No	NLAA	NE	n/a
monarch butterfly	PFT	Yes	n/a	NLAA	n/a
Pitcher's thistle	FT	Yes	NLAA	NLAA	5/9/25

- (a) Indicates protection status under the Endangered Species Act. FC = candidate for Federal listing; FE = federally endangered; FT = federally threatened; PFE = proposed for Federal listing as endangered; PFT = proposed for Federal listing as threatened; NEP = in the vicinity of the action area, this species is part of a nonessential experimental population.
- (b) The NRC staff make its effect determinations for federally listed species in accordance with the language and definitions specified in the FWS and NMFS Endangered Species Consultation Handbook (FWS and NMFS 1998-TN1031). NLAA = may affect, not likely to adversely affect. NE = No effect.
- (c) The ESA does not require Federal agencies to seek FWS concurrence for "no effect" determinations or for agency actions that are not likely to jeopardize the continued existence of any proposed species. "n/a" indicates not applicable.

Table J-7 Endangered Species Act Section 7 Consultation Correspondence with the U.S. Fish and Wildlife Service

Date	Description	ADAMS Accession No.
May 21, 2024	Letter from Michigan Ecological Services Field Office dated May 21, 2024, list of threatened and endangered species that may occur in your proposed project location or may be affected by proposed project (Palisades Nuclear Power Plant Restart).	ML24178A000
January 15, 2025	Letter from Michigan Ecological Services Field Office dated January 15, 2005, list of threatened and endangered species that may occur in your proposed project location or may be affected by proposed project (Palisades Nuclear Power Plant Restart).	ML25023A243
March 12, 2025	Comments via email from Scott Hicks (FWS) to NRC on draft EA for Palisades	ML25076A709
April 24, 2025	Letter from the Michigan Ecological Services Field Office dated April 24, 2025, List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project (Palisades Nuclear Plant Restart)	ML25114A253

Table J-7 Endangered Species Act Section 7 Consultation Correspondence with the U.S. Fish and Wildlife Service (Continued)

Date	Description	ADAMS Accession No.
May 9, 2025	Communication dated May 9, 2025, Letter from FWS concurring on NLAA conclusion for eastern massasauga rattlesnake and Pitcher's thistle	ML25132A245
May 14, 2025	Addendum dated May 14, 2025, to communication dated May 9, 2025, Letter from FWS concurring on other NLAA conclusions in biological evaluation	ML25135A439

ADAMS = Agencywide Documents Access and Management System; EA = environmental assessment; FWS = U.S. Fish and Wildlife Service; NLAA = may affect, not likely to adversely affect; NRC = U.S. Nuclear Regulatory Commission.

Endangered Species Act Section 7 Consultation with the National Marine Fisheries Service

As discussed in Section 3.7.1.2 of this EA, no federally listed species or critical habitats under NMFS's jurisdiction occur within the action area. Therefore, the NRC staff did not engage the NMFS pursuant to ESA Section 7 for the proposed Palisades reauthorization.

J.8 Magnuson–Stevens Act Essential Fish Habitat Consultation

The NRC must comply with the Magnuson–Stevens Fishery Conservation and Management Act of 1996 (MSA), as amended (TN7841), for any actions authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken that may adversely affect any essential fish habitat (EFH) identified under the MSA.

In Section 3.7.1.2 of this EA, the NRC staff conclude that the NMFS has not designated any EFH under the MSA within the action area and that the proposed Palisades reauthorization would have no effect on EFH. Thus, the MSA does not require the NRC to consult with the NMFS for the proposed action.

J.9 National Marine Sanctuaries Act Consultation

The National Marine Sanctuaries Act of 1966, as amended (TN7197), authorizes the Secretary of Commerce to designate and protect areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archaeological, educational, or aesthetic qualities as national marine sanctuaries. Under Section 304(d) of the Act, Federal agencies must consult with the National Oceanic and Atmospheric Administration's Office of National Marine Sanctuaries if a Federal action is likely to destroy, cause the loss of, or injure any sanctuary resources.

In Section 3.7.1.2 of this EA, the NRC staff conclude that no marine sanctuaries occur near Palisades and that the Palisades reauthorization would have no effect on sanctuary resources. Thus, the National Marine Sanctuaries Act does not require the NRC to consult with the National Oceanic and Atmospheric Administration for the proposed action.

J.10 References

50 CFR Part 402. *Code of Federal Regulations*, Title 50, *Wildlife and Fisheries*, Part 402, "Interagency Cooperation—Endangered Species Act of 1973, as amended." TN4312.

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16 U.S.C. § 1536. Endangered Species Act, Section 7, "Interagency Cooperation." TN4459.

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APPENDIX K

COMMENTS RECEIVED THROUGH PUBLIC REVIEW OF THE DRAFT ENVIRONMENTAL ASSESSMENT

K.1 Overview

This report summarizes the comments received on the draft environmental assessment (EA) and draft finding of no significant impact (FONSI) for the Palisades Nuclear Plant (Palisades) Reauthorization of Power Operations project and provides the U.S. Nuclear Regulatory Commission (NRC) staff's response to those comments.

K.2 Issuance

On January 31, 2025, the NRC staff published a Notice of Availability (NOA) of the draft EA and draft FONSI in the *Federal Register* (90 FR 8721-TN11704). In the notice, the NRC provided information on how to submit comments and request a copy of the draft EA and draft FONSI and set March 3, 2025, as the closing date for submitting public comments.

Electronic versions of the draft EA, draft FONSI, and supporting information were made accessible through the NRC Agencywide Documents Access and Management System (ADAMS) website. The public also had the opportunity to examine and have copied, the draft EA, draft FONSI, and other related publicly available documents from the NRC Public Document Room. Finally, copies of the draft EA and the draft FONSI were also made available for public review at the following public library locations: South Haven Memorial Library, 314 Broadway Street, South Haven, MI 49090 and St. Joseph/Maud Preston Palenske Memorial Library, 500 Market Street, St. Joseph, MI 490.

K.3 Public Comment Period

In the January 31, 2025, NOA, the NRC staff invited members of the public to submit comments on the draft EA and draft FONSI through the Federal Rulemaking website (<https://www.regulations.gov>) or via email to PalisadesRestartEnvironmental@nrc.gov. or by U.S. postal mail to addresses provided in the NOA over a 30-day period ending on March 3, 2025. The NRC staff received 29 written comment documents.

K.4 Comment Identification and Review Methodology

Table A-1 provides a list of commenters who provided comment submissions identified by name, affiliation (if stated), the correspondence identification (ID) number, the correspondence source, and the ADAMS Accession Number of the source. The staff reviewed each correspondence submission to identify individual comments within each correspondence. Each comment was marked with a unique identifier consisting of the correspondence ID (specified in Table K-1)) and a comment number. For example, Comment 3-1 refers to the first comment within the document provided by Correspondence ID 3. This unique identifier allows each comment to be traced back to the source where the comment was identified.

The comments were first grouped in two categories, those that specifically addressed items within the scope of the EA (Section K.5) and those that were generic in nature or were concerned with the process or were outside the scope of the EA (Section K.6).

Table K-1 Correspondence Identification, Source and ADAMS Accession Number Received on the Draft Environmental Assessment and Draft Finding of No Significant Impact for the Palisades Nuclear Plant Reauthorization of Power Operations

Commenter	Affiliation (if stated)	Correspondence ID	Correspondence Source	ADAMS Accession Number
Anonymous	-	1	Regulations.gov	ML25038A110
Anonymous	-	2	Regulations.gov	ML25042A228
Anonymous	-	3	Regulations.gov	ML25044A101
Anonymous	-	8	Regulations.gov	ML25059A012
Anonymous	-	15	Regulations.gov	ML25063A297
Britting, J	Holtec Decommissioning International	20	Regulations.gov	ML25063A296
Connors, Shawn	-	6	Email	ML25055A277
Conte, AJ	-	21	Regulations.gov	ML25063A293
Detering, Dietmar	-	14	Regulations.gov	ML25063A304
F, Roxanne	-	9	Email	ML25060A005
Feltner, Pauline	-	12	Email	ML25061A006
Gale, Daryl	-	19	Regulations.gov	ML25069A713
Gibson, Kenneth	-	11	Email	ML25059A016
Goldman, Steven	-	23 ^(a)	Email	ML25060A004
Hicks, Scott	U.S. Fish and Wildlife Service	18	Email	ML25076A699
Kamps, Kevin	Beyond Nuclear Coalition	23	Email	ML25063A063, ML25063A065, ML25063A066, ML25063A067
Lee, Michel	Council on Intelligent Energy & Conservation Policy, Promoting Health and Sustainable Energy	10	Email	ML25063A058, ML25063A062
Mcardle, Edward	-	7	Email	ML25061A007
McClain, Krystle Z.	U.S. Environmental Protection Agency	^(b)	Email	ML25114A254
McNally, Alice	-	16	Regulations.gov	ML25063A295
Medsker, Alan	-	22	Regulations.gov	ML25063A298
Mercer, Mary	Committee For A Constructive Tomorrow	4	Regulations.gov	ML25052A209
Muhich, Mark	-	5	Email	ML25055A278
Scott, David C.	The Environmental Law & Policy Center	17	Regulations.gov	ML25063A303
Tilson, Deric	The Breakthrough Institute	13	Regulations.gov	ML25063A302
Yonker, Ashley	-	23 ^(a)	Email	ML25062A293

ADAMS = Agencywide Documents Access and Management System; ID = identification.

(a) Commenter submitted part of the content from Correspondence 23 (ML25063A066).

(b) Correspondence provided by the U.S. Environmental Protection Agency is addressed in Section K.7.

In Section K.5, for comments that specifically addressed items within the scope of the EA, the comments were repeated verbatim from the comment source organized by major topics of concern or resource areas. For comments generic in nature or outside the scope of the EA, Section K.6, the comments were grouped based on the similarity related to a topic, as appropriate, and summarized.

This approach allowed similar comments to be addressed with a single response to avoid duplication of effort and enhance the readability of this report. A response has been provided for each comment or group of comments. Each response indicates whether the final EA was modified as a result of the comment.

K.5 Major Topics of Concern—In Scope

Comments received specifically addressed items within the scope of the EA are addressed in this section.

Topics raised included a variety of concerns about:

- Accidents (Section K.5.1)
- Alternatives—No Action (Section K.5.2)
- Alternatives—Other (Section K.5.3)
- Consulting and Cooperating Agencies (Section K.5.4)
- Cumulative Effects (Section K.5.5)
- Ecology—Aquatic Resources (Section K.5.6)
- Ecology—Terrestrial Resources (Section K.5.7)
- Geologic Environment (Section K.5.8)
- Greenhouse Gas Emissions and Climate Change (Section K.5.9)
- Historic and Cultural Resources (Section K.5.10)
- Human Health—Nonradiological (Section K.5.11)
- Human Health—Radiological (Section K.5.12)
- Hydrology—Groundwater Resources (Section K.5.13)
- Hydrology—Surface Water Resources (Section K.5.14)
- Land Use and Visual Resources (Section K.5.15)
- Meteorology and Air Quality (Section K.5.16)
- Need for Power/Purpose and Need (Section K.5.17)
- Socioeconomics (Section K.5.18)
- Waste Management—Nonradioactive (Section K.5.19)
- Waste Management—Radioactive (Section K.5.20)

K.5.1 Comments Concerning Accidents

K.5.1.1 Accidents Response 1

Comments: (23-19-5) (23-26-2)

Comment: how do these SAMAs compare to CRAC-II of 1982? See our CRAC-II related comments, above. (23-19-5 [Kamps, Kevin])

Comment: APPENDIX H DISCUSSION OF CANCER RISKS AT AND AROUND PALISADES NUCLEAR PLANT

[incorporate by reference Mangano studies]

[also cite CRAC-II latent cancer fatality figure]

[cite NAS LNT] (23-26-2 [Kamps, Kevin])

Response: *The CRAC-II report referred to by the commenter is the “Calculation of Reactor Accident Consequences” which is a study performed by the Sandia National Laboratories in 1982 for the NRC. The report estimated the consequences of the worst-case accidents at nuclear power plants in the United States. The NRC has devoted considerable research resources, both in the past and currently, to evaluating accidents and the possible public consequences of severe reactor accidents.*

The NRC’s most recent studies have confirmed that early research into the topic led to extremely conservative consequence analyses that are not useful for attempting to quantify the possible effects of very unlikely severe accidents. They often used unnecessarily conservative estimates or assumptions concerning possible damage to the reactor core, the possible radioactive contamination that could be released, and possible failures of the reactor vessel and containment buildings. These previous studies also failed to realistically model the effect of emergency preparedness.

The NRC performed a state-of-the-art assessment of possible severe accidents as part of its ongoing effort to evaluate the consequences of such accidents. The State-of-the-Art Reactor Consequence Analyses (SOARCA) project incorporates the results of more than 25 years of research to analyze the realistic outcomes of postulated severe reactor accidents, even though it is considered highly unlikely that such accidents could occur. The SOARCA project combined up-to-date information about the pilot plants’ layout and operations with local population and weather data and emergency preparedness plans. Plant changes that were accounted for included system improvements, training, emergency procedures, and offsite emergency response, as well as mitigation enhancements in response to the terrorist attacks of September 11, 2001. The SOARCA project is documented in NUREG-1935, State-of-the-Art Reactor Consequence Analyses Report (NRC 2012-TN11799), and in a public communications brochure, NUREG/BR-0359, Modeling Potential Reactor Accident Consequences (NRC 2012-TN3089).

Regarding the incorporation by reference to the Mangano studies, cancer risks are addressed in Appendix H of the EA and reflect the NRC’s current understanding of the environmental effects of radiation. Discussion of LNT is addressed in Section K.5.12.3.

The severe accident mitigation alternative (SAMA) analysis completed for Palisades Nuclear Plant (Palisades) identified potential cost-beneficial modification that could be implemented to mitigate postulated accidents. The CRAC-II and follow-on SOARCA analysis focused on

understanding the consequences of potential accidents. These analyses work in tandem to enhance nuclear safety and inform regulators but are not directly comparable. No changes were made to the Palisades EA as a result of these comments.

K.5.1.2 Accidents Response 2

Comment: (23-18-16)

Comment: Cumulative effects, accumulating risks, such as highly radioactive waste piling up. Just the quantity alone increasing is a major, large impact, and huge risk. But NRC and DOE don't even acknowledge that. See irradiated nuclear fuel storage and transport risk comments, above.

IF SMRs are pursued? Holtec is full steam ahead on that one. They just held yet another high-profile press conference last week with Hyundai of South Korea, their SMR partner. The partners announced, yet again - not for the first time - that PNP is their top target for SMR deployment. NRC is complicit and colluding on this SMR rush job.

Three reactors instead of one is a new risk - of domino effect, multiple meltdowns. The site is only 432-acres in size. The zombie reactor has severe and worsening age-related degradation breakdown risks. The new SMRs would have break-in phase risks. The tiny site would host the extremes of the risk spectrum. **(23-18-16 [Kamps, Kevin])**

Response: *The NRC's approach to analyzing the interaction of multiple nuclear reactors under postulated accident conditions involves a mix of regulatory oversight, technical analysis, emergency preparedness, and continuous learning and improvement. This systematic approach is designed to ensure a high level of safety and to protect public health and the environment.*

In Section 3.14 of the Palisades EA, the NRC staff determined that the environmental impacts of postulated accidents, including severe accidents, of the proposed Federal actions would be NOT SIGNIFICANT. In addition, prior to construction and operation of any proposed new SMR at a site, the applicant would be required to submit an application for a separate license which would require the staff to perform an environmental review related to the construction and operation of the SMR, which would require the staff to perform an environmental review related to the construction and operation of the SMR. See Section 3.13 of the Palisades EA that addresses the uranium fuel cycle including cumulative effects of a potential new SMR on the site. This comment provides no new or significant information, and therefore, no changes were made to the Palisades EA as a result.

K.5.2 Comments Concerning Alternatives - No Action

Comment: (13-3)

Comment: The NRC correctly identifies that continuing the decommissioning of an existing reactor with the intent to build a new reactor would exceed the opportunity costs of reauthorizing power operations of the original reactor by causing significant delays, substantial costs, and additional disturbance to the surrounding environment. It further notes that replacing the nuclear reactor with another generation type would "result in substantial additional environmental impacts not needed to resume operation of the existing reactor." It cannot be understated that the marginal impacts of such actions would outweigh the marginal benefits. The NRC agrees with this.

Given the FONSI and significant environmental benefits, in the scope of environmental review, not reauthorizing power operations would be in conflict with the NRC mandate to not unnecessarily limit benefits to society.⁴

⁴ See Section 501 of the ADVANCE Act, 2024 (13-3 [Tilson, Deric])

Response: *The NRC acknowledges this comment. As the comment is supportive and general in nature, no changes were made to the Palisades EA as a result of this comment.*

K.5.3 Comments Concerning Alternatives-Other

Comments: (10-18) (13-2) (13-5) (17-4) (17-17) (17-18) (17-19) (17-20) (23-2-6) (23-2-7) (23-4-9) (23-4-14) (23-4-16) (23-4-17) (23-4-18) (23-6-7) (23-6-8) (23-20-10) (23-20-11) (23-21-7)

Comment: Exploration of all reasonable energy alternatives, especially the renewable clean forms of energy that are widely viewed as the energy technologies of the future as well as efficiency technologies, demand-side options, grid upgrades, and battery/storage.

Cheaper, cleaner, safer, more sustainable and broadly supported and desirable alternatives to both nuclear and fossil fuel generation exist today. Barnaby 2007; Benham 2023 ; Bond 2024; Bradford 2017; Brown 2018; Cooper 2021; Diesendorf 2016; Dunai 2019; Jacobson 2023; Jacobson 2020; Jacobson 2018; Lovins 2020; Lovins 2018; Makhijani 2018; Mez 2016; Perez 2019; Ramana 2024; Ramana 2018; Schlissel 2024; Sovacool 2020; Smith 2006)

Wind, solar, and small hydroelectric, backed up by storage, modernization of the grid, and smart grid management will improve reliability. These are the energy solutions which are expanding rapidly globally. Indeed, efficiency technologies and renewables and storage/battery solutions are viewed by the International Energy Agency (IEA) and other world authorities as the systems which will do the heavy lifting for the energy transition which is now well underway. (Benham 2023; Bond 2024; IEA Energy Efficiency 2024; IEA Renewables 2024)

In sharp contrast to nuclear, all of these energy solutions are less costly, more sustainable, and do not present anywhere near the level of national and global security risks inherent in nuclear.

The NRC's Alternatives Analysis is a case study in the disregard of alternatives to nuclear power. (10-18 [Lee, Michel])

Comment: In addition to the EA threshold, the Fiscal Responsibility Act of 2023 amended NEPA mandating the consideration of the negative impacts where no action was taken: *...a reasonable range of alternatives to the proposed agency action, including an analysis of any negative environmental impacts of not implementing the proposed agency action in the case of a no action alternative, that are technically and economically feasible, and meet the purpose and need of the proposal.*

Instead of considering the impacts of if construction will or won't happen on-site, this NEPA amendment requires the NRC to grapple with the broader impacts of not reauthorizing power operations at the Palisades reactor and others like it.

To its credit, the NRC identified some of the significant downsides to taking no action including but not limited to the reduction in clean baseload necessary for Michigan to reach its clean

energy goal, the need for additional power plants to be built in order to replace the baseload, and the potential environmental disturbances caused by the construction of new non-nuclear power generation facilities. Restarting the Palisades power plant is equivalent to Michigan's nearly all of the wind electricity generation, or five times the generation from solar or hydroelectric.² No alternatives were "technically and economically feasible, and meet the purpose and need of the proposal." Had other generation sources been identified as a reasonable alternative, the NRC should have taken their analysis a step further by including the significant environmental and public health impacts that emissions³ from new fossil fuel generation, made necessary to maintain baseload generation, would impose on their surrounding populations. Replacing nuclear technologies with carbon-releasing ones is detrimental to the environment and society as a whole.

²Based on data from Energy Information Administration, Net Generation by State by Type of Producer by Energy Source (EIA-906, EIA-920, and EIA-923), 2021 values for Palisades as the last full operation year, the most recently available data is used for renewables.

³The NRC is equipped to do so as evidenced by Sections 3.3 and 3.11 of the draft EA and draft FONSI in which it takes into consideration the effects of reauthorizing power operations on air quality and public health. This analysis could be applied to alternatives, as well. (13-2 [Tilson, Deric])

Comment: When considering viable alternatives, the NRC should take into consideration the externalities of other power generation types. (13-5 [Tilson, Deric])

Comment: Lastly, the NRC has artificially narrowed the alternatives analyzed in the Draft EA by improperly restricting the purpose and need of the proposed action. (17-4 [Scott, David C.])

Comment: Resources like wind and solar are often combined with energy storage systems which effectively operationalize them as a form of baseload power. The DOE has already touted the excellent performance of these systems in the recent Solar and Wind Grid Services and Reliability Demonstration, which has shown "the reliable operation of power systems that have up to 100% of their power contribution coming from solar, wind, and battery storage resources."⁴⁸ While nuclear power will likely form a portion of energy portfolios moving forward, it is necessary for the NRC and the DOE to consider the full range of alternatives to produce clean power in light of the current technological landscape.

⁴⁸ See DOE, Solar and Wind Grid Services and Reliability Demonstration, available at <https://www.energy.gov/eere/solar/solar-and-wind-grid-services-and-reliability-demonstration-funding-program>; see also Energy Information Administration (EIA), In-Brief Analysis: Solar, battery storage to lead new U.S. generating capacity additions in 2025, (Feb. 24, 2025) available at <https://www.eia.gov/todayinenergy/detail.php?id=64586> (detailing the demonstrated success and projected growth of solar combined with energy storage). (17-17 [Scott, David C.])

Comment: The NRC further contends that building other forms of renewables would have greater environmental impacts related to land disturbance compared to restarting Palisades.⁴⁹ The NRC then makes another conclusory assertion, without analysis, that "[d]epending on the location or locations ultimately selected for the new facilities, the environmental impacts could potentially be SIGNIFICANT. In contrast, the potential environmental impacts from proposed Federal actions to resume operation of the existing Palisades reactor are known to be NOT SIGNIFICANT."⁵⁰ This short statement does not address the future land disturbances associated with building out SMRs at the Palisades site, but it also fails to meet the regulatory standard required for an alternatives analysis.

⁴⁹ Draft EA and FONSI, pg. 4-6.

⁵⁰ Id. (17-18 [Scott, David C.])

Comment: ELPC believes that the NRC is required to conduct a full EIS, and a robust alternatives analysis is the core of that document.⁵¹ In the alternative however, an EA still requires a thorough alternatives analysis under the NRC's NEPA regulations.⁵² The conclusory assertions made by the NRC, in a single paragraph in the Draft EA, even fall short of the "brief discussion" standard required for an EA.⁵³ An alternative is deemed to be reasonable if it is objectively feasible and reasonable in relation to the agency's objective.⁵⁴ In deciding to issue an EA instead of an EIS the NRC was required to take a "hard look" at the project and provide "sufficient discussion of the relevant issues and opposing viewpoints [and make itself] fully informed".⁵⁵ The NRC has not taken a hard look at the Palisades restart by failing to make itself fully informed of the full range of alternatives available to achieve the purpose of the project. Instead, the agency's objective in the Draft EA has been cabined to producing traditional baseload power instead of renewable power in general. This, in turn, has allowed the NRC to argue that the only path forward which is reasonable in relation to that objective or purpose is nuclear generation. This is a false premise and contrary to the underlying statute that grants funding for this project.

⁵¹ 40 C.F.R. § 1502.14.

⁵² 40 C.F.R. § 1501.5(c)(ii); see also 42 U.S.C. § 4332(H).

⁵³ See 40 C.F.R. § 1508.9(b).

⁵⁴ See *City of Alexandria v. Slater*, 198 F.3d 862, 867 (D.C. Cir. 1999); see also 43 C.F.R. § 46.420(b) defining "reasonable alternatives" as alternatives "that are technically and economically practical or feasible and meet the purpose and need of the proposed action."

⁵⁵ *Myersville Citizens for a Rural Cmty., Inc. v. FERC*, 783 F.3d 1301, 1325 (D.C. Cir. 2015). (17-19 [Scott, David C.]

Comment: In an environmental scoping meeting on July 11, 2024, members of the NRC and an environmental protection specialist from the DOE Loan Program Office (LPO) gave a presentation on the loan guarantee program.⁵⁶ The presentation explained that funding for this project would be coming from the Title 17 Clean Energy Financing Program.⁵⁷ This program was established pursuant to Title 17 of the Energy Policy Act of 2005.⁵⁸ That statute allows for funding of projects that "avoid, reduce, utilize, or sequester air pollutants or anthropogenic emissions of greenhouse gases."⁵⁹ Amongst the categories, both "advanced nuclear energy facilities" and "renewable energy systems" are mentioned.⁶⁰ The purpose of the underlying statute, which provides the funding for projects, should guide the purpose of the proposed projects themselves. Palisades is an aging nuclear plant far past its time to be considered advanced and, at the same time, other forms of renewable energy systems fall within the categories presented by the underlying statute. Furthermore, the LPO stated in their presentation that Title 17 projects are meant to "retool, repower, repurpose, **or replace** Energy Infrastructure that has ceased operations."⁶¹ Given the broad range of possibilities that these funds could be used for, including replacing the energy output with other forms of renewables, like solar and wind generation facilities, the NRC should realign the purpose and need of the project to more closely reflect the underlying statute that is providing the funding here. This approach will allow the NRC to analyze the full range of alternatives available to provide energy generation while reducing anthropogenic emissions.

⁵⁶ NRC, Environmental Scoping Meeting: Potential Reauthorization of Power Operations – Palisades Nuclear Plant, Accession No. ML24193A025 (Jul. 11, 2024) ("Environmental Scoping Meeting"), available at <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML24193A025>.

⁵⁷ *Id.*, slide 10.

⁵⁸ 42 U.S.C. § 16511.

⁵⁹ *Id.* at § 16513(a)(1).

⁶⁰ *Id.* at § 16513(b).

⁶¹ Environmental Scoping Meeting, slide 10. (17-20 [Scott, David C.]

Comment: NRC's Alternatives Analysis is unacceptably narrow in scope and woefully inadequate.

Alternatives for the generation of 800 Megawatts-electric of carbon-free and nuclear-free electricity generation should not be arbitrarily confined to the tiny 432-acre Palisades site. The alternatives of wind power (both on- and off-shore), solar power (both household/business-scale and industrial scale), and other renewable electricity generation sources should be given the "hard look" required under NEPA. So too should the potential for energy efficiency upgrades, to prevent unnecessary waste of electricity, and decrease demand. Energy storage technologies should also be analyzed as a complement to any intermittency issues associated with renewables like solar and wind.

We incorporate by reference, as if fully rewritten herein, the expert witness testimony of Dr. Mark Jacobson, posted online here:

{February 1, 2025: Beyond Nuclear, et al.'s legal counsel, Wally Taylor of Cedar Rapids, IA, and Terry Lodge of Toledo, OH, submitted expert witness testimony by Dr. Mark Jacobson, professor at Stanford U. and internationally renowned greenhouse gas emission reduction strategist, to the NRC ASLB: Jacobson congressional testimony, dated Jan. 17, 2024, Seven Reasons Why New Nuclear Energy is an Opportunity Cost That Damages Efforts to Address Climate Change and Air Pollution; and Jacobson book chapter, Dec. 22, 2019, Evaluation of Nuclear Power as a Proposed Solution to Global Warming, Air Pollution, and Energy Security.}(<https://beyondnuclear.org/wp-content/uploads/2024/10/2-1-25-JACOBSON-24-01-MZJ-TestimonyV2-24-01-MZJ-HRTestimony.pdf>)

Amory Lovins, also a professor at Stanford University, and a founder of the Rocky Mountain Institute, has long asserted that nuclear power takes too long, and costs too much, making it an on-starter for climate mitigation, from a market perspective. He has been making such assertions for decades. He recently spoke about this (Press Briefing: Why Latest Nuclear Revival Is Already Doomed, October 3, 2024). The recording of the press briefing is posted online here:

<https://www.youtube.com/watch?v=2u8PYEyqr14>

We incorporate by reference, as if fully rewritten herein, the entirety of Amory Lovins' testimony above.

Lovins also testified about this subject matter at a Capitol Hill congressional briefing, Toward an Evidence-Based Nuclear Energy Policy; What Congress Needs to Know About Nuclear Decommissioning, Radioactive Waste, and Nuclear Energy as a Climate Strategy, on March 30, 2021. We incorporate by reference as if fully rewritten herein the entirety of Lovins' presentation recording, including his slideshow, posted online here:

<https://www.eesi.org/briefings/view/033021nuclear>

Dr. Arjun Makhijani, founder and president of the Institute for Energy and Environmental Research, and a Fellow of the American Physical Society, wrote an entire book on this subject matter, entitled Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy. We incorporate by reference as if entirely rewritten herein the entirety of this book, and related publications, posted online here:

<https://ieer.org/projects/carbon-free-nuclear-free/>

These authors, scholars, and experts cited above provide extensive, comprehensive information about the alternatives that NRC and DOE should address in a higher level EIS/PEIS, namely renewables (solar, wind, etc.), efficiency, and storage, as ready, reliable, much more cost-effective, and time-effective, clean, safe and secure methods to mitigate the greenhouse gas emissions that cause global warming and climate chaos, as compared to the "zombie" reactor restart scheme at PNP, as well as to the SMR new builds scheme at Palisades and Big Rock Point.

None other than former Michigan Governor (and former Energy Secretary) Jennifer Granholm herself advocated in favor of developing off-shore wind power available to the Great Lakes State. A study by the Michigan State University Land Use Institute documented that more than 300,000 MW-e of off-shore wind power potential is available to be tapped on the Great Lakes. Gov. Granholm, in 2010, convened an advisory council re: this subject matter. As conveyed by James Clift -- a member of the off-shore wind power advisory council, as well as executive director of Michigan Environmental Council at the time -- in a presentation he made at a renewable energy summit in Southfield, Michigan in June 2010, Gov. Granholm's off-shore wind power advisory council advised some two-dozen criteria to guide the development of off-shore wind power on the Great Lakes. These included avoiding impacts on fisheries, avoiding aesthetic impacts, avoiding historic shipwrecks, etc. The council recommended three areas of the Great Lakes for off-shore wind, based on the two-dozen criteria: extreme southern Lake Michigan, not that far from PNP actually; extreme northern Lake Michigan, not that far from the Big Rock Point nuclear power plant site, actually; and Saginaw Bay, where it opens out into Lake Huron (fortunately, two reactors at the Midland nuclear power plant in that part of the state were blocked from operating, a tremendous environmental victory in the 1980s). Just tapping a very small percentage of the off-shore wind power potential available to Michigan on the Great Lakes would far surpass the 800 MW-e that a restarted PNP would provide, and would also far surpass the additional nuclear megawattage that two SMR-300s at PNP would provide, and would also far surpass the nuclear megawattage one or more SMR-300s at Big Rock Point would provide. This off-shore wind power would also avoid reactor core meltdowns, radioactive waste fires, radioactivity releases from "routine reactor operations," radioactive leaks, spills, and contamination, radioactive waste generation, thermal wastewater, and toxic chemical releases at all these atomic reactors, and would do so cost- and time-effectively, compared to SMR newbuilds, and even the PNP restart scheme.

We incorporate by reference, as if fully rewritten herein, the following: Governor Granholm Signs Executive Order Creating Great Lakes Wind Council, February 06, 2009. It is posted online here:

<https://www.michigan.gov/formergovernors/recent/granholm/press-releases/2009/02/06/granholm-signs-executive-order-creating-great-lakes-wind-council>

Likewise, we incorporate by reference, as if fully rewritten herein, the following:

Report of the Michigan Great Lakes Wind Council, October 1, 2010.

It is posted online here:

https://www.baycountymi.gov/uploads/GLOWreportOct2010_with%20appendices.pdf (23-2-6 [Kamps, Kevin])

Comment: Why didn't NRC and DOE include a comprehensive analysis of off-shore wind power as an alternative to PNP restart in the EA? Why wasn't solar power (both household/business-scale, as well as utility-scale) comprehensively analyzed as an alternative? Why wasn't on-land wind power comprehensively analyzed? Why weren't energy efficiency and energy storage (such as batteries) comprehensively analyzed as an alternative, especially considering that battery storage has been touted as a supposed Purpose and Need for PNP restart? (23-2-7 [Kamps, Kevin])

Comment: *[The Preferred Alternative - PNP restart - is most unreasonable. It is unprecedented, unneeded, insanely expensive for the public, and extremely risky for health, safety, security, and the environment. The No-Action Alternative, no restart, is most reasonable, compared to unreasonable Preferred Alternative. (23-4-9 [Kamps, Kevin])*

Comment: Renewables, efficiency, and energy storage, on the contrary, have nowhere near that negative impact on the environment and health. Please see the expert witness declarations provided by our intervening environmental coalition's expert witness Dr. Jacobson, above, which points out the time- and cost-effectiveness of renewables, efficiency, and storage, in terms of reducing greenhouse gas emissions as climate mitigation. Dr. Jacobson testifies that nuclear power fails these time- and cost-effectiveness tests. (23-4-14 [Kamps, Kevin])

Comment: 2.2.2 Alternatives Considered and Not Carried Forward for Further Analysis

2.2.2.1 Replacing Palisades Reactor with New Onsite Reactor

[But Holtec IS building new reactors onsite - not to replace the Palisades "zombie reactor," but to "complement" or "supplement" it, in addition to it.]

This alternative would reuse land that had been previously disturbed by the existing reactor, but it would still result in additional noise, emissions, and other impacts from building new facilities.

[So on one hand NRC and DOE are saying this is to be avoided. On the other hand, they are expediting this very thing, in terms of 2 SMR-300 new builds. The federal agencies are talking out both sides of their mouth.]

However, building a new reactor would still require substantial costs beyond those needed to resume operation of an already built reactor. Additionally, building the new reactor would require substantial additional ground disturbance not needed to put the existing reactor back in operation. The unused lands on the Palisades site include sensitive dune, forest, shoreline, and wetland habitats. Using those lands to build a new reactor could result in loss or degradation of those habitats, as well as generate additional noise, emissions, and other impacts from building new facilities

Neither of the alternatives described above were carried forward for detailed analysis because of the additional time and cost needed to build a new reactor and greater environmental impacts relative to resuming operation of the existing reactor.

[And yet, that is exactly what Holtec and NRC propose doing with 2 SMR-300s. DOE would be complicit if it awards Holtec the \$7.4 billion in nuclear loan guarantees for its SMRs the company has requested.] (23-4-16 [Kamps, Kevin])

Comment: None of the alternatives described above were carried forward for detailed analysis because of the additional time and cost needed to build the alternative facilities and greater environmental impacts relative to resuming operation of the existing reactor

[Please compare NRC and DOE's words here to the points made about the work and analyses provided by Dr. Arjun Makhijani of Institute for Energy and Environmental Research, Dr. Mark Z. Jacobson of Stanford University, Amory Lovins of Stanford and the Rocky Mountain Institute, above.]

Also, compare NRC and DOE's words here to former Michigan Governor (and former Energy Secretary) Jennifer Granholm's offshore wind power advocacy, above.

Renewables, efficiency, and storage do not have million year or longer - that is, forevermore - negative impacts on human health and the environment in the form of high-level radioactive waste, per above.] (23-4-17 [Kamps, Kevin])

Comment: 2.2.2.3 Installing System Design Alternatives for Use with the Current Palisades Reactor

System design alternatives would involve fitting the existing Palisades reactor with alternative system designs for processes such as heat dissipation, circulating water, and transmission systems. However, the systems already in place at the reactor meet regulatory requirements (e.g., U.S. Environmental Protection Agency (EPA) 316(b) [TN662]). As described in Chapter 3 of this EA, the NRC staff has determined that the environmental impacts from resuming operation of the existing facilities, with their existing systems, as called for in the proposed Federal action would be minimal. There is therefore no reason to carry any such alternatives forward for more detailed analysis.

[NRC and DOE have made a meaningless straw man argument here.] (23-4-18 [Kamps, Kevin])

Comment: What is the wind power potential on-site, and off-site on the Lake? After all, Holtec is willing to risk the future of Lake Michigan. Why not build wind turbines there/nearby, instead? This would have much less impact on the environment and health than restarting PNP. What about aesthetic impacts of offshore wind power? It's preferable to the aesthetic impacts of Palisades itself, let alone the radioactive impacts, and potentially much larger radioactive impacts. As Dr. Arjun Makhijani put it at a book talk about Carbon-Free and Nuclear-Free: A Roadmap for U.S.

Energy Policy in Kalamazoo, Michigan in late October, 2008, we can either freeze in the dark without a job (live without electricity), bake the planet (climate chaos), kick the plutonium can down the road to our descendants (another risk of nuclear power - weapons proliferation), or, we can deal with the view (wind turbines, solar panels).

Dr. Makhijani's framing led to a letter to the editor published in the Muskegon Chronicle, incorporated by reference herein as if full rewritten herein:

<https://static1.1.sgspcdn.com/static/f/356082/10617450/1297055663983/Muskegon+Chronicle+Nov+17+2008.pdf?token=TPctULtDIzyNFik9y9wVPsCLoR0%3D>

IEER "wrote the book" on the many downsides of nuclear power, and why it is not a climate mitigation strategy. We incorporate IEER's book on the subject by reference, as if fully rewritten

herein:

<https://ieer.org/resource/books/insurmountable-risks-dangers-nuclear/>

NRC and DOE should use IEER's framing, as in this book, in its hard look in an EIS/PEIS, re: PNP's restart, as in a much more robust and comprehensive Alternatives analysis than was carried out in this woefully inadequate EA. (23-6-7 [Kamps, Kevin])

Comment: Even with cloud cover, solar power would still work at PNP itself, and/or nearby, and/or elsewhere in the service area. This would be a preferred alternative to PNP restart. Dr. Al Compaan, a solar power entrepreneur and patent holder, as well as emeritus chair of the Physics Department at the University of Toledo, testified as much to the NRC ASLB as an expert opposing the 80-year license at Point Beach NPP in Wisconsin. Dr. Compaan explained the solar power technology is growing ever more efficient and effective. Direct sunlight is not needed to generate electricity. Even diffuse sunlight is sufficient, through a process called insolation. That intervention petition and request for hearing testimony is incorporated by reference, as if fully rewritten herein:

<http://static1.1.sqspcdn.com/static/f/356082/28418937/1616559485077/3+23+21+Declaration+Compaan+PBN+final+-+Declaration+Compaan+w+exhs+COMPLET.pdf?token=v%2BxPAAS%2FxVFSzfOauZpj5Xnhtc%3D>

(23-6-8 [Kamps, Kevin])

Comment: *Ken Bossong with Sun Day Campaign based in Takoma Park, Maryland publishes regular updates on the growth of renewable energy in the U.S. and around the world. They are quite hopeful. Renewables are growing by leaps and bounds, and have been for a long time, as opposed to nuclear power, despite its massive subsidization, as by the federal government and State of Michigan government for zombie reactor restart at Palisades, as well as SMR new builds there, and at Big Rock Point. We urge NRC to subscribe to Ken Bossong's emailed newsletters!*

See Dr. Jacobson's expert witness declaration testimony submitted to ASLB in this very PNP restart proceeding, above. We also cite Dr. Mark Cooper, Arnie Gundersen of Fairewinds, and Dr. Al Compaan's expert witness declarations, submitted on behalf of PSR WI, in its opposition to an 80-year license at Pt. Beach nuclear plant in WI, which is relevant to the Alternatives Analysis in this EA, given the comparable geographic locations of Pt. Beach and Palisades, in terms of renewable potential. We incorporate by reference as if fully rewritten herein their expert witness declarations, posted online here:

<https://archive.beyondnuclear.org/home/2021/7/29/nrc-rejects-safety-at-wi-nuke-dangerously-age-degraded-nuke.html>

NRC REJECTS SAFETY AT WI NUKE: Dangerously age-degraded nuke may get license extension

A U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (ASLB) panel has rejected

<http://static1.1.sqspcdn.com/static/f/356082/28455983/1627563749117/7+26+21+Point+Beach+ASLB+decision.pdf?token=0FQ8txoDSuGTq5OzqiQhUNDjAk0%3D>) numerous contentions
<http://static1.1.sqspcdn.com/static/f/356082/28418935/1616558621227/3+23+21+Point+Beach>

+Petn+final+COMPLET.pdf?token=4wYHUHP2k%2BQROggYaXsFcuEXNh4%3D) brought by Physicians for Social Responsibility Wisconsin (<https://psr-wisconsin.org/>) (PSR WI), while it acknowledged the group's legal standing. PSR raised objection to a "subsequent license renewal" (<https://www.nrc.gov/reactors/operating/licensing/renewal/subsequent-license-renewal.html>) at the two-reactor Point Beach nuclear power plant on the Lake Michigan shore (pictured). Point Beach is already 51 years old (<https://www.nrc.gov/info-finder/reactors/poin1.html>), but is seeking approval to operate for 80 years. It has the worst embrittled reactor pressure vessel in the U.S. -- a pathway to core meltdown, and an issue raised by PSR WI's expert witness, nuclear engineer Arnie Gundersen (<http://static1.1.sqspcdn.com/static/f/356082/28418936/1616559309943/3+23+21+Declaration+Arnie+Gundersen+FAI+for+PSR-WI+-+Gundersen+COMPLET.pdf?token=fr0oQdNGfjA4liKv8BHsXUa5RaU%3D>) of Fairewinds Associates. Experts At Compaan (<http://static1.1.sqspcdn.com/static/f/356082/28418937/1616559485077/3+23+21+Declaration+Compaan+PBN+final+-+Declaration+Compaan+w+exhs+COMPLET.pdf?token=v%2BxPAAS%2FxVFSzfOauZpj5Xnhs tc%3D>) and Mark Cooper (<http://static1.1.sqspcdn.com/static/f/356082/28418939/1616559889087/3+23+21+Cooper+report+Monday+pg+1+to+23+-+Cooper+DONE-1.pdf?token=bkONP6rpTDQRWcE8gTc3j8U7oiw%3D>) raised contentions about safe, clean, and affordable renewable alternatives.

July 29, 2021

Our previous comments cited above re: Dr. Arjun Makhijan's extensive work, over decades, on the carbon-free, nuclear-free alternatives of renewables, efficiency, and storage are also very relevant here. (23-20-10 [Kamps, Kevin])

Comment: As noted in Section 2.2.1.1 of this EA, taking no action would not meet the clean energy demand driving the purpose and need for the proposed Federal actions and could lead to a need to build new nuclear or non-nuclear power generation facilities.

This is illogical. The non-nuclear power generation facilities - as well as the non-fossil fuel power generation facilities - that could be built would and should include renewables. Yet NRC and DOE refuse to consider them a viable alternative. This is especially ironic, considering the great work of DOE's own National Renewable Energy Lab! But NRC and DOE here say they could not be. Renewables would be more cost effective, just as reliable if not more so, as compared to PNP, especially if storage is included. Renewable would also be much safer, more secure, cleaner, etc., as compared to PNP. NRC and DOE are willfully blind to all this. Also see Dr. Mark Jacobson's expert witnesses declarations in this very ASLB proceeding, cited above.] (23-20-11 [Kamps, Kevin])

Comment: Unfortunately, there are no renewables - as in oh so viable renewable energy alternatives to PNP - included in this EA. That's the problem. Why wasn't Gov. Granholm's off-shore wind report from 2010, which we cited above, included as part of the alternatives analysis in this EA?! After all, she was the Energy Secretary when this DOE-sponsored EA was launched in 2024. **Would the REAL Jennifer Granholm PLEASE STAND UP?!** We are supposed to believe, in the year 2025, that there are no alternatives to this PNP restart scheme?! How absurd is that?! Renewables are the future, if we are to have a future. (23-21-7 [Kamps, Kevin])

Response: Commenters expressed concern that the Palisades draft EA did not adequately analyze alternatives to the proposed Federal actions. Specifically, commenters purported that: (1) the EA lacked a thorough alternatives analysis; (2) the purpose and need statement overly narrowed the alternatives analyzed; inclusion of DOE purpose and need further narrowed the reasonable alternatives; (3) the no-action alternative, no restart, was the most reasonable, compared to the preferred alternative; (4) the reasonable energy alternatives, including renewable energy and demand-side management, were not adequately addressed; (5) the conclusion that building other forms of renewables would have greater environmental impacts related to land disturbance was incorrect; (6) the consideration of alternatives was arbitrarily confined to the 432-acre Palisades site; and (7) the requirement included in NEPA as amended from Fiscal Responsibility Act of 2023 mandating the consideration of the negative impacts where no action was taken was not addressed. Each concern is addressed in the subsequent paragraphs.

With respect to the thoroughness of NRC staff's analysis, as outlined in Section 2.2 of the EA, for EAs, NRC regulations in 10 CFR 51.30(a)(1)(ii) (TN10253) call for a brief discussion of alternatives as required by NEPA. NEPA Section 102(2)(F) requires Federal agencies to, "consistent with the provisions of this Act, study, develop, and describe technically and economically feasible alternatives." The analysis of alternatives in Sections 2.2 and 4.2 of the EA identified a range of technically and economically feasible alternatives to resuming operations of Palisades.

Commenters felt the purpose and need statement overly narrowed the alternatives analysis. The NRC staff analyzed alternatives based on the purpose and need of the proposed NRC Federal actions, specifically to provide an option for baseload clean energy power generation capability within the term of the Palisades' renewed facility operating license (RFOL) to meet current system generating needs. The evaluation also considered DOE's purpose and need-- Federal financial assistance in the form of a loan guarantee supporting the requirement that Federal agencies process environmental reviews and authorization decisions for "major infrastructure projects" as One Federal Decision (82 FR 40463-TN6393). Section 2.2 of the EA considers several alternatives to the proposed action, including: 1) the no-action alternative; 2) replacing the Palisades reactor with a new reactor; 3) replacing the Palisades reactor with other power generation technologies; and 4) installing system design alternatives at the current Palisades Reactor. Moreover, NEPA, as recently amended through the enactment of the Fiscal Responsibility Act of 2023, places a limitation on an agency's alternatives analysis to include only those alternatives "that are technically and economically feasible, and meet the purpose and need of the proposal."

Commenters felt that the no-action alternative was preferable. As discussed in Section 4.2 of the EA, the no-action alternative would not meet the purpose and need of the proposed action. The NRC Staff, however, carried the no-action alternative forward for further analysis and compared the no-action alternative to the proposed action. In doing so, the EA specifically considered the environmental effects of the proposed action against those of the no-action alternative and ultimately determined there are no environmentally preferable alternatives to the proposed action.

With regard to the inclusion of renewable energy alternatives and efficiency programs in the alternative analysis, the NRC staff considered possible renewable energy alternatives in Section 2.2 of the EA. In relation to demand side management, in the absence of new generation, the potential for power needs to be offset by instituting energy conservation and efficiency measures (demand-side management) has been extensively studied. As stated in NUREG-

1437 (TN10161), Appendix D, conservation and energy efficiency programs may reduce overall environmental impacts associated with energy production. However, while the energy conservation or energy efficiency potential in the United States is substantial, the NRC staff is not aware of any cases where a demand-side management program has been implemented expressly to replace or offset a large, baseload generation station. As described in Section 1.2.3 of the EA, the power purchase agreement, under which Wolverine Power Cooperative and Hoosier Energy would purchase, for the foreseeable future, Palisades' net generating capability.

Concerning NRC staff's conclusion regarding environmental impacts related to land disturbance for building new power generation. Section 4.2 of the EA acknowledges that building new power generation facilities of any type to replace the power generation capabilities of the existing Palisades facilities would require potentially significant environmental impacts somewhere, whether in undeveloped lands on the Palisades site or in some other setting. In contrast, as demonstrated in Chapter 3 of the EA, the proposed Federal actions supporting the reauthorization of power operations of the existing Palisades facilities would not result in significant environmental impacts. The power generation facilities on Palisades are already built. While preparing those facilities to resume operations would require approximately 11 ac of previously disturbed soils adjoining existing industrial facilities (see Section 3.6.2 of the EA), building replacement generation facilities would require using a substantially greater area of land and possibly introducing industrial disturbances to areas with no history of industrial development.

One commenter noted that if operations of the existing Palisades facilities are resumed, then any replacement power generation facilities would not necessarily be located on the 432-acre Palisades site. Section 4.2 acknowledges that building new facilities instead of resuming operations at Palisades would result in adverse environmental impacts. It does not necessarily imply that the facilities would be built on the Palisades site or that the impacts would be limited to that site. Additionally, one commenter states that the EA does not meet the statutory requirements under NEPA, as amended by the Fiscal Responsibilities Act of 2023, because it does not address the adverse environmental impacts from land disturbances needed to build SMRs if Palisades is not returned to service. Section 4.2 describes how not resuming operations at Palisades, i.e., the no-action alternative, could result in adverse environmental impacts from having to build new facilities to replace the power generation capabilities of the existing Palisades facilities.

One commenter questioned whether the EA meets the requirements under the Fiscal Responsibilities Act of 2023 amendments to NEPA to address the potential adverse environmental impacts from taking no action. Section 4.2 of the EA addresses the potential negative environmental impacts of a no action alternative under which operations at Palisades are not resumed. Section 4.2 describes how the no action alternative would not meet the anticipated demand for clean energy and could require extensive land disturbance and associated environmental impacts to build new facilities to replace the power generation capabilities of the existing Palisades facilities. Other comments concerning the no-action alternative are addressed in Section K.5.2.

There were no changes to the EA as a result of these comments.

K.5.4 Comments Concerning Cooperating Agency

Comments: (23-1-2) (23-2-4) (23-2-9) (23-3-11) (23-4-10) (23-8-5) (23-19-8)

Comment: It is insanely expensive for the public: Holtec has requested a total of more than \$8 billion, and still counting, in federal, state, and ratepayer bailouts, and has already been awarded \$3.12 billion in hard-earned taxpayer money. (23-1-2 [Kamps, Kevin])

Comment: Why are Michigan state taxpayers being forced to subsidize -- to the tune of \$300 million -- the purchase of extremely overpriced PNP electricity (57% or more above market rates, according to Holtec itself in its 7/5/22 bailout application to DOE), by rural electric co-ops in Indiana and Illinois? Why are American taxpayers from 47 other states being forced to pay nearly \$3 billion already, and perhaps additional billions of dollars more to come, for this extremely overpriced electricity to be consumed in MI, IN, and IL? If nuclear power is such a good idea, why can't it pay its own way in the competitive free market? It never has done so. It has had to be massively subsidized, for many decades, by the public. (23-2-4 [Kamps, Kevin])

Comment: DOE should not risk vast sums of federal taxpayer money - \$1.52 billion, and still counting - on Holtec's scheme. Likewise, the U.S. Department of Agriculture (USDA) should not risk \$1.3 billion on this scheme, namely grants to reimburse the Power Purchase Agreement (PPA) purchasers (the rural electric co-ops Wolverine, in Michigan, and Hoosier in Indiana and Illinois) for 25% of the costs of the exorbitantly overpriced electricity from Holtec's Palisades reactor, from 2025 to 2051. The electricity will cost 57%, or more, above market rates, according to Holtec itself, in its initial PNP restart strategy document and bailout application submitted in secret to DOE on 7/5/22, just a week after taking ownership of PNP, supposedly for decommissioning purposes only, which was a big lie. Holtec has never operated any reactor, let alone a nuclear lemon from the get-go like Palisades, which is now severely, dangerously age-degraded. (23-2-9 [Kamps, Kevin])

Comment: [Members of our environmental coalition fought tirelessly against passage of the Energy Policy Act of 2005, for many long years. Ironically enough, the Energy Policy Act of 2005 was signed into law on August 8, 2005, which happened to be the deadline for our environmental coalition's petition to intervene and request for hearing regarding PNP's 2011-2031 license extension, which we opposed. One of the most important reasons we opposed this legislation was its authorization of the wrongheaded nuclear loan guarantee program. We also fought against the \$22.5 billion in nuclear loan guarantee appropriations, enacted into law on December 23, 2007. And we fought against enactment of the Inflation Reduction Act of 2022, which amended the Energy Policy Act of 2005's nuclear loan guarantee program. In the beginning, nuclear loan guarantees were supposed to be limited to innovative new designs for reactors, and only one reactor per design. This was soon weakened by DOE to allow for multiple reactors of the same design. But the Inflation Reduction Act of 2005 weakened the loan guarantee program dramatically further, no longer requiring innovative new designs. Now, DOE has been authorized to award a \$1.52 billion loan guarantee for a jalopy of a reactor, designed in the mid-1960s, constructed beginning in 1967, operated from 1971 to 2022, which was a nuclear lemon from the beginning, and now is very severely and dangerously age-degraded, including major safety-significant systems, structures, and components. (23-3-11 [Kamps, Kevin])

Comment: Re: the insane expense of the PNP restart for the public - more than \$3 billion already awarded by the federal government and State of Michigan, with more than \$5 billion more still requested by Holtec - we incorporate by reference as if fully rewritten herein a Breakdown of Bailouts at PNP. This includes another \$7.4 billion in nuclear loan guarantees requested by Holtec from the DOE for SMR design certification, construction, and operation. The entire amount could be gobbled up by Holtec just for the two proposed SMR-300s at Palisades, and certainly if one or more additional SMRs get built at Big Rock Point. The

Breakdown of Bailouts at Palisades (and Big Rock Point) is posted online at the following link:

<https://beyondnuclear.org/breakdown-of-bailouts-at-holtecs-palisades/> (23-4-10 [Kamps, Kevin])

Comment: Here is yet another data figure regarding the predicted number of jobs at a restarted PNP. In the past, PNP has claimed to have up to 650 employees. This figure of 600 workers can be used to calculate the cost per job at PNP. So far, \$3.12 billion in mostly federal, but also State of Michigan, taxpayer funded bailouts have been awarded to Holtec for the PNP restart. As mentioned above, the Trump administration has said it will repeal/revoke the Inflation Reduction Act of 2022, as well as the Infrastructure Investment and Jobs Act of 2021, and even claw back grants already awarded. This could even lead to the return of \$300 million to the State of Michigan's treasury, because the state grants were predicated on federal funding flowing first. But all that said, 600 jobs, divided by \$3.12 billion, equals 0.0052 billion dollars per job, or \$5.12 million, per job, at a restarted PNP.

But there were still 220 employees at PNP when Holtec took over on 6/28/22, presumably to do decommissioning related work. Holtec, and NRC, has blurred the distinction between decommissioning status, and operational restarted status, ever since. To go from 220 employees, up to 600 employees, means 380 "restored" jobs. 380 "restored" jobs, divided by \$3.12 billion in bailouts thus far, equals 0.0082 billion dollars per "restored" job, or \$8.12 million per "restored" job.

But Holtec has requested more than \$8 billion altogether in federal and state bailouts for the restart scheme. If Holtec does receive \$8 billion in public bailouts, 380 "restored" jobs, divided into \$8 billion, equals 0.021 billion dollars per "restored" job, or \$21 million per "restored" job.

But at one point in the past three years of this PNP restart nightmare we've been forced to deal with, Holtec had stated that only 280 jobs would be "restored," for a grand total of 500 jobs at a restarted PNP. This was stated out loud, and in Holtec's slideshow, at one of the very large number of meetings NRC and Holtec have held, related to the PNP restart scheme.

Now, if the 600 job figure above is to be believed, Holtec has added another 100 "restored" jobs onto its earlier 280 "restored" jobs figure. This moving target exercise is confusing, the opposite of public transparency, which is outrageous, given the vast sums of public money involved. In effect, the U.S. and State of Michigan governments have handed over the keys to the treasuries, so Holtec can laugh all the way to the bank, with up to \$8 billion of hard earned taxpayer money.

If Holtec decides to return to its previous figure of 500 total jobs at a restarted PNP, instead of the figure of 600 above cited by NRC and DOE in this EA, then the figure of 280 "restored" jobs, not 380, should be used. \$8 billion per "restored" job, divided by just 280 "restored" jobs, equals 0.0285 billion dollars per "restored" job, or \$28.5 million per "restored" job.

This figure is interesting, in that on average, in 2023, the cost per new job created with State of Michigan subsidies was a mere \$29,000. \$28.5 million per "restored" job at PNP would be nearly a thousand times larger than that \$29,000 job creation figure for State of Michigan subsidies. In other words, for the same amount of public funding, a thousand times more jobs could be created in the State of Michigan, if the subsidies were used in other economic sectors, rather than for PNP restart. Given such opportunity costs, DOE's community benefits report, and NRC's socioeconomic analyses, are called into major question. The agencies should address these concerns, comprehensively, in an EIS/PEIS. This EA's analysis is clearly insufficient.

Even if the latest figure of 600 jobs, which means 380 "restored" jobs, is used, 380 "restored" jobs divided into \$8 billion equals \$21 million per "restored" job, which is 724 times larger than the State of Michigan average subsidy to create a new job in 2023. That is, 724 jobs in other economic sectors could be created in Michigan, by using the \$8 billion in federal and state bailouts Holtec has requested for PNP restart. These opportunity costs are outrageous. Clearly, the PNP restart is a very inefficient way to create or "restore" jobs. This is significant, because job creation or "restoration" has been among the leading "Purpose and Need Statements," or supposed justifications, for the PNP restart scheme, from the get-go. This is obviously bankrupt, in more ways than one. (23-8-5 [Kamps, Kevin])

Comment: Funny - NOT! - no mention of the \$1.52 billion loan guarantee here. Also funny - NOT! - that DOE LPO announced finalization of the loan guarantee at almost the exact same time, or even a bit after, the steam generator degradation extent was revealed, and weeks after the problem had been red flagged by the NRC - PNO and Summary of Conference Call - in Sept. 2024. How could DOE LPO do that, given the red flags?! Isn't there a safety criteria? Kevin Kamps of Beyond Nuclear warned DOE LPO that NRC's word on safety was worthless and could not be trusted, at the mtg in Benton Harbor on July 11, 2024. (23-19-8 [Kamps, Kevin])

Response: *Holtec applied for Federal financial assistance from the U.S. Department of Energy (DOE) Loan Programs Office (LPO) under Title XVII of the Energy Policy Act of 2005 (EPAAct) (42 United States Code [U.S.C.] 16513 et seq.), as amended. Specifically, in accordance with 42 U.S.C. 16517 (TN10779) (Energy infrastructure reinvestment - for projects that retool, repower, repurpose, or replace energy infrastructure that has ceased operations), the DOE LPO determined the project, as proposed by the applicant, is eligible under the requirements. The DOE LPO purpose and need of the proposed action is implementation of DOE LPO's Section 1706 authority to provide Federal financial assistance via a loan guarantee for eligible projects, and the DOE LPO proposed action is to provide Federal financial support (a loan guarantee) to support repowering at Palisades. The decision to reauthorize power generation activities at Palisades is ultimately determined by the NRC, the lead Federal agency for the NEPA review.*

K.5.5 Comments Concerning Cumulative Effects

Comments: (17-15) (23-1-13) (23-2-10) (23-3-16) (23-5-4) (23-5-14) (23-5-15) (23-8-7) (23-8-13) (23-20-13) (23-20-14) (23-25-7)

Comment: **Holtec's recently announced plan to build small modular reactors on the Palisades site constitutes a change in circumstance.**

Lastly, there have been significant changes in Holtec's plans for the Palisades site, including very recently since the NRC's issuance of the Draft EA and FONSI. On February 25, 2025, Holtec announced that it has signed a deal with Hyundai E&C to build small modular nuclear reactors (SMRs) at the Palisades site.⁴⁴ In the Draft EA, under the cumulative effects section, the NRC recognized that the planned onsite construction of multiple SMRs could have "the potential to impact nonradiological human health."⁴⁵ The agency then made the conclusory statement that "the incremental effects of the proposed Federal actions related to nonradiological human health when added to the effects of other past, present, and reasonably foreseeable projects *would not have significant cumulative effects.*"⁴⁶ Given that this "reasonably foreseeable project" has now become more certain, with Holtec having inked this deal, the

circumstances have changed once again. The NRC must study the associated environmental and public health impacts of the planned SMRs as it has become clear that such action will be taken by Holtec subsequent to a grant of an operating license for the existing Palisades plant.

⁴⁴ See Holtec International, "Holtec Launches 'Mission 2030' to Deploy America's First SMR-300s at the Palisades Site in Michigan" (Feb. 25, 2025), available at <https://holtecinternational.com/2025/02/25/hh-40-05/>.

⁴⁵ Draft EA and FONSI, pg. 3-59 at 3.11.2.4.

⁴⁶ *Id.* (17-15 [Scott, David C.])

Comment: Its SMR-300s would generate 2 to 30 times more radioactive waste, per unit of electricity generated, due to loss of economy of scale, according to President Obama's former NRC chair, Allison Macfarlane, and former U.S. Nuclear Waste Technical Review Board chair, Rodney Ewing. (23-1-13 [Kamps, Kevin])

Comment: Two SMR-300s being constructed and operated on the tiny 432-acre PNP site, alongside 80 years altogether of extended operations, from 1971 to 2051, at the "zombie" reactor, represents a major cumulative impact and effect. (23-2-10 [Kamps, Kevin])

Comment: 2 SMR-300s being constructed and operated on the tiny 432-acre PNP site, alongside 80-year extended operations at the "zombie reactor," represents a major cumulative impact. (23-3-16 [Kamps, Kevin])

Comment: 3.1.1 The Affected Environment Related to the Proposed Federal Actions

As described in Section 1.3.4 of this EA, the environmental baseline or affected environment for Palisades and the proposed Federal actions under the NRC staff's evaluation are the environmental conditions at the point in time prior to the commencement of the project.

[This comes very close to ignoring cumulative impacts - what about PAST impacts on the same site FROM PALISADES?] (23-5-4 [Kamps, Kevin])

Comment: Treatment and consideration in this EA of the 2 SMR-300 new builds Holtec is targeting at the PNP site have been woefully inadequate. This is why an EIS/PEIS is needed, as we stated above. (23-5-14 [Kamps, Kevin])

Comment: The two gigantic reactors at Cook, 30 miles south of PNP, and the three reactors at PNP (the restarted "zombie" reactor, and the 2 SMR new builds), would represent a very major impact on Lake Michigan and the surrounding region, for decades to come. Such risks deserve a much harder look under NEPA than NRC and DOE have provided in this EA. (23-5-15 [Kamps, Kevin])

Comment: Over a year of operations, the evaporative loss would be less than 0.001 percent of the water volume of Lake Michigan.

[But, there is such a thing as death by a thousand cuts. Palisades's restarted "zombie" reactors, plus two SMR-300 new builds, would represent three big cuts, not little ones.] (23-8-7 [Kamps, Kevin])

Comment: An 80-year license at PNP, which Holtec has indicated it will apply to NRC for, would extend operations till 2051. But what about a 100-year license? Is this not reasonably foreseeable? After all, NRC EDO Luis Reyes spoke favorably about 100-year reactor licenses, a

good two decades ago. There has been plenty more talk about it since. It's been talked about, not only by industry but even by NRC, for decades now. Why was it not discussed by NRC and DOE in this EA, as a cumulative effect? (23-8-13 [Kamps, Kevin])

Comment: DOE and NRC are also substantially ignoring the 80-year license, to operate PNP's zombie reactor from 2031-2051. Chances are, PNP would also apply for a 100-year license at some point, which NRC and DOE have entirely ignored in this EA. That is reasonably foreseeable, as NRC and industry have been talking about 100-year licenses for decades - for example, Luis Reyes, NRC staffer of high level (wasn't he formerly NRC's EDO?), spoke glowingly about 100-year licenses at a gathering of hundreds of NRC staffers and industry representatives, which Beyond Nuclear's Kevin Kamps attended; that event was likely decades ago now. Reyes at that same meeting advised his closed friends and colleagues at NRC and in industry to stop calling it "spent nuclear fuel," and instead to call it "used nuclear fuel," because that phrase was even less concerning for Joe and Jane Six Pack. Was Reyes paid a bonus on the side by industry, for such off the top of his head focus group PR advice, to promote the nuclear power industry's agenda? We didn't know such PR advice to industry was a part of NRC's supposed health, environment, and safety protection mandate?! (23-20-13 [Kamps, Kevin])

Comment: NRC and DOE's substantially ignoring the two SMR-300s proposed by Holtec at PNP, for the most part, and operating licenses approvals (including extensions at the restarted zombie reactor) beyond 2031, violates cumulative effects impacts analysis requirements under NEPA. In other words, NRC and DOE are violating environmental protection law! This environmental review should not be treated as a mere "paper game," and a very shallow one at that. (23-20-14 [Kamps, Kevin])

Comment: However, because of the uniqueness of each environmental resource area evaluated and its associated geographic area of analysis, Section 3 does not consider or explicitly evaluate every project and action listed in Table G-1.

[why not? not a hard look, rather hardly a look] (23-25-7 [Kamps, Kevin])

Response: *Two commenters expressed concern that the Palisades draft EA did not adequately analyze the cumulative effects from the small modular reactors (SMRs) expected to be constructed at Palisades, future subsequent license renewals, and past actions. As identified in Table G-1 of the EA, the construction and operation of SMRs and subsequent license renewal for Palisades have been considered as reasonably foreseeable actions and have been included when determining the cumulative environmental effects for each resource area in Section 3 of the EA. An additional subsequent license renewal, beyond the expected subsequent license renewal application included in the analysis, was not included in the cumulative analysis because that action is speculative and conditional upon approval of the reasonably foreseeable subsequent license renewal.*

The cumulative analyses presented in the EA include the incremental effects resulting from the proposed Federal actions when added to the effects of other past, present, and reasonably foreseeable actions for each resource area provided in Section 3 of the EA. As stated in EA Section 3.1.4, past actions include the NRC's past actions, e.g., licensing of operations. Further, as discussed in Section 3.1.1 of the EA, the baseline affected environment considered in the EA is the environmental conditions at the point in time prior to the commencement of the project. By comparing the current conditions, the affected baseline, the cumulative effects of past actions on the environment are included in the analysis.

In addition, prior to construction and operation of any proposed new SMR at a site, the applicant would be required to submit an application for a separate license which would require the staff to perform an environmental review related to the construction and operation of the SMR. No changes were made to the Palisades EA as a result of these comments.

K.5.6 Comments Concerning Ecology-Aquatic Resources

K.5.6.1 Ecology-Aquatic Response 1

Comment: (7-9)

Comment: The draft water permit also allows many toxic chemicals to be discharged to the lake. The most disturbing is the use of Hydrazine, an anti-corrosive, a known carcinogenic, highly flammable chemical that is mostly used as a rocket fuel. The EU is considering banning this chemical. Very toxic biocides such as Spectrum-1300 along with other chemicals are used to control algae and zebra mussels. The draft permit also allows steam generator blow down water, rad waste water, stormwater, and oil and greases. This surely has a significant impact to the fish and biota of Lake Michigan. How many of these emissions are bio-accumulative to fish and other organisms? (7-9 [McCardle, Edward])

Response: *The commenter expressed concerned about toxic chemicals being discharged into Lake Michigan. Michigan Environment, Great Lakes, and Energy (EGLE) is responsible for setting limits on discharges from projects in the State that could impact the environment. For Palisades, EGLE-issued National Pollutant Discharge Elimination System (NPDES) Permit No. MI0001457 establishes limits on Palisades discharges to ensure protection of the aquatic environment. The permit includes a requirement to use bentonite clay to detoxify effluent that has been treated with Spectrus CT-1300 (MDEQ 2014-TN10665, MEGLE 2023-TN10739). Environment Canada (CE 2013-TN11926) reports that hydrazine is readily degraded by microorganisms in water and soil and has a low potential for bioaccumulation in food chains. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.*

K.5.6.2 Ecology-Aquatic Response 2

Comment: (23-12-9)

Comment: 1972 FES (AEC 1972-TN10603): Section V.C.1.a., Sources of Potential Biological Damage; Table V-1, Examples of Number and Length of fish **Counted Daily at the Intake Screens** from January 23, 1972 - February 22, 1972; Appendix V-2, Outline Map of North America Showing the Southern Limit of Distribution of Lake Whitefish. **[Emphasis added.]**

[By counted, NRC and DOE euphemistically mean injured or killed, right? How many indigenous fish and other aquatic organisms has Palisades injured and/or killed since construction began in 1967, and operations began in 1971? We incorporate by reference, and as if fully rewritten herein, the "Licensed To Kill" report, linked here, authored by Paul Gunter and Linda Pentz Gunter, now on staff at Beyond Nuclear:

https://static1.1.sqspcdn.com/static/f/356082/3590840/1247621149403/ltk_full.pdf?token=jLbCMPcAlAkJlqx Cibq0%2F3Hy%2Ftw%3D

The comments in this report, such as regarding the major impacts on aquatic ecosystems from nuclear power plants' thermal wastewater and toxic chemical wastewater and radioactive wastewater discharges into adjacent surface waters, as well as organism kills by entrainment and entrapment, should be treated as environmental coalition comments on this EA.]
(23-12-9 [Kamps, Kevin])

Response: *The commenter expressed concern about the number of aquatic organisms that are killed or injured by the intake. As discussed in EA Section 3.7.3.1, the U.S. Environmental Protection Agency (EPA) data shows that 96 percent of studied fish can avoid an intake structure when the intake velocity is 0.5 fps or less (EPA 2014-TN10834); Palisades intake flow is 0.1 fps, which is less than 0.5 fps. Additionally, as described in that section, the NRC staff calculated total fish loss to impingement at just under 6,000 pounds per year (lb/year) (2,700 kilograms per year [kg/year]), which is a mere 0.06 percent of the total fish harvested annually from Lake Michigan. The reference noted in the comment looks at once-through cooling systems; however, Palisades, originally designed as a once-through cooling system, was converted to closed-cycle cooling (NRC 2006-TN7346). This comment and the reference materials do not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.*

K.5.6.3 Ecology-Aquatic Response 3

Comments: (23-12-14) (23-13-6) (23-13-18)

Comment: 3.7.1.2 Important Species and Habitats

[What species and habitats are NOT important?! What a bad attitude this subject header reveals about DOE and NRC! Of course ALL species and habitats are important! Such a bad attitude begins to explain the Anthropocene mass extinction underway globally, the first mass extinction in some 65 million years - and that one was due to a giant asteroid that collided with Earth, extirpating the dinosaurs. This mass extinction is caused by human activities. PNP has wreaked havoc on its fragile, rare, formerly biologically diverse host site's habitat, since 1967.] (23-12-14 [Kamps, Kevin])

Comment: 3.7.2.2 Important Aquatic Species and Habitats

[What Aquatic Species and Habitats AREN'T important?! They ALL ARE, of course!] (23-13-6 [Kamps, Kevin])

Comment: 3.7.3.2 Important Aquatic Species and Habitats

[As above, which ARE NOT important?!] (23-13-18 [Kamps, Kevin])

Response: *The comments question the use of the word "important" to describe specific groups of aquatic species. The NRC uses the designation of "important" to identify those species and habitats meeting specific criteria for individualized consideration in environmental reviews, beyond just a broader evaluation of potential impacts to properties of the ecosystem at large. However, NRC evaluations of impacts to ecological resources also consider whether impacts affecting elements of the ecosystem not specifically designated as "important" could be potentially significant. In NUREG-1555, Section 2.4.2 and 5.3.1.2, the areas to be analyzed and assessed for potential impacts on aquatic ecosystems are described and "important" species*

and their habitats are defined in Table 2.4.2-1 (NRC 2024-TN10251, NRC 2000-TN1160). The comments do not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.6.4 Ecology-Aquatic Response 4

Comment: (23-12-18)

Comment: This is all put at risk by PNP. There has been no mention above about the "dinosaur fish" - Lake Michigan and Great Lakes sturgeon - which is important, and even sacred, to Indigenous Nations, such as the Anishinaabe. Odawa traditional storyteller, pow wow emcee, and elder, Larry "Pun" Plamondon (Two Hawks), may he rest in peace, spoke about how the sturgeon was to the Anishinaabe, like the buffalo was to the Lakota, in terms of cultural importance. (23-12-18 [Kamps, Kevin])

Response: *This comment expresses concern on the potential impacts to the lake sturgeon and if they were adequately considered in the EA. Because of overharvesting in the late 1800s and early 1900s, the lake sturgeon is no longer abundant in Lake Michigan and is primarily found in northern portions of the Lake in Green Bay, the Menominee River, the Fox River, the Wolf River, and the Manistee River. It is not listed as occurring near Palisades (within Van Buren County) by the State, and on April 23, 2024, the U.S. Fish and Wildlife Service (FWS) published its determination that lake sturgeon does not require listing under the Endangered Species Act of 1973 (ESA) (89 FR 30311-TN11902). While not specifically addressing the lake sturgeon by name, the EA still addresses how potential effects on aquatic habitats would not be significant. Based on these habitat-based analyses, the EA demonstrates that there is no potential for significant effects on any species present, including the lake sturgeon, even in the unlikely event that it actually is present. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.*

K.5.6.5 Ecology-Aquatic Response 5

Comment: (23-12-20)

Comment: By the way, as this EA itself pointed out, recreational fishing associations were a part of the coalition that successfully demanded that cooling towers be installed at PNP in the early 1970s, a huge environmental victory for Lake Michigan's freshwater aquatic ecology. But unfortunately, Cook Units 1 and 2 in MI, and Point Beach Units 1 and 2 in WI - still operating, since the early to mid 1970s, with no end of operations in sight - have no cooling towers whatsoever. All the thermal waste heat is discharged into Lake Michigan via wastewater discharges. Each of those four reactors is more than 1,000 MW-e. This is a tremendous negative impact on Lake Michigan. It has even led to major fish kills at Cook, during inadvertent winter time shut downs. The physiology of numerous fish species cannot adjust quickly enough when the hot water discharges suddenly stop. The thermal shock kills the fish. In one such incident at Cook, in the early 2000s, 500,000 fish were killed in a single incident, according to an NRC Incident Report.

Such cumulative impacts and effects should have been included in this EA, but have not been. An EIS/PEIS should be required. (23-12-20 [Kamps, Kevin])

Response: The commenter expressed concerns about not including the Donald C. Cook Nuclear Plant; Units 1 and 2, and Point Beach Nuclear Plant; Units 1 and 2 as part of the aquatic ecology cumulative effects analysis in the EA. As listed in EA Appendix G, Donald C. Cook Nuclear Power Plant is considered as part of cumulative effects; however, Point Beach Nuclear Plant is located more than 50 miles (mi) (80 km) away from Palisades and therefore is not considered. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.6.6 Ecology-Aquatic Response 6

Comment: (23-12-21)

Comment: There has been no mention of Asian Carp, at least not by that name, in this EA, despite Asian Carp having been a major, evening leading, invasive species concern in Lake Michigan and throughout the Great Lakes, for decades. It would seem, given the white fish section above, that some invasive species have had MAJOR impacts! (23-12-21 [Kamps, Kevin])

Response: The commenter expressed concern that the Asian carp was not identified in the EA as an invasive species concern. The NRC staff did consider the possible presence of Asian carp (including bighead, black, and silver carp); however, the species, while found nearby in rivers throughout the Mississippi River basin, is not currently known to occur in Lake Michigan and was therefore not identified as a concern. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.6.7 Ecology-Aquatic Response 7

Comments: (23-13-1) (23-28-4)

Comment: PNP use of biocides is a major ecological harm and impact. And what about PNP contributing to invasive species - such as its thermal wastewater driving away native species, and attracting invasives? Why is there no mention of this dynamic in the EA? (23-13-1 [Kamps, Kevin])

Comment: Benthic Invertebrates [quagga and zebra mussels are an excuse PNP uses for biocides that harm Lake Michigan] (23-28-4 [Kamps, Kevin])

Response: The commenter expressed concern about the use of biocides and whether Palisades is attracting invasive species. Invasive species present in the area around Palisades are discussed in Section 3.7.1.3 of the EA. All of the invasive species can be found in other parts of Lake Michigan and the other Great Lakes, and there is no evidence suggesting that their occurrence in the Palisades area is linked to the discharge from Palisades. Biocide use at Palisades is regulated by Michigan EGLE through Palisades' NPDES permit (MDEQ 2014-TN10665, MEGLE 2023-TN10739). The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.6.8 Ecology-Aquatic Response 8

Comment: (23-13-4)

Comment: The NRC staff concludes that, based on the current SWPPP, the existing stormwater system, and the small area of potential surface disturbance or new impervious surfaces, the impacts to onsite streams from the proposed activities would be minimal.

[What about new construction just from restart preparations, and restarted operations, such as the new pad for dry cask storage? And what about the SMR new builds' construction?! This appears to be illegal segmentation, not allowed by NEPA law and court ruling precedents.]
(23-13-4 [Kamps, Kevin])

Response: *The comment concerns whether the consideration of stormwater discharges in the EA is inclusive of the full life cycle of the plant, without segmentation. The NRC staff discusses the small area of potential surface disturbance and creation of new impervious surfaces in EA Section 3.7.2.1, including the pad for dry cask storage. The potential SMR project is discussed in EA Section 3.7.4. The NRC staff's cumulative impact analysis considered the potential SMR project to be a reasonably foreseeable contributor to environmental impacts on and surrounding the Palisades site. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.*

K.5.6.9 Ecology-Aquatic Response 9

Comment: (23-13-5)

Comment: Holtec plans no changes to the water intake system from Lake Michigan, relative to the previously operating plant.

[This could be a false or misleading statement. Arnie Gundersen, above, has questioned the logic of Holtec's approach - the CCW heat exchangers being doubled in size - instead of adding more cooling towers, to deal with Lake Michigan's surface waters increasing in temperature due to global warming. The water intake system is connected to the CCW heat exchangers and cooling towers. Doubling the CCW heat exchangers in size and capacity means that the intake flow could be as much as doubled. While the physical structure of the water intake system may not change, per se, the flow rate could be doubled. This is a significant change. It would mean double the water usage, double that impact on Lake Michigan. This is a significant change, that deserves to be analyzed in an EIS/PEIS, more carefully and thoroughly than done in this shallow EA.

In addition, as mentioned previously, a Holtec spokesman admitted, at an NRC meeting on 3/20/23, that "minor modifications" were made by Holtec on the mechanical draft cooling towers. We have never been able to learn what these "minor modifications" were all about, why they were done, what impact they have had or will have on PNP's cooling water systems, etc. Why was such information not included in the EA? It's further reason to require an EIS/PEIS.] (23-13-5 [Kamps, Kevin])

Response: *The commenter expressed concerns about the modifications to the water intake system, specifically the potential replacement of the component cooling water (CCW) heat exchangers. The CCW heat exchangers are discussed in Section 3.4.3 of the EA and explained in detail in RAI-SW-11, and explained in detail in RAI-SW-11 (HDI 2024-TN10670). Palisades*

CCW system is a closed-cycle cooling loop and, as such, the modifications mentioned would not have any effect on the intake or discharge or change the flow rate at the intake which is determined by the heat generated by the reactor, not the heat exchangers. Installing larger heat exchangers that can each cool at 100 percent cooling capacity, rather than having two heat exchangers that can cool at 50 percent cooling capacity, will provide the flexibility to take one of the heat exchangers out of service for maintenance without losing cooling capacity. Palisades will still be cooling at 100 percent cooling capacity and any cooling beyond that would be inefficient. The mechanical draft cooling tower modifications are discussed in Section 2.1 of the EA and were completed prior to shutdown. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.6.10 Ecology-Aquatic Response 10

Comment: (23-13-8)

Comment: mussels, the slippershell, creek heelsplitter, flutedshell, and round pigtoe, that may occur within the vicinity of Palisades (Table J-4 of this EA). Holtec has not identified any State-listed species in the intake or discharge systems during annual monitoring (HDI 2024-TN10843: RCI-AE-4a). Therefore, the potential for impact to State-listed mussel species is expected to be NOT SIGNIFICANT.

[No observations reported? Did Holtec even look?! One can't observe without looking!] (23-13-8 [Kamps, Kevin])

Response: The commenter expressed concern about the lack of identification of the potential presence of State-listed mussels in waters potentially affected by Palisades. As part of the environmental audit, the NRC issued a Request for Confirmatory Information to Holtec asking for the results of any past or current monitoring of the intake screens including number and species entrained, or if any State-listed species have been found (HDI 2024-TN10843). Holtec confirmed that it did a dive survey on May 16, 2024, which included observations of mollusks. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.6.11 Ecology-Aquatic Response 11

Comment: (23-13-9)

Comment: The impacts from resumption of operation of Palisades would be similar to those described in the 2006 SEIS (NRC 2006-TN7346), which is incorporated by reference. In Section 3.3.1 of the N&S Report, the applicant states that no additional aquatic studies have been conducted and that the descriptions and discussions of aquatic resources in the 2006 SEIS remain valid (Holtec 2023-TN10538). The NRC staff has not identified any new and significant information during its independent review of the N&S Report (Holtec 2023-TN10538), the 2024 site visit, the scoping process for this EA, and the NRC staff's evaluation of other available information

[If no additional studies have been done, how can Holtec say with confidence - or a straight face - that the 2006 studies remain valid? How can NRC say this? Ignorance is bliss? What a mockery of NEPA's required "hard look"! This is "hardly a look" instead!] (23-13-9 [Kamps, Kevin])

Response: The commenter expressed concern about not updating the aquatic field surveys that formed the basis for the evaluation of aquatic ecology impacts in the 2006 SEIS (NRC 2006-TN7346). In addition to reviewing information provided by the applicant the NRC staff also conducts its own due diligence to find and review additional research, monitoring, and studies relevant to the affected area. The additional information reviewed for the aquatic environment can be found in Section 3.7.1 of the EA. Based on the review of this information by NRC ecologists, the NRC staff does not expect that additional updated aquatic field studies would add to NRC staff's understanding of Palisades' impacts to aquatic ecology from the 2006 SEIS. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.6.12 Ecology-Aquatic Response 12

Comment: (23-13-11)

Comment: Impingement and Entrainment of Aquatic Organisms

If approved and power operations resume, the resumed water intake would impinge and entrain aquatic organisms from Lake Michigan. Section 2.1 of this EA and the 2006 SEIS (NRC 2006-TN7346) describe the Palisades cooling and auxiliary water systems in detail. Smaller organisms, such as fish eggs and larvae, can be entrained and pass through the system, where they are subjected to mechanical, thermal, and toxic stresses before the water is discharged back into the lake. Impinged organisms are collected at the trash racks or traveling screens and disposed as solid waste.

[See link to "Licensed to Kill" and related commentary, above.]

Also, the Ludington, MI pumped water storage facility on the Lake Michigan shore should be included in the Cumulative Effects analyses. It has represented major, significant impacts on Lake Michigan's aquatic ecology as a fish Killing Monster. It was built to accommodate nuclear power generation at night in Michigan, many decades ago. There was not enough demand to consume all the electricity MI's atomic reactors generated at nighttime. But the trade off for storing this nighttime generation was the very high price paid by fisheries and fish species and other aquatic organisms in Lake Michigan.] (23-13-11 [Kamps, Kevin])

Response: The commenter inquired as to whether the EA should have included the Ludington, Michigan pumped water storage facility in the cumulative effects analysis. The pump station is over 100 mi (62 km) away from Palisades, which is too far from Palisades to cumulatively contribute to the potential effects of Palisades on aquatic biota in Lake Michigan; therefore, the pump station is not one of the projects considered under cumulative effects. The entrainment and impingement of aquatic organisms is, however, discussed in Section 3.7.3.1 of the EA. Additionally, Michigan EGLE reviewed the cooling-water intake structures and determined that they comply with the best technology available (BTA) standards for impingement mortality and entrainment to minimize adverse environmental impact in accordance with Title 40 Code of Federal Regulations (40 CFR) Subpart J under Section 316(b) of the Clean Water Act (CWA) (TN662). In addition, Section 3.7.3.1 of the EA also discusses the small numbers of species that could be impinged (estimated 863 fish/year) or entrained (~6,000 lb/year [2,700 kg/year]), which constitutes about 0.06 percent of the total fish harvested from Lake Michigan in 2023. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.6.13 Ecology-Aquatic Response 13

Comment: (23-13-15)

Comment: The first chemical issue concerns the potential effects of nonradiological contaminants on aquatic organisms that could occur from nuclear power plant operations. This issue initially became a concern because some nuclear power plants used heavy metals in condenser tubing that could leach from the tubing and expose aquatic organisms to these contaminants (NRC 2024-TN10161). Because aquatic organisms can bioaccumulate heavy metals, even when exposed at low levels, this can be toxic to fish and other animals that consume contaminated organisms. However, Palisades has stainless steel condenser tubes that do not leach metals to the cooling-water discharge (Holtec 2023-TN10538). The NRC staff verified that the issue associated with heavy metals leaching from condenser tubing, does not apply to Palisades.

[Will that continue to be the case, as Holtec makes changes, as to the CCW heat exchangers, cooling towers, etc.? See Arnie Gundersen expert witness declaration testimony, above.] (23-13-15 [Kamps, Kevin])

Response: Changes to the design of plant equipment, such as the heat exchangers and cooling towers, would be evaluated by the licensee to determine whether a license amendment is required in accordance with 10 CFR 50.59 (TN249). If a license amendment is required, it would be subject to NRC review and approval, including an environmental review. Regardless of the outcome of the licensee's evaluation of a change under 10 CFR 50.59, the licensee would still be bounded by its NPDES permit regarding discharges to Lake Michigan. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment and referenced information.

K.5.6.14 Ecology-Aquatic Response 14

Comment: (23-13-19)

Comment: As noted in Section 3.7.2.2, four State-listed fish species have occurred in the vicinity of Palisades, although the lake herring and shortjaw cisco have not been observed in 30 years (Table J-4 of this EA).

[How much did Palisades contribute to their demise? Have they been extirpated from the entirety of Lake Michigan? The Great Lakes?] (23-13-19 [Kamps, Kevin])

Response: The commenter inquired as to whether Palisades may have contributed to the apparent elimination of the lake herring and shortjaw cisco from Lake Michigan. The lake herring was one of several fish that were depleted in the 1950s by the invasive, parasitic sea lamprey, at the same time they were also being outcompeted by the invasive alewife (introduced in 1949) as the principal forage fish species. The shortjaw cisco is currently considered extirpated from Lake Michigan due to a combination of overfishing, pressure from the invasive sea lamprey and alewife, declines in food availability, habitat loss, contaminants (particularly organochlorine compounds and heavy metals), and hybridization and has not been documented in Lake Michigan since 2001. The NRC has added information in Section 3.7.2.2 of the EA, explaining why the lake herring and shortjaw cisco are no longer present in Lake

Michigan. Additionally, potential contaminants at Palisades are regulated by EGLE under the NPDES permit and Storm Water Pollution Prevention Plan (SWPPP).

K.5.6.15 Ecology-Aquatic Response 15

Comment: (23-14-1)

Comment: The ISFSI expansion would occur in an area that is already concrete and not affect the surface water input.

[Well, concrete or pavement means run off; contaminants, be they toxic chemical or radioactive, would enter that run off, entering surface waters, including on-site wetlands, streams, and Lake Michigan, as well as groundwater, once the surface run off enters and descends down through soil.] (23-14-1 [Kamps, Kevin])

Response: The commenter is concerned about whether an Independent Spent Fuel Storage Installation (ISFSI) expansion could introduce additional contamination in runoff to aquatic habitats. Cumulative effects on surface waters and ground waters are discussed in EA Sections 3.4.4 and 3.5.4, respectively. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.6.16 Ecology-Aquatic Response 16

Comment: (23-28-2)

Comment: Plankton Plankton are small and often microscopic organisms that drift or float in the water column. In some nearshore areas, there is excessive growth of the nuisance algae *Cladophora* spp. and toxic blooms of cyanobacteria occur in Green Bay, Wisconsin. While cyanobacteria that produces cyanotoxins have been found in inland lakes in Michigan there were no reported blooms in Lake Michigan during 2022 or 2023 (MEGLE 2024-TN10716). [but won't PNP restart, and/or SMRs, worsen thermal wastewater impacts, contributing to toxic blue-green algae blooms?] (23-28-2 [Kamps, Kevin])

Response: The commenter is concerned that the reauthorization of power operations at Palisades may contribute to harmful algae blooms. As discussed in EA Section 3.7.3.1 and Appendix J.4 the discharge temperature is on average 2°F (1.1°C) above ambient water temperatures and there have been no recent algae blooms reported anywhere near the plant. Discharges from Palisades would also be subject to the NPDES permit issued by EGLE, which includes limits designed to minimize the potential for damaging algal blooms. Potential future discharges from SMRs would be subject to their own permitting requirements, including an NPDES permit and 401 water quality certification. The NRC staff's review of cumulative effects for aquatic ecology in Section 3.7.4 of the EA includes the SMRs. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.6.17 Ecology-Aquatic Response 17

Comment: (23-28-3)

Comment: Macrophytes Aquatic macrophytes are large plants, both emergent and submerged, that inhabit shallow water areas. Macrophytes within Lake Michigan include duckweed, cattails, and rushes. The U.S. Environmental Protection Agency Coastal Wetland Monitoring Program considers the coastal wetland vegetation in the southeast side of Lake Michigan to be degraded but less so when compared to plant communities in Lakes Ontario and Erie (EPA 2023-TN9721). The U.S. Environmental Protection Agency attributes this to less nutrient runoff and less invasive species as compared to the other Great Lakes. The areas directly adjacent to Palisades Nuclear Plant (Palisades) are sandy beaches, suggesting a relatively high-energy shoreline without much, if any, terrestrial vegetation.

[well of course there are dune grasses and even forests, just inland from the Lake] **(23-28-3 [Kamps, Kevin])**

Response: *This comment is about whether dune grasses and forests could be considered under aquatic macrophytes. Since these plants are terrestrial rather than aquatic, they are not discussed in this section. They are, however, discussed in Section 3.6 of the EA on terrestrial ecology. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.*

K.5.6.18 Ecology-Aquatic Response 18

Comment: (23-28-6)

Comment: J.6 State-listed Aquatic Species Table J-4 State-listed Aquatic Species That May Occur Within 1 mi (1.6 km) of Palisades Nuclear Plant

[why just 1 mile radius - so small - especially for species that migrate much greater distances, including within short distance from PNP, such as 1 mile]

[other thermal, radioactive, and toxic wastewater impacts, from routine releases, but also catastrophic releases] **(23-28-6 [Kamps, Kevin])**

Response: *This comment concerns the radius used to assess State-listed aquatic species. NRC staff ecologists in their professional judgement consider the 1 mi (1.6 km) radius to be sufficiently appropriate for aquatic ecology. In response to this comment, the NRC staff ecologists considered the effect if the radius was extended to 6 mi (9.7 km), and no additional species were identified. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.*

K.5.6.19 Ecology-Aquatic Response 19

Comment: (23-29-14)

Comment: Endangered Species Act Section 7 Consultation with the National Marine fisheries Service As discussed in Section 3.7.1.2 of this EA, no federally listed species or critical habitats under NMFS's jurisdiction occur within the action area. Therefore, the NRC staff did not engage the NMFS pursuant to ESA Section 7 for the proposed Palisades reauthorization.

[well, they should have, given impacts on Lake MI's aquatic ecology and species in decline] (23-29-14 [Kamps, Kevin])

Response: *The National Marine Fisheries Service (NMFS) does not currently have jurisdiction over ESA-listed species in any of the Great Lakes. All ESA-listed aquatic species in Lake Michigan are currently under the jurisdiction of FWS. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.*

K.5.7 Comments Concerning Ecology-Terrestrial Resources

K.5.7.1 Ecology-Terrestrial Response 1

Comments: (23-1-15) (23-29-8) (23-29-13)

Comment: Endangered Species Act and Coastal Zone Management Act concerns: We object to NRC and DOE's NLAA (may affect, not likely to adversely affect) and NE (No effect) FONSI conclusions for a large number of endangered species, threatened species, and species of concern -- both plant and animal, both terrestrial and aquatic -- for which the PNP site and its vicinity is habitat or potential habitat. The Critical (Sand) Dune Area, on the Great Lakes shore, is a unique and fragile habitat and ecosystem, with remarkable biological diversity. (23-1-15 [Kamps, Kevin])

Comment: No activities such as land disturbances, mowing, or herbicide application would take place in or adjacent to areas where Pitcher's thistle is known to occur or previously occur. Operations Impacts:1,4,5 In the 2006 SEIS (NRC 2006-TN7346), operational impacts were determined to be NLAA based on the following: (1) Pitcher's thistle did not occur in locations where it would be affected by operations,

(2) no refurbishment or ground-disturbing activities were proposed during the LR period, (3) the applicant had pre--disturbance procedures in place to evaluate impacts to federally listed species, and **(4) Michigan EGLE regulates the dune habitats, so any ground disturbance in habitat for this species would require a permit.** The same assessment applies to resumption of operations at the present time. The population found in 2024 would not be affected by routine site operation or management, for the following reasons:

(1) No disturbances, mowing, or herbicide application to areas where populations are known to exist; (2) continued operations and maintenance activities would be similar and be of same magnitude and frequency as previous operations; **(3) dredging (MEGLE 2020-TN10696) would continue to disturb beach and dune areas, likely preventing establishment of new plants;** (4) applicant has pre--disturbance procedures in place to evaluate impacts to federally listed species; (5) Michigan EGLE regulates dune habitats, so any ground disturbance in habitat for this species would require a permit; and (6) population found in 2024 separated from the mechanical cooling towers by approximately 1,000 ft of mature deciduous forest. The cooling towers are equipped with drift eliminators. Any drift would be unlikely to penetrate the dense forest, even in leaf-off conditions. See Section 3.6.3 of the EA for a discussion of cooling tower impacts on terrestrial plants.

[well they are now!

Which under Whitmer they seem very poised to rubberstamp - SMR construction will majorly disturb vast swaths of the site

Oh good, so PNP activities are guaranteed to prevent this E/T/SC species from ever reestablishing itself on the PNP site - anti-ESA!] (23-29-8 [Kamps, Kevin])

Comment: (c) The ESA does not require Federal agencies to seek FWS concurrence for "no effect" determinations. For n/a = not applicable; TBD = to be determined; the NRC will seek the FWS's concurrence following the issuance of this draft EA.
[challenge all NRC NLAA and NE conclusions] (23-29-13 [Kamps, Kevin])

Response: *These comments address the NRC's determinations for the proposed Federal actions' effects on species that are species protected under ESA and/or by the State of Michigan, as well as the presence of State-Designated Critical Dune Areas (CDAs) onsite. The NRC staff conducted an independent analysis to determine which important species and habitats could occur on the Palisades site (EA Sections 3.6.1.1, 3.6.1.2, 3.7.1.2, and Appendix J). The detailed species occurrence analyses are in Appendix J, for both terrestrial and aquatic species. The NRC staff determined that approximately 247 ac (100 ha) of the site consists of CDAs (EA Section 3.6.1.1). By analyzing potential occurrence and activities associated with the proposed Federal actions, the NRC staff determined that the impacts for the proposed actions were NOT SIGNIFICANT (EA Sections 3.6.2, 3.6.3, 3.7.2, and 3.7.3), because proposed activities would occur within already developed and/or highly disturbed areas and the applicant has existing permits, policies, and procedures to minimize environmental impacts to terrestrial and aquatic resources. The NRC staff made its effects determination in accordance with Endangered Species Consultation Handbook (FWS and NMFS 1998-TN1031), as stated in EA Table 3-5 and analyzed in Appendix J.7.*

The NRC staff acknowledges the commenter's concern that the initial siting of the Palisades on the site may have resulted in the disturbance of sensitive terrestrial habitats existing on the site prior to initiation of site work in 1971. However, the initial siting of the plant is a past action that is accounted for in the baseline affected environment. The proposed Federal actions would involve physical disturbance of only a few acres of previously disturbed terrestrial habitats in already industrialized areas of the site, as described in Section 3.6.1 of the EA. The resumption of operational impacts is presented in Section 3.6.2 of the EA.

The discussion of cumulative effects on terrestrial ecological resources presented in Section 3.6.4 of the EA and accounts for the incremental effects of the Federal actions when added to the effects of other past, present, and reasonably foreseeable actions on a particular resource area. It evaluates the incremental contributions of the proposed Federal actions on terrestrial ecology plus the additional effects on the same terrestrial resources affected by past, present and reasonably foreseeable future actions, including the SMR project; and concludes that the incremental effects of the proposed Federal actions when added to these projects would not have significant cumulative effects.

These comments provide no new and significant information and, therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.7.2 Ecology-Terrestrial Response 2

Comment: (23-24-7)

Comment: Palisades has had a LARGE negative impacts and effects on ecological resources since 1967. Climate change adds its own LARGE negative impacts and effects on an ongoing basis. Indigenous species are being extirpated. Extinction rates will increase, due in part to Palisades' impacts and effects, as well as to the impacts of climate change. NRC and DOE shrug off these LARGE impacts and effects, in violation of NEPA. (23-24-7 [Kamps, Kevin])

Response: *This comment is in reference to the impacts Palisades has had since the start of initial construction on ecological resources, localized extirpation of indigenous species, and the potential additional impacts from climate change. The impacts of Palisades on ecological resources are discussed in Sections 3.6 and 3.7, and climate change is discussed in Appendix F of the EA, specifically potential climate change impacts on ecological resources in Appendix F.3. The NRC staff evaluated the environmental impacts on ecology of the proposed Federal actions and determined them to be NOT SIGNIFICANT. The NRC staff also looked at the potential effects of climate change and whether they would alter the ecological impacts of the proposed Federal actions and determined that climate change would not alter the conclusions. The extirpation of indigenous species is discussed in EA Section 3.7.2.2 and an explanation of the causes of that extirpation has been added as discussed in Section K.5.6. 14. Section K.5.6.17 responds to the terrestrial species discussed above as being potentially extirpated from the site. The comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.*

K.5.7.3 Ecology-Terrestrial Response 3

Comments: (23-5-8) (23-29-6)

Comment: Holtec continues to conduct routine herbicide application (HDI 2024-TN10670:RAI-GEN-1).

[What are the impacts on endangered or threatened indigenous plants?] (23-5-8 [Kamps, Kevin])

Comment: Monarch butterfly

[challenge NLAA

Based on sightings and presence of mildweed alone - see just below

Need to save this iconic species]

P.239/242 (page J-19)

Site Occurrence: flying adults were observed by NRC staff in September 2024 visiting the Palisades site. Widely scattered, occasional milkweed (*Asclepias* spp.) plants were observed by NRC staff in 2024 south of Van Buren State Park, on vegetated dunes close to the beach, and on dunes along the access road. Monarchs and milkweeds are known from Van Buren State Park and site vicinity based on a review of iNaturalist in 2024

(<https://www.inaturalist.org/>). Larvae are potentially present wherever milkweeds are present.

Preparation Impacts: 1-5 Ground disturbance as part of preparation could disturb widely scattered milkweed plants growing amid sparse and ruderal vegetation in areas of previously disturbed soils. However, milkweed is a common, quick-growing herbaceous plant that is present at least sparsely in most areas of non-forest vegetation in the area. None of the affected areas contain dense or extensive patches of milkweed. While it is possible that a few milkweed plants containing monarch larvae could be killed, it is unlikely that the losses would noticeably affect monarch populations in the region. If a few milkweed stems are killed by herbicide applications, the losses are likewise not likely to result in noticeable effects on the regional population. Any insecticide applications would likely be limited to in or around buildings or paved areas where milkweed is not present.

[extinction by a thousand cuts - herbicide applications, vehicle strikes, etc.] (23-29-6 [Kamps, Kevin])

Response: The commenter questioned the effects of routine herbicide application at the Palisades site on endangered or threatened indigenous plants. As described in EA Sections 3.1.1 and 3.6.2, the applicant would continue to apply herbicides and pesticides as necessary to maintain the exterior grounds in developed areas, including onsite transmission line rights-of-way. All chemicals would be applied by certified applicators according to label instructions; chemicals are limited to those that are over-the-counter, premixed, and ready to use (HDI 2023-TN10705).

The only federally listed threatened or endangered plant species occurring on the site is Pitcher's thistle. Pitcher's thistle occurs on the site solely in a location in an undeveloped portion of the site that would not be subject to herbicide or pesticide application (Table J-5 of the EA). Of the State-listed plants with the potential to occur on site (Table J-1), none are known to occur on the site. Further, none are likely to occur in substantial numbers in the areas of previously disturbed soils subject to disturbance, as characterized in Section 3.6.2 of the EA.

NRC staff determined that the monarch's host plant, the milkweed is scattered and occasional on the Palisades site, and none of the areas that would be affected by ground preparation contain dense or extensive milkweed patches (Table J-5 of the EA). As such, neither herbicide nor insecticide applications are anticipated to noticeably impact monarch populations in the region.

Therefore, the NRC staff expects no significant impacts from routine application of herbicides or other pesticides on these species. These comments provide no new and significant information and, therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.7.4 Ecology-Terrestrial Response 4

Comment: (23-5-18)

Comment: PNP has caused major damage to the wildlife habitat of these critical dunes, since ground was broken in 1971. (23-5-18 [Kamps, Kevin])

Response: The commenter is concerned with the effects that the construction and operation of the Palisades plant has had in the past on the wildlife habitat provided by the CDAs and lake shoreline on the site. NRC considered the initial licensing of Palisades in the cumulative effect analysis for all resource areas, as described in EA Section 3.1.4. Sections 3.2.1 and 3.6.1.1 of the EA describes the critical dunes remaining on the site, and Figure 3-4 shows the location and extent of CDAs on the Palisade site. EA Section 3.6.2 describes the potential further impact to these remaining dune areas from preparations for resumption of power operations on CDAs. This comment provides no new and significant information and, therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.7.5 Ecology-Terrestrial Response 5

Comments: (23-6-15) (23-12-5)

Comment: In the 2024 LR GEIS (NRC 2024-TN10161), the NRC staff noted that all observable effects on vegetation from the cooling tower plume ceased after the plant stopped adding sulfuric acid to the cooling water prior to the initial license renewal for Palisades, and noted that there were no anticipated additional impacts associated with cooling tower drift from the original towers.

[So sulfuric acid impacts only persisted from about 1971 to 2012 on the one bank of cooling towers, and only from about 1971 to 2017 on the other array? That is a LARGE impact lasting more than 40 years at the one array, and more than 45 years at the second array. These impacts were on rare, threatened, and endangered plants indigenous to critica forested sand dune habitats, a unique and biologically diverse ecosystem serving as home to a diversity of plant species. (23-6-15 [Kamps, Kevin])

Comment: This severe damage was to Critical Dune Areas and their fragile ecosystems and habitats, including for threatened and endangered species, as well as species of special concern, pushing them closure to extirpation, at least on the PNP site, contributing to their ultimate extinction. Why is this not taken seriously as a cumulative effect and major impact by NRC and DOE in this EA?

PNP DOES have unique topography, and ecology. It deserves protection under law and regulation, not further neglect and abuse. (23-12-5 [Kamps, Kevin])

Response: *The commenter expressed concern about the impacts of cooling tower drift on terrestrial vegetation from Palisades operation from the past use of sulfuric acid. The plant stopped adding sulfuric acid to the cooling water prior to 1987 (CPC 1987-TN11913). The EA was updated to specify this date. For the proposed Federal actions, the NRC staff analyzed this issue in detail in Section 3.6 and Appendix J of the EA. The analysis for the proposed Federal actions incorporated previous staff analyses of the cooling tower impacts at Palisades on vegetation in all three versions of the license renewal (LR) generic environmental impact statement (GEIS) (NRC 1996-TN288, NRC 2013-TN2654, NRC 2024-TN10161); EA Sections 3.3.1, 3.6.1.1, and 3.6.1.2; Rochow 1978-TN10666, which investigated the issue at Palisades, HDI 2024-TN10670: RAI-TE-1 (which provides guaranteed drift rate), and HDI 2024-TN10669: RCI-TE-2 (location of Pitcher's thistle on the Palisades site). These comments provide no new and significant information and, therefore, no additional changes were made to the Palisades EA as a result of these comments.*

K.5.7.6 Ecology-Terrestrial Response 6

Comments: (23-8-2) (23-28-29)

Comment: Holtec expects site employment levels to peak at 1,600 workers during the preparations for resumption of power operations (HDI 2024-TN10670: RAI-SE-1).

[What are the environmental impacts of such a large number of permanent, as well as temporary, workers? For example, NRC and DOE have identified an endangered turtle species seen recently at the PNP site. Given the vehicular traffic necessary for 1,600 workers alone, will this extirpate the turtle species, as through road kills? What protections will NRC and DOE require of Holtec to prevent such a horrific outcome, which would violate the Endangered Species Act, for one thing, not to mention NEPA as well. This is why an EIS/PEIS is needed. The lower level EA is not sufficient, given this and other high stakes involved.] (23-8-2 [Kamps, Kevin])

Comment: J.7.1 Endangered Species Act Section 7 Consultation As a Federal agency, the NRC must comply with the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.-TN1010), for any action authorized, funded, or carried out by the agency. The NRC proposed action is to reauthorize nuclear power operations at the Palisades in Covert Township,

Michigan and refueling of the reactor. Under Section 7 of the ESA, the NRC must consult with the FWS and the National Marine fisheries Service (NMFS) ("the Services" [collectively] or "Service" [individually]), as appropriate, **to ensure that the proposed action is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.**

[what about that Eastern boxed turtle mentioned above as having been seen on site recently? 3,000 truck deliveries - they could run over the turtles - not to mention all the workers driving in and out] (23-28-9 [Kamps, Kevin])

Response: The commenter expressed concern with the effects of vehicle traffic during preparations for resumption of power operations on a turtle species listed as threatened by the State of Michigan. The eastern box turtle is State-listed, and species information is presented in EA Appendix J. It is not federally listed, and therefore, is not subject to regulation under the ESA. The peak workforce of 1,600 workers during preparations for resumption of power operations would be similar to that of refueling outages during previous power operations, as discussed in EA Section 3.4.2. Additionally, EA Section 3.6.2 discusses the environmental impacts from the preparations for the resumption of power operations, including noting that the increased vehicular use would be temporary and use only existing roadways, and, therefore, traffic impacts to wildlife are expected to be minor. The comments provide no new and significant information and, therefore, no changes were made to the Palisades EA as a result of the comments.

K.5.7.7 Ecology-Terrestrial Response 7

Comment: (23-10-15)

Comment: Figure 3-4

[Both of the two largest Freshwater Wetlands already appear significantly impacted by Palisades, given how close they are to major developed land there. This includes dry cask storage of highly radioactive waste at the northernmost location - even the gamma and neutron emissions (radioactive shine) would impact flora, fauna, and fungi, perhaps significantly. And yet NRC and DOE do not mention such impacts at all here.] (23-10-15 [Kamps, Kevin])

Response: The commenter expressed concern regarding the effects of past activities, current activities, and proposed Federal actions activities on freshwater wetlands on the site. There are scattered wetlands on the site as discussed in EA Section 3.6.1.1. EA Section 3.6.3 states that no measurable levels of radiation above baseline levels attributable to operations of Palisades were found in the Palisades vicinity from 2019 to 2022, or in 2023 when the reactor was in decommissioning status. Additionally, site-specific programs and best management practices are and will continue to be implemented at the Palisades site to decrease stormwater runoff and other environmental effects and reduce the occurrence of inadvertent releases of nonradiological contaminants (NRC 2024-TN10842). This comment provides no new and significant information and, therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.7.8 Ecology-Terrestrial Response 8

Comment: (23-11-2)

Comment: The database indicated that ***no designated or proposed critical habitat*** occurs within the action area. ***[Emphasis added.]***

[But how could this possibly be? Critically endangered, and fragile, sand dunes, including with forests and even wetlands contain no critical habitat, in this unique Great Lakes shoreline ecosystem, hosting a rich biological diversity of rare, indigenous flora, fauna, and fungi? Is it that the site has so long been trashed already - since ground was broken in 1967 for PNP construction - so NRC and DOE are fine with it being trashed even more so, indefinitely into the future as well? That bad attitude means this site's ecosystem may never recover, at least not for a very long time to come, from the abuses heaped upon it. NRC and DOE's words would seem to fly in the face of what they'd just acknowledged above, MI's designation for hundreds of acres of the site as CDA, a critical dunes area.] (23-11-2 [Kamps, Kevin])

Response: The commenter questioned the absence of designated or proposed critical habitat for ESA-protected species on the site or in the surrounding area. Although the Palisades site contains CDAs, this is a State status, not critical habitat as defined under the ESA (FWS 2017-TN11925). Designated or proposed critical habitat for endangered species comprise specific locations designated for protection of species protected under the ESA. No designated or proposed critical habitat for any ESA-protected species occur on the site, based on FWS correspondence (FWS 2024-TN10697, FWS 2025-TN11903).

In preparing the EA, the NRC staff accessed the FWS Information for Planning and Consultation (IPaC) database on May 21, 2024, and received a list of 11 species listed as threatened, endangered, or candidate under the Federal ESA (FWS 2024-TN10697). Prior to publication of the final EA, the NRC staff accessed the FWS IPaC database on April 24, 2025 (FWS 2025-TN11903) and no additional species were noted. Both IPaC reports indicated that no designated or critical habitat for ESA-protected species are present on or in areas surrounding the Palisades site. This comment provides no new and significant information and, therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.7.9 Ecology-Terrestrial Response 9

Comments: (23-11-4) (23-11-9) (23-12-8)

Comment: During the NRC staff's environmental review for the 2006 SEIS (NRC 2006-TN7346), the staff evaluated the effects of Palisades operations on four federally listed species (Indiana bat [*Myotis sodalis*], Pitcher's thistle [*Cirsium pitcherii*], Karner blue butterfly [*Lycæides melissa samuelis*], Mitchell's satyr butterfly [*Neonympha mitchellii mitchellii*] and one candidate species-eastern massasauga [*Sistrurus catenatus*]). In 2016, eastern massasauga was federally listed as threatened (81 FR 67193-TN10698). Of these five species, only Pitcher's thistle was then known to occur on the Palisades site, and the NRC effects determination was "may affect, not likely to adversely affect." In a letter dated May 15, 2006 (DOI 2006-TN10699), FWS agreed that ***the 2006 SEIS did not involve any major construction or physical alteration of the action area*** and concurred with the NRC staff's effect determinations for these species (summarized in Table 3-5 of this EA). ***[Emphasis added.]***

[The "zombie" reactor restart involves major construction; so too two new build SMR-300s. So, how can they stand by this 2006 conclusion?] (23-11-4 [Kamps, Kevin])

Comment: n/a = not applicable, because ***the NRC staff did not evaluate this species in the 2006 SEIS*** (NRC 2006-TN7346)

[Emphasis added.]

[Why not? So, since 2006, a number of these species became threatened or even endangered - and NRC didn't care enough to even consider them in the 2006 SEIS? Isn't this an indication that NRC is either incompetent, or does not regard the ESA and NEPA important enough to enforce, to the letter and in the spirit of the law? No wonder species are becoming threatened and endangered over time.] (23-11-9 [Kamps, Kevin])

Comment: *It is also anticipated that SMR development would mostly take place within previously developed areas of the site and affect only narrow or small areas of naturally vegetated terrestrial habitat adjoining areas of previous development, without noticeably intruding into areas of intact terrestrial habitat in relatively undeveloped areas of the site.* Therefore, the NRC staff determined that the incremental effects of the proposed Federal actions related to terrestrial ecology when added to the effects of other past, present, and reasonably foreseeable projects would not have significant cumulative effects. **[Emphases added.]**

[This is very hard to believe - PNP's nuclear megawattage would be nearly DOUBLED by the addition of two SMR-300s. Besides, even "narrow" or "small" intrusions on what is left of the critical dune area habitat could mean "death by a thousand cuts" for the flora, fauna, and fungi species barely holding on at the PNP site. Not only is segmentation not allowed under NEPA law and court ruling precedents, but neither is NRC and DOE's downplaying of clearly major, large-scale impacts - such as building two new reactors at the tiny 432 acre site - and referring to them instead as "narrow" and "small" effects.] (23-12-8 [Kamps, Kevin])

Response: *The commenter discussed the need for addressing potential impacts to special-status species occurring in areas of new ground disturbance that were not considered in the 2006 SEIS (NRC 2006-TN7346), as described in EA Section 3.6.1.2. In 2006, the NRC staff evaluated the effects of the Palisades license renewal on ESA-protected species and determined that the proposed Federal action was not major construction and did not involve physical alteration of the action area.*

The NRC staff conducted an independent analysis of potential impacts to special-status species for the EA (Sections 3.6, 3.7, and Appendix J), by reviewing the proposed Federal actions, including the activities related to the preparation for the resumption of power operations (EA Section 3.1.2 provides a list of those activities evaluated), information provided by the applicant, species-specific information maintained by the FWS, the 2006 SEIS analysis, and other publicly available information. The NRC staff analyzed environmental impacts for the proposed Federal actions for terrestrial resources in EA Sections 3.6.2 and 3.6.3 and for cumulative effects in EA Section 3.6.4.

EA Section 3.6.4 and Appendix G address the SMRs as a reasonably foreseeable future action and as well as other past, present, and reasonably foreseeable projects that could cumulatively contribute to the environmental effects of the proposed Federal actions. These comments provide no new and significant information and, therefore, no changes were made to the Palisades EA as a result of these comments.

Comment: (23-11-5)

Comment: The number of endangered species has doubled since 2006; **why was this NOT included in 2006, if it has been endangered since 1985?** Doesn't that major oversight invalidate the entire 2006 SEIS? Instead of a "hard look" under NEPA, and endangered species protection under the ESA, as required by law and court precedent for environmental and endangered species protection in this "rule of law" country, NRC simply went forward with the 2006 SEIS, which completely ignored a local endangered species, that had been designated as such for 21 years previously? And PNP has been allowed to operate from 2011 to 2022, based on the SEIS that contained such a glaring omission? To make matters worse, this omitted endangered species happens to be an iconic one, beloved on the Great Lakes shorelines. Are there endangered or threatened species, or species of special concern, that NRC and DOE have neglected to include in this 2025 EA? **(23-11-5 [Kamps, Kevin])**

Response: *This comment addresses the evaluation of ESA-protected species during the 2006 LR for Palisades as well as the current proposed Federal actions (NRC 2006-TN7346). Table J-6 summarizes all species evaluations and determinations for the 2006 LR and the current proposed Federal actions. The "iconic" species mentioned is not specified in this comment. The NRC staff assumes it to be the piping plover, which was federally listed in 1985 (50 FR 50726-TN5502).*

During the 2006 LR, the NRC evaluated ESA-protected species with the potential to occur within the site at that time, as determined by correspondence with FWS (NMC 2005-TN10839): Indiana bat, Karner blue butterfly, Mitchell's satyr butterfly, Pitcher's thistle, and eastern massasauga. The NRC staff did not evaluate ESA-protected species that were not expected at that time to occur within the site (whooping crane and piping plover), nor did it evaluate species that were not protected under ESA in 2006.

The following species became federally listed or proposed for listing after the 2006 SEIS: northern long-eared bat (80 FR 17974-TN4216); tricolored bat (87 FR 56381-TN8546), rufa red knot (79 FR 73706-TN4267), and monarch butterfly (89 FR 100662-TN10959). The current list of potential species is larger than the 2006 SEIS species list, because species ranges have changed and because more species have become listed. Background information and analyses for these newly listed species are provided in Table J-5, along with those for species previously evaluated in the 2006 SEIS.

For the current proposed Federal actions, the NRC staff accessed the FWS IPaC database on May 21, 2024, and received a list of species listed as threatened, endangered, or candidate under the Federal ESA and potentially occurring in an action area comprising the site and surrounding landscape (FWS 2024-TN10697). Prior to publication of the final EA, the NRC staff again accessed the FWS IPaC database for the same action area on April 24, 2025 (FWS 2025-TN11903) and no additional species were noted. The NRC staff reviewed its past analyses for Palisades, information from the applicant, species-specific information maintained by the FWS, and other publicly available information. Table J-5 summarizes the NRC staff evaluation of the potential for the identified species to occur on the Palisades site and the staff's conclusions regarding effects of the proposed Federal actions on these species. As required under the Federal Endangered Species Act (ESA), the Michigan Field Office of the U.S. Fish and Wildlife Service concurred with the "may affect, not likely to adversely affect" conclusions in Table J-5. Comments on monarch butterfly, the presumed iconic species, are addressed in

Section K.5.7.3. The comment provides no new and significant information and, therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.7.11 Ecology-Terrestrial Response 11

Comments: (23-11-8) (23-28-12)

Comment: NLAA = may affect, not likely to adversely affect.

[These flippancy conclusions - NE, NLAA - are signs that NRC, as well as FWS, are themselves a severe threat to these already threatened and endangered species, as well as species of special concern. We contest these conclusions.] (23-11-8 [Kamps, Kevin])

Comment: P. 240/242 (page J-20)

key to table NLAA = not likely to adversely affect Also challenge NE's NE = No effect. The radioactivity and toxic chemicals alone, let alone getting run over by vehicles, being killed by major construction activities such as new rad waste building construction, new dry cask storage pad destruction, and most destructive of all, the closely connected SMR new build scheme] (23-28-12 [Kamps, Kevin])

Response: *These comments address the determination of project effects on ESA-protected species. The NRC staff makes its effects determination in accordance with Endangered Species Consultation Handbook (FWS and NMFS 1998-TN1031), as stated in EA Table 3-5 and Appendix J.7. Terms such as NE (no effect) and NLAA (not likely to adversely affect) are part of a standard terminology developed by FWS for evaluating impacts on ESA-listed species. As required under the Federal Endangered Species Act (ESA), the Michigan Field Office of the U.S. Fish and Wildlife Service concurred with the “may affect, not likely to adversely affect” conclusions in Table J-5. These comments provide no new and significant information and, therefore, no changes were made to the Palisades EA as a result of these comments.*

K.5.7.12 Ecology-Terrestrial Response 12

Comments: (23-11-11) (23-27-13) (23-27-19)

Comment: In the N&S Report, Holtec presented a list of Federal and State-listed species that occur in Van Buren and Berrien Counties (Holtec 2023-TN10538).

[Why not extend the scope out to at least 50 miles. For example, NRC Chairman Greg Jaczko urged Americans in Japan to get at least 50 miles away from Fukushima Daiichi, as the nuclear catastrophe began. The Chernobyl and Fukushima Dead Zones extend some tens of miles in the northwest direction, given that radioactive fallout contamination was especially bad there. Dr. Timothy Mousseau has studied the biological impacts, at both Chernobyl and Fukushima, in these radioactively contaminated Dead Zones. Also, other analyses cited in this EA involved nearly a ten-county expanse. Why are only two counties being considered here?] (23-11-11 [Kamps, Kevin])

Comment: State-Listed Terrestrial Species The U.S. Nuclear Regulatory Commission (NRC or Commission) reviewed the information in the 2006 supplemental environmental impact statement regarding State-listed species, Holtec's exemption request (Holtec 2023-TN10538), updated lists of species known to occur in Van Buren and Berrien counties (MNFI 2024-TN10861, MNFI 2024-TN10862), and other information provided by the applicant (HDI 2024-

TN10670: RAI-GEN-3, Attachment 2) and incorporates these species lists by reference. Table J-1 and Table J-2 below present the 58 State-listed species that have been observed in these two counties since 2000.

[why only Van Buren and Berrien? Why not Allegan, Cass, and Kalamazoo, at the very least? They cited all those counties for other analyses in this same EA. NRC should be consistent in this regard, by expanding its ECOLOGY ANALYSES AND TABLES here.] (23-27-13 [Kamps, Kevin])

Comment: Year Last Observed in Van Buren or Berrien County

[re: this, are biologists et al. looking but not seeing, or are they not looking?]

Table J-2 Amphibians and Reptiles Listed as State Endangered or Threatened That Have Been Observed in Berrien and Van Buren Counties Before 2000 or That are Listed as Species of Special Concern and Have Been Observed in Berrien and Van Buren Counties

[why not further back in time? The year 2000 was only 25 years ago. flora and fauna have been here since time immemorial - not thousands, but likely millions of years, Ice Age excluded - so at least 12,000 years, right? Was MI under ice that recently? Who/what lived ON or IN the ice?] [again, why not more counties that just these two? Including Kent, Ottawa? Consistency needed] (23-27-19 [Kamps, Kevin])

Response: *This commenter questioned the use of two counties to develop the list of potential Federal and State-listed species that could occur and questioned the selection of the time frame. Each resource area has specific guidance to direct their analyses. For terrestrial resources, these are RG 4.11 (NRC 2012-TN1967), RG 4.2 (NRC 2000-TN1982), and NUREG-1555 (NRC 2000-TN1160), which direct staff to evaluate important species on and in the vicinity of the site. These documents define the vicinity as the area encompassed by a radius of 6 mi (10 km). For the Palisades site, the vicinity area only overlaps Van Buren and Berrien Counties.*

The NRC staff evaluated the list of State-listed species provided by Holtec in the exemption request (HDI 2023-TN10538: Table 3.3-2)). Michigan Natural Features Inventory provides species lists by county with date of last observation in that county. In its analysis, the NRC staff determined that those species observed since 2000 were the most likely to occur now. Encyclopedic discussions of past biota would not substantially contribute to our analysis of impacts to species present in the area now. These comments do not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.7.13 Ecology-Terrestrial Response 13

Comments: (23-11-12) (23-27-14) (23-28-1) (23-28-11)

Comment: Because Michigan Department of Natural Resources Director's Order No. FO-224.21 (MNRC/MDNR 2021-TN10703) provides specific protections for amphibians and reptiles, Appendix J, Section J.1, Table J-2 presents habitat requirements for amphibians and reptiles listed as threatened and endangered that have not been seen since 2000, as well as those that are listed as species of Special Concern.

[But the NRC and DOE had just said above:

The ESA of the State of Michigan (Michigan Compiled Law Part 365-TN10704) specifies the State's responsibility for conserving, protecting, restoring, and propagating

endangered and threatened species. [Emphasis added.]

So once Palisades has extirpated species on site, there is no need for Holtec nor NRC/DOE to worry about it any longer, even though the habitat could and should be restored, which could then see those species return from further afield elsewhere? This is illogical and cynical. It certainly violates common sense, as well as the spirit and even letter of the ESA. Is the ESA of the State of Michigan a dead letter law, then?

Two State-listed species have been observed at the Palisades site: the endangered prairie vole and the threatened eastern box turtle (HDI 2024-TN10670: RAI-GEN-3, Attachment 2).

[Then why doesn't that put a stop to the PNP reactor restart and SMR new build schemes? Is the ESA just a jay walking statute? Tragically, there is a mass extinction underway worldwide, across this country, and even in the State of Michigan. This should not be allowed to happen on-site at PNP, which had long been planned to be retired by now. The PNP should be retired as long planned, the facilities dismantled, the radioactive contamination cleaned up, the radioactive waste managed safely and securely, and the natural ecosystems allowed to heal, as best they can, after decades of nearly 60 years of physical, chemical, thermal, and even radioactive abuse.] (23-11-12 [Kamps, Kevin])

Comment: Two State-listed species have been observed at the Palisades site: the endangered prairie vole and the threatened eastern box turtle (HDI 2024-TN10670: RAI-GEN-3, Attachment 2). The prairie vole is a small rodent that has not been seen in Van Buren County since 1960 and Berrien County since 1962 (MNFI 2021-TN10874).

[so is this an admission by NRC that the construction and operation of PNP, beginning in 1967, contributed to the extirpation of the prairie vole? NRC did not specify WHEN these two species were "observed at the Palisades site," but saying the vole has not been seen in VB Co. since 1960 would indicate it had already been extirpated before PNP groundbreaking? By what, the sand quarry previously operated on the PNP site?] (23-27-14 [Kamps, Kevin])

Comment: P.228/242 (page J-8)

Reptile

Terrapene carolina carolina Eastern box
turtle T

Known from site (HDI 2024TN10670 Enclosure 3, Attachment 2). Forested habitats with sandy soils near a source of water such as a stream, pond, lake, marsh or swamp; adjacent thickets, old fields, pastures, or vegetated dunes. Access to unshaded nesting sites in sandy, open areas, is critical for successful reproduction.

[Last seen in 2021 at the site? Could this, or any other T, E, or SC species listed here, or others not listed here, be used to stop PNP restart/SMR new builds, under ESA law, for example?] (23-28-1 [Kamps, Kevin])

Comment: The NRC staff structured its biological evaluation in accordance with definitions from 50 CFR 402.12(f) (TN4312). Sections 3.6.1 and 3.7.1 of this EA define and describe the action area and state that no critical habitat for listed species occurs within it. Table J-5 describes each ESA-protected species potentially present in the action area, assesses the potential effects of the proposed action on each species, and presents the NRC's effect determination for each of species. Table J-6 compares the conclusions from this 2024 biological evaluation with those developed for a supplemental environmental impact statement prepared by NRC in 2006 for license renewal of the Palisades plant. finally, Section 4.2 addresses the potential effects of the no-action alternative.

[B.S. Cite likely impacted species, by NRC's own account; what about the turtle! That is, challenge NRC's flippant NLAAs (23-28-11 [Kamps, Kevin])

Response: *The commenter inquired about two State-listed species on the Palisades site. The source for the information included in Appendix J of the EA text is a letter from EGLE dated August 30, 2024 (HDI 2024-TN10670: RAI-GEN-3, Attachment 2).*

When evaluating species occurrence by county, Michigan Natural Features Inventory provides a date that the species was last seen in the county. The NRC staff looked at the county lists for Van Buren, which includes the site, and Berrien (MSU 2024-TN10862; MSU 2024-TN10861). The eastern box turtle was last seen in both counties in 2021. If any eastern box turtles occur on the site, they would likely be in the large, naturally vegetated undeveloped areas of the site north, south, and east of the plant where they would least likely be affected by the proposed Federal actions. Although it is possible that a few individuals might be killed by vehicles using the site entrance roads to the east of the plant, the effects would be not likely be significant at a population level.

The prairie vole last seen dates are the same for both counties. The species has been in observed in the adjacent county, Kalamazoo County in 2021 (MSU 2021-TN10874). According to the 2005 ER (NMC 2005-TN10678: Table 2.3-5), two individuals found in 1978 in open habitat, but none were found in 1979. Although prairie voles, which inhabit dry, grassy fields, could potentially occur in previously disturbed lands in the developed areas of the site, large areas of superior habitat are present in the large undeveloped areas of the site and surrounding landscape. Plenty of more suitable habitat is available for any affected individuals to move into. There is no evidence that the construction and operation of Palisades contributed to the extirpation of these species from the two counties. Although it is possible that a few individuals could be physically injured by ground-disturbing work, those losses are unlikely to be significant to regional prairie vole populations.

Effects to terrestrial resources, including State-listed species, from the proposed Federal actions are evaluated in EA Sections 3.6.2 and 3.6.3. The applicant is required to adhere to permit conditions from EGLE and other Federal, State, and local agencies to minimize impacts to terrestrial resources. Impacts from potential SMR to biota are addressed in Section 3.6.4, Section 3.7.4, and Appendix J of the EA. ESA determinations and abbreviation are addressed in Section K.5.7.1. These comments do not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.7.14 Ecology-Terrestrial Response 14

Comment: (23-11-13)

Comment: Eagles and Migratory Birds

The 2006 SEIS (Section 2.2.6, incorporated by reference) stated that 113 bird species have been documented on the site. According to the FWS IPAC report, accessed May 21, 2024 (FWS 2024-TN10697), 21 Birds of Conservation Concern have to the potential to occur on site. Birds of Conservation Concern are bird species not designated as federally threatened or endangered that are of the highest conservation priority for the FWS. In addition, breeding bald eagles have the potential to occur on site (breeding period December 1-August 31), as do non-breeding golden eagles (FWS 2024-TN10697). Additional information on eagles and migratory

birds is provided in Appendix J, Section J.2

[Again, as just above, why does this not lead to a permanent STOP WORK order on the PNP reactor restart and SMR new build schemes? Doesn't the species that serves as our national symbol deserve protected habitat, as as the PNP site, which should have long ago been retired, decommissioned, cleaned up, and allowed to heal and serve as habitat again?] (23-11-13 [Kamps, Kevin])

Response: *This comment addresses birds known to occur on site, including bald eagles and other migratory bird species. These species are described in Section 3.6 of the EA. Potential project impacts for these and other important species are evaluated in Section 3.6.2, Section 3.6.3, and Appendix J of the EA. These evaluations indicate that the potential effects on terrestrial ecological resources, which include eagles and migratory birds, would be minimal. This comment provides no new and significant information and, therefore, no changes were made to the Palisades EA as a result of this comment.*

K.5.7.15 Ecology-Terrestrial Response 15

Comments: (23-12-1) (23-12-2) (23-12-3)

Comment: The NRC staff analyzed in detail below three terrestrial resource issues that were not analyzed previously or could be different from current conditions: (1) exposure of terrestrial organisms to radionuclides (not analyzed in 2006 SEIS), (2) non-cooling system impacts on terrestrial resources (not analyzed in 2006 SEIS, potentially different from non-operating conditions), and (3) cooling tower impacts on terrestrial plants (potentially different from current non-operating conditions). [Emphases added.]

[WHY were they not considered in 2006? So the 2006 SEIS was incomplete, woefully inadequate. The 20-year license extension should be invalidated based on such self-admitted fatal flaws in NRC's 2006 SEIS.] (23-12-1 [Kamps, Kevin])

Comment: The 2006 SEIS for Palisades (NRC 2006-TN7346) did not address exposure of terrestrial organisms to radionuclides because the 1996 LR GEIS (NRC 1996-TN288) did not include this issue from routine operations as an issue to analyze.

[so the 1996 GEIS should also be invalidated. That's a lot of license extensions nullified!] (23-12-2 [Kamps, Kevin])

Comment: The NRC staff has concluded that exposure to radionuclides on terrestrial organisms would be NOT SIGNIFICANT.

[So all the radiation releases admitted to in the annual emissions reports simply, and magically, disappeared into nothingness? No flora, fauna, fungi, nor humans were harmed? All the cancer in humans locally must have been caused by something else? All extirpations of species on the Palisades site must have been caused some other way? This is magical thinking, which is dangerous.] (23-12-3 [Kamps, Kevin])

Response: *The commenter inquired about the inclusion of issues that were not addressed in the 2006 SEIS for Palisades (NRC 2006-TN7346). The text in EA Section 3.6 provides a description of the NRC staff's decision for including issues to analyze for the resumption of power operations, including those not analyzed previously or which have the potential to be*

different from the current, non-operating conditions. The LR GEIS has been updated twice (NRC 2013-TN2654, NRC 2024-TN10161) since it was first issued in 1996 (NRC 1996-TN288). During each iteration, issues for each resource area were reviewed, analyzed, and updated based on the analysis. As stated in the 2013 LR GEIS (NRC 2013-TN2654), the NRC recognizes “that environmental issues may change over time, and that additional issues may need to be considered.” The 2024 LR GEIS, Section 1.5.2.2 (NRC 2024-TN10161) states, “Information, including lessons learned and knowledge gained, from license renewal environmental reviews performed since development of the 2013 LR GEIS was collected and reviewed.” The 2013 LR GEIS (Section 4.6.1.1) provides the following rationale for the inclusion of this issue: “This issue was not evaluated in the 1996 LR GEIS. However, public concerns about the impacts of radionuclides on terrestrial organisms at some nuclear power plants have led to an evaluation of the issue in this GEIS revision.” The 2024 LR GEIS (Section 4.6.1.1.2) also includes this issue.

Therefore, the 2006 SEIS for Palisades (NRC 2006-TN7346) did not include a section called “exposure of terrestrial organisms to radionuclides from routine operations” because the 1996 LR GEIS (NRC 1996-TN288) did not include this issue as a required issue to analyze. Although the sections were not labeled as “exposure of terrestrial organisms to radionuclides,” the NRC staff have addressed radiological pathways to terrestrial biota in multiple NEPA documents for Palisades in different sections prior to the Palisades EA (AEC 1972-TN10603: pp. V-78 through V89; NRC 1978-TN10664: Section 5.4.2.4; NRC 2006-TN7346: Section 2.2.7).

For the EA, the NRC staff reviewed recent radiological environmental monitoring program (REMP) reports, which describe the impacts to the local environment through monitoring of releases. As described in REMP reports from 2019 through 2023, no measurable effects of radiation above baseline levels have been detected. These comments do not provide new and significant information that is within the scope of the NRC’s environmental review; therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.7.16 Ecology-Terrestrial Response 16

Comment: (23-19-16)

Comment: Terrestrial and Aquatic Ecology

[How rude to say ruderal:

Ruderal

adjective

adjective: **ruderal**

1. (of a plant) growing on waste ground or among refuse.

noun

noun: **ruderal**; plural noun: **ruderals**

1. a plant growing on waste ground or among refuse.

What an odd thing to say. How very misleading. The PNP site is amidst critically endangered sand dunes on the shore of the Great Lakes. An area of tremendous biological diversity, and tremendous natural beauty, that is very fragile, and critically endangered.

If PNP hadn't trashed the place, it would not be ruderal.

Liberty Hyde Bailey is a famous botanist who hailed from South Haven, MI. We incorporate by

reference this website, as if fully rewritten herein:

https://en.wikipedia.org/wiki/Liberty_Hyde_Bailey

His childhood home is now a museum dedicated to his memory and remarkable lifetime of achievements in botany. We incorporate the following by reference, as if fully rewritten herein:

<https://www.libertyhydebailey.org/about-bailey>

Although he lived nearly a century, and died just about a decade before PNP broke ground, he must be rolling in his grave, about the radiological and other harms done to the critically endangered, fragile, and biologically diverse flora upon which PNP was imposed nearly 60 years ago now. As the biologist Timothy Mousseau and his colleagues have documented at Chornobyl, with a large number of peer-reviewed scientific studies, a nuclear catastrophe can wreak havoc on fauna and flora, across very large regions. That is what is now being risked at PNP, with the restart and SMR new builds. PNP could yet turn the Great Lakes region, including the Great Lakes State, out to great distances, into one large radioactive ruderal wasteland.] (23-19-16 [Kamps, Kevin])

Response: The commenter expressed concerns with the use of the word “ruderal” to describe certain plants on the Palisades site and referenced the accomplishments of Liberty Hyde Bailey from two sources provided by the commenter. The commenter also includes nuclear safety concerns, which are addressed in Section K.6.11.

The NRC staff used the word “ruderal” in the EA and in Appendix J. The commenter states that the Great Lakes sand dunes have tremendous biodiversity and disagrees with the implied characterization of the Palisades site as “waste ground” by use of a dictionary definition of “ruderal.” In contrast, the NRC staff uses the word “ruderal” to describe certain plant species specializing in disturbed habitats, as is common in plant ecology (Grime 1977-TN11904; Crawley 2004-TN11905). This standard botanical use of the term does not imply a waste land, rather a species adapted to frequent disturbance. The NRC staff reviewed both references provided by the commenter and found no information specific to the Palisades site. This comment does not provide new and significant information that is within the scope of the NRC’s environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.7.17 Ecology-Terrestrial Response 17

Comment: (23-27-18)

Comment: X = Presumed Extirpated but would be treated as State Threatened. [in key; that doesn't seem right; shouldn't it be: would be treated as State Endangered. Threatened is less dire than Endangered. Extirpated is much more dire than Endangered.] (23-27-18 [Kamps, Kevin])

Response: The commenter questioned how species currently listed as “presumed extirpated” would be treated as threatened if found to be extant in Michigan. This treatment is based on the Michigan Department of Natural Resources threatened and endangered species list. To provide clarity, the NRC staff added this reference (MDNR 2025-TN11681) to the bottom of Table J-1. Other than adding this reference, no changes were made to the EA as a result of this comment.

K.5.7.18 Ecology-Terrestrial Response 18

Comments: (23-28-13) (23-28-14) (23-28-15)

Comment: P.234/242 (page J-14)

Indiana bat

Baseline Information: According to the recovery plan (FWS 2007-TN934), the Indiana bat is a flying, insectivorous mammal that hibernates in caves and mines and forms maternity roosts in mature trees over 5-in. diameter at breast height, especially trees with exfoliating bark. It roosts and forages in forested or semi-forested areas. **Threats include disturbance to the hibernacula, loss and fragmentation of forested swarming and roosting habitat, chemical contaminants, collision with wind turbines, and white-nose syndrome.**

[PNP restart would emit toxic and radioactive chemicals into the surrounding environment; SMR construction would likely lead to further deforestation on the site - has Holtec ever revealed where, exactly, on the site, the two SMR-300s would be built?] (23-28-13 [Kamps, Kevin])

Comment: Preparation Impacts:1-5 Proposed activities would occur only in previously developed areas of site, and no forest would be disturbed (figure 3-5 of this EA). Preparation activities are expected to occur over an 18-month period. The applicant has estimated that approximately 3,000 truck deliveries would take place over this period (HDI 2024-TN10670: RAI-GEN-1). Temporary increases in noise and traffic over this time period are unlikely to alter Indiana bat use of the site. **Bat collisions with vehicles and human-made structures at nuclear power plants are not well documented but are likely rare based on available information (NRC 2024-TN10161: p. 3-63).**

[that's not very persuasive; sounds more like wishful thinking]

Operations Impacts:1-5 For the 2006 SEIS (NRC 2006-TN7346), operational impacts were determined to be NLAA. Proposed operational activities are anticipated to be similar in magnitude and frequency as the previous operations characterized in the SEIS. No forest would be disturbed. Indiana bats, if present in the area, have likely already acclimated to the noise, vibration, and general human disturbances associated with site maintenance, infrastructure repairs, and other site activities. Holtec reports no bat incidents at the Palisades site and states that it would consult with FWS as an administrative control for any unanticipated construction or tree removal activities during operations (Holtec International 2023-TN10538:pp. 94-95). The NRC staff recognizes that individuals may have to reacclimate to the resumption of past operational conditions, but based on the relatively short duration of the shutdown it is the staff's professional judgment that the adverse effects would not be substantial.

[again, wishful and self-justifying thinking. The bats probably have used the PNP site for 12,000 years, after the glaciers retreated at the end of the most recent Ice Age. PNP groundbreaking only began in 1967. That was "only" 55 years of construction and operational activity - a blip in the natural history of these bats. 2022-2025 closed for good status returned the site to what the bats had been used to for the better part of 12,000 years. Now NRC wants to bless Holtec's activities that would further stress these bats.] (23-28-14 [Kamps, Kevin])

Comment: P.235/242 (page J-15)

northern long-eared bat(NLEB)

[challenge NRC's NLAA, for same reasons we gave re: IN bat]

tricolored bat

[challenge NRC's NLAA, for same reasons we gave re: IN bat] (23-28-15 [Kamps, Kevin])

Response: The commenter questioned the potential impacts to the Indiana bat, including chemical effects, radiological effects, deforestation from SMRs, bat collisions, and use of

site. As stated in the analysis (Table J-5 of the EA), forest habitat that could be used by federally protected bats occurs only in undeveloped areas of the site. None of this forested habitat would be impacted by the proposed Federal actions. The existing plant and additional areas subject to ground disturbance under the proposed Federal actions do not include any potentially suitable habitat for the Indiana bat.

The NRC acknowledges the information provided by the commenter on the history of Indiana bat occurrence in the geographic area of the site. However, this information does not alter the minimal potential for adverse impacts from the proposed actions on the Indiana bat. As required under the Federal Endangered Species Act (ESA), the Michigan Field Office of the U.S. Fish and Wildlife Service concurred with the “may affect, not likely to adversely affect” conclusions in Table J-5, including those for the federally protected bat species. These comments do not provide new and significant information that is within the scope of the NRC’s environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.7.19 Ecology-Terrestrial Response 19

Comment: (23-28-16)

Comment: P.235-236/242 (page J-15 to J-16)

eastern massasauga

[challenge NRC's flippant NLAA]

Preparation Impacts: 1-5 No activities are proposed in or adjacent to wetlands or other suitable habitats. ***It is possible that individuals in undeveloped areas of the site could experience infrequent injury or mortality***

from vehicles using adjoining roadways. However, the roadways on the site are separated from favorable eastern massasauga habitats by roadside clearings several feet in width, and the potential for snake collisions are no greater than for other arterial roadways in the surrounding rural landscape.

Operations Impacts: Impacts from operational activities were determined to be NLAA in the 2006 SEIS (NRC 2006-TN7346). Proposed operational activities are anticipated to be of the same magnitude and frequency as anticipated in 2006.

[snakes could enter PNP site from outside, seeking habitat that NRC admits here exists on the site.

extinction by a thousand vehicle strikes. PNP roadways are no LESS of a threat than arterial roads in the surrounding rural landscape. NRC admits 3,000 vehicle deliveries associated with restart. Not to mention increasing numbers of workers coming and going, which has already begun.

Several FEET in width? I think the snakes could cross that, into the roadway danger zone.

Don't tread on me, literally - including tire treads

Operational radioactivity and toxic chemical releases from restart, in addition to what PNP has already disgorged since 1971, will also harm the snakes.] **(23-28-16 [Kamps, Kevin])**

Response: *This comment addresses eastern massasauga onsite and potential impacts from the proposed Federal actions, including vehicle injuries, radiological impacts, and chemical impacts. Radiological impacts to biota are addressed in Section K.5.7.15 and will not be discussed further in this response. The snake is not known to be present in the developed portion of the site but could occur in undeveloped portions of the site (Table J-5 of the EA). The NRC staff previously evaluated operational impacts and determined them to be NLAA in the 2006 SEIS (NRC 2006-TN7346), based on planned activities and BMPs for vegetation maintenance. During its review of the proposed Federal actions in the EA, the NRC staff*

reviewed proposed activities and BMPs. In the FWS review of the proposed Federal actions, FWS requested that Holtec review and adopt standard BMPs for this species. Holtec agreed to do so (HDI 2025-TN11906), and the NRC staff updated its analysis in the final EA, Section 3.6 and Appendix J, to reflect the planned adoption of the new, species-specific BMPs. This comment provides no new and significant information and, therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.7.20 Ecology-Terrestrial Response 20

Comments: (23-29-1) (23-29-2)

Comment: P.236/242 (page J-16)

rufa red knot

[challenge NRC's flippant self-serving NLAA] [industrial activity and car/truck strikes could harm birds, in addition to hazardous emissions from PNP. Cite similar reasons as IN bat protection.

Site should be allowed to return to natural state, providing sand dune forested wetland habitat, and restored natural beach habitat, for indigenous species, including this one]

(23-29-1 [Kamps, Kevin])

Comment: P.236-237 (page J-16 to J-17)

Operations Impacts:1-5 The rufa red knot was not previously evaluated in 2006 SEIS (NRC 2006-TN7346; NMCCO 2005-TN10839). Undeveloped, unarmored beaches on or near site could potentially provide habitat but would not be disturbed or altered by operational activities. Holtec has a current permit (MEGLE 2020-TN10696) allowing for maintenance dredging of sand and placement of dredged materials on the beach (Section 3.6.1.1).

Dredging locations occur only in previously disturbed areas (Holtec International 2023-TN10538: p. 95). Holtec reports no new and significant information regarding bird collisions with plant structures or transmission lines (Holtec International 2023-TN10538: p. 4.3-2). Continued implementation of permit requirements, environmental protection plans, and BMPs for operational activities would be protective of the terrestrial habitats used by this species

[stop doing that. PNP restart is not even needed. State framing at the very top. Along with intro/summary.

Cite bird kills from flying into Shield Building at Davis-Besse

Holtec and NRC looking the other way, and assuming the best. Not acceptable given threats to such species as this.]

(23-29-2 [Kamps, Kevin])

Response: *The commenter queried about the federally threatened rufa red knot and disagrees with the NLAA finding and mentions activity, vehicle strikes, collisions with plant structures, and hazardous emissions as justification. The NRC staff considered potential threats to the rufa red knot in Table J-5 of the EA. The principal threat is reduced prey availability from the overharvesting of horseshoe crabs, which reduces availability of a primary food source, horseshoe crab eggs. Other threats include climate change and coastal development. As discussed in Table J-5, the shoreline habitat adjacent to Palisades has already been highly*

disturbed and the beaches narrowed making it unlikely to provide suitable habitat for the rufa red knot. In the 2006 SEIS, the NRC staff determined that there would be no impacts of bird collisions with cooling towers during the renewal term beyond those discussed in the GEIS. The NRC staff used the 2024 LR GEIS (NRC 2024-TN10161) terrestrial resource issues in EA Section 3.6.3 and determined that the bird collisions with nuclear power plant structures would be minimal and not different from past operations and current conditions under resumption of power operations. There is no new and significant information regarding bird collisions with Palisades plant structures or transmission lines (HDI 2023-TN10538: p. 4.3-2).

BMPs to protect migratory bird species are discussed in Sections 3.6.2 and 3.6.3 and Table J-5 of the EA. Both the NRC and the DOE have completed consultation requirements with FWS and received concurrence on the NLAA determinations (FWS 2025-TN11931, FWS 2025-TN11932). This comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.7.21 Ecology-Terrestrial Response 21

Comments: (23-11-7) (23-11-10) (23-29-3) (23-29-5) (23-29-10) (23-29-11)

Comment: Table 3-5

NEP = in the vicinity of the action area, this species is part of a **nonessential experimental population**

NE = No effect

[Emphasis added.]

[How can this be said of Whooping Cranes - there are mere hundreds left in the entire world. How can any population of Whooping Cranes be designated "nonessential"?] **(23-11-7** [Kamps, Kevin])

Comment: (c) **Species has designated critical habitat, but it does not overlap the action area** (FWS2024-TN10697).

DPS = distinct population segment

[How could this possibly be - the site is only 432 acres in size. It would seem that any critical habitat for an endangered or threatened species, or species of special concern, on such a tiny site, could not help but be impacted by PNP activities. This is not only true of the "zombie" reactor restart scheme, and a quarter-century of operations there, but also at the two SMR-300 new build construction sites, to be followed by many decades of operations there as well.]

(d) Species has proposed critical habitat, but it does not overlap the action area (FWS 2024TN10697).

*[Ditto what we just said immediately above. Don't karner blue butterflies and piping plovers have wings, and fly around? So it's their own fault if they leave their postage stamp-sized remnants of remaining critically endangered habitat, and are themselves injured or killed by PNP operations?] **(23-11-10** [Kamps, Kevin])*

Comment: P.237/242 (page J-17)

piping plover(Great Lakes DPS)

[challenge nrc's flippant LLAA

I think I saw piping plovers at Lake MI College in South Haven at a NRC-Entergy meeting. So sometime between 2007-2022.]

Site Occurrence: The piping plover is not known from the Palisades site. The beach fronting the developed area has been too narrowed by past armoring to offer potentially suitable piping plover habitat (site observations by NRC ecologists in 2024). Undeveloped beaches on or near site could potentially provide habitat. Adults may pass through the area when moving to more suitable habitat along Lake Michigan.

[well, per above, I've seen them just several miles northwest. And they do have wings...]
whooping crane

[challenge NRC's flippant NE]

P.238/242 (page J-18)

Site Occurrence: The whooping crane is not known from the Palisades site. Individuals from experimental populations are possible in Michigan, and even those are unlikely. Furthermore, none of the large marshes favored by the species occur on or near the Palisades site (Section 3.6.1 of the EA).

[challenge this - cite reference above of a marsh not far from PNP site - perhaps in Cumulative Impacts appendix?]

[cite impacts on Whooping Cranes from Fort Saint Vrain nuclear power plant risk of contamination to Platte River, upstream of Nebraska]

[species measured in only the hundreds of individuals continent wide

"Non-essential" habitat is really objectionable, given the critically endangered status of this species.]

(23-29-3 [Kamps, Kevin])

Comment: Karner blue butterfly (KBB)

Baseline Information: The KBB is a flying insect that favors ***oak savanna and pine barren habitat containing blue lupine (Lupinus perennis)*** (FWS2024-TN10778). Recent (2024) IPaC searches did not mention this species, but the NRC staff is evaluating it because it was addressed in the 2006SEIS.

Site Occurrence: The KBB is not known to occur on the Palisades site, and the specialized habitat it requires is not present on the site or in the surrounding landscape.

Preparation and Operations Impacts: No preparation or operational activities would take place in or adjacent to habitat for the KBB.

[compare habitats mentioned nearby, as/per just above. Butterflies have wings. They can move and migrate.]

Mitchell's satyr butterfly (MSB)

Baseline Information: The MSB is a flying insect with nine known populations in Michigan (FWS 2021-TN10883), and otherwise known or suspected to occur in Alabama, Indiana, Michigan, Mississippi, Ohio, and Virginia (FWS 2021-TN10882). Primary habitat is sedge-dominated wetlands, including fens and wetland edges of beaver ponds, swamps, and seeps (FWS 1998-TN10884, FWS 2021-TN10883). Threats include wetland habitat loss from urban development

and adjacent human activities, hydrologic alteration, over-collection by butterfly collectors, inadequacy of existing regulatory mechanisms, limited ability to colonize new habitat patches, infection with the reproductive bacterial parasite *Wolbachia*, and climate change (FWS 2021-TN10883: p.19-24).

Site Occurrence: The MSB is not known to occur on the Palisades site. No sedge-dominated fens favored by the MSB are present on site (NRC 2006TN7346: p. 4-34).

Preparation and Operations Impacts: No preparation or operational activities will occur in or adjacent to habitat for this species.

[challenge NRC's flippant NE. Compare w/habitats mentioned in EA, per above. Butterflies DO have wings...]

[in terms of catastrophic radiation release impacts, including on birds, insects, etc, cite Mousseau; cite the German biological artists who won the Nuclear-Free Future Award for Education in 2016] (23-29-5 [Kamps, Kevin])

Comment: P.241/242 (page J-21)

NEP = in the vicinity of the action area, this species is part of a nonessential experimental population.

[outrageous thing to say about Whooping Cranes, given their critically endangered small numbers - how can any population, even individual(s), be considered "nonessential"? How can they be called "experimental"? Their decline and loss is human caused.] (23-29-10 [Kamps, Kevin])

Comment: Potentially Present in the Action Area?

[challenge NRC's flippants No's - of course they are all potentially present, or could be, if let alone, not disturbed. The only reason they have not been seen on site is due to Cumulative Impacts, on the site, and beyond, as well as perhaps no one at PNP is really looking for them with any required regularity?] (23-29-11 [Kamps, Kevin])

Response: *The commenter questioned the potential impacts to a number of species on the Palisades site. The NRC staff determined that there is no suitable habitat for the specified butterfly species, piping plover, or whooping crane on the site (EA Table J-5).*

The commenter inquired about the potential for whooping crane to occur on the Palisades site and suggests that their absence from the site is a result of cumulative impact from Palisades activities. In the EA, the NRC staff analyzed the potential for the whooping crane to occur on the site (Table J-5). These cranes are part of the eastern migratory population (EMP), currently estimated at 70 individuals (ICF 2025-TN11907). The distribution of EMPs in the previous 2 months is publicly available information (ICF 2025-TN11908) and shows no occurrence within the site or vicinity. The NRC staff added these references to its analysis in Table J-5.

The term "nonessential" is a regulatory designation established by the FWS, not NRC. FWS may designate a population of a listed species as experimental if it will be released into suitable natural habitat outside the species current range (FWS 2018-TN9653). FWS may designate experimental populations as essential or nonessential. Under a non-essential designation, the species is treated as proposed for listing, except on National Wildlife Refuges or National Park System lands, where it is treated under the ESA as a threatened species. The EMP of whooping crane, which would include any whooping cranes that would pass through the Palisades site, were designated as a nonessential, experimental population by the FWS in 2001. FWS rationale

for this determination is provided in 66 FR 33903 (TN9652). Additionally, as noted in Table J-5, whooping cranes are wading birds that favor throughout their life cycle wetland habitats in open settings, a habitat type not extensively present throughout the site and surrounding landscape.

Since there is no potentially suitable habitat for the piping plover at the Palisades site, as discussed in Table J-5, it is not surprising that they have been seen in other locations north and south of the plant that do provide suitable habitats, as discussed in Table J-5. BMPs to protect migratory bird species are discussed in Sections 3.6.2 and 3.6.3 and Table J-5 of the EA. Both the NRC and the DOE have completed consultation requirements with FWS and received concurrence on the NLAA determinations (FWS 2025-TN11931, FWS 2025-TN11932).

These comments provide no new and significant information and, therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.7.22 Ecology-Terrestrial Response 22

Comment: (18-1)

Comment: Listed/proposed bats-

The draft EA currently notes that "no forest would be disturbed" for both Preparation and Operational Impacts. Additionally you clarified that transmission line maintenance (to first substation covered under NRC's action) there are no trees > 3" dbh that would be impacted by operations/maintenance, as the vegetation around the transmission lines is generally low/open habitats and maintained that way through spraying. **(18-1 [Hicks, Scott])**

Response: *This comment addresses forest impacts discussed during a conversation between FWS and NRC staff on March 12, 2025 (FWS 2025-TN11909). The in-scope transmission lines lie within the site boundary and are those from Palisades main transformer and the Palisades substation. The 2006 LR (NRC 2006-TN7346: Figure 2-3) depicts the in-scope transmission lines passing from transformer to the substation through non-forested habitat. EA Figure 2-2 displays a current image of the Palisades site and infrastructure and shows site boundary (outlined in red), plant infrastructure, and habitats. Onsite landscape maintenance practices and impacts from those practices, as described in EA Sections 3.6.2 and 3.6.3 include ground below in-scope transmission lines. No changes were made to the Palisades EA as a result of this comment.*

K.5.7.23 Ecology-Terrestrial Response 23

Comment: (18-2)

Comment: eastern massasauga-

The draft EA notes --"The species is not known from the Palisades site but is known to occur nearby, within 1 mi (1.6 km) of the site;" Although the risks from the proposed action for this species are not significant, given the proximity to known occurrences and potentially suitable habitat on the site, we recommend incorporating 3 basic BMPs into the plans (these are recommended because issues later came to light at other sites initially thought to be low or no risk to the species) -

- Use wildlife-safe materials for erosion control and site restoration (do not use erosion control products containing plastic mesh netting or other similar material that could ensnare EMR)
- To increase human safety and awareness of EMR, to raise awareness of the species docile

nature and avoid an uninformed reaction to simply seeing the species, those implementing the project/on-site should first watch MDNR's "60-Second Snakes: The Eastern Massasauga Rattlesnake" video (available at https://youtu.be/-PFnXe_e02w).

- Require reporting of any EMR observations, or observation of any other listed threatened or endangered species, during project implementation to the Service within 24 hours.

More detail on EMR BMPs -

https://ecos.fws.gov/docs/tess/ipac_project_design_guidelines/doc5280.pdf (18-2 [Hicks, Scott])

Response: *The commenter, FWS, requests that Holtec implement standard FWS BMPs to protect eastern massasauga. Holtec has indicated to NRC staff that they will implement the subject BMPs (HDI 2025-TN11906). Text was added to EA Appendix J stating that Holtec has indicated they will implement the BMPs.*

K.5.7.24 Ecology-Terrestrial Response 24

Comments: (18-3) (23-29-7)

Comment: Pitchers thistle-

You showed us where Pitcher's thistle was observed currently and historically. Based on the location where the species remains (a few isolated blowout habitats), you indicated its highly unlikely that any security patrols or other activities are likely to access that area. If possible, you will share the Pitcher's thistle survey report with our office.

It sounded like the Pitcher's population on site may be negatively impacted by vegetation encroachment. We recommend that the facility operator consider developing a vegetation management site plan that incorporates measures that could to help to ensure adequate viability of the Pitcher's thistle population. For example, to help with creating/maintaining open sandy environments needed by the species, at appropriate locations, consider removing up to 50% of dominant grasses (mechanical or chemical), removing litter (raking), and tree or shrub removal. If possible, the treatments should occur in late fall to enhance effect of late fall/early winter winds in terms of moving sand and creating areas sandy openings. We may be able to provide additional recommendations after reviewing the survey report and would welcome the opportunity to help them in developing a vegetation management plan.

If you have questions on any of the above, please let us know. If you could please confirm our understanding and let us how NRC will proceed with the information above, then we will be set to finish our review and provide concurrence. (18-3 [Hicks, Scott])

Comment: Pitcher's thistle

[challenge NLAA]

Site Occurrence: Pitcher's thistle has been observed in undeveloped dune areas on the site, on open sand dune and flats (NRC 2006-TN7346: p. 2-45;HDI 2024-TN10670). The species was known from 1980s and 1990s to occur near the cooling towers. However, none was reported near the cooling towers in 2005.

[cite acid vapor plume from cooling towers for decades on end as a contributing factor, likely a major one] (23-29-7 [Kamps, Kevin])

Response: *These comments address the location of the Pitcher's thistle on the Palisades site. Holtec has prepared a Pitcher's thistle survey report (HDI 2025-TN11910), which the NRC staff provided to FWS. This report was added as a reference to the EA in Section 3.6 and Table J-5.*

The commenter expressed concern about an acid vapor plume. This reflects conditions prior to 1987 when sulfuric acid was added to the water delivered to the cooling tower (CPC 1987-TN11913). As stated in the EA, Pitcher's thistle was observed near the cooling towers in the 1990s and therefore the historical addition of sulfuric acid to the cooling tower water could not have affected the Pitcher's thistle near the cooling towers in the 1990s.

The NRC staff made the FWS recommendations available to Holtec and encouraged Holtec to prepare the indicated vegetation management plan. However, these recommendations have not been received as terms and conditions in an Incidental Take Statement received in response to a formal Section 7 consultation. The NRC therefore does not have the regulatory jurisdiction to require Holtec to prepare and implement such a plan. Although the NRC staff agrees that preparing and implementing such a plan would have conservation benefit, the NRC staff believe that conservation would be most enhanced by allowing natural dune blowout and successional processes to continue in the undeveloped areas north and south of the plant without human intervention. Removal of invasive plant species from dune vegetation may be beneficial, but removal of indigenous dune vegetation may interfere with the natural successional processes on which dune biota, including Pitcher's thistle and other dune adapted species, depend. Cooling tower impacts to this species are addressed in Section K.5.7.5. No changes were made to the Palisades EA as a result of this comment.

K.5.7.25 Ecology-Terrestrial Response 25

Comment: (18-4)

Comment: Lastly we discussed resources for other potential projects, NRC may want to explore these FWS resources for Michigan -

- Instructions for Conducting Endangered Species Act Project Reviews in Michigan using IPaC https://www.fws.gov/sites/default/files/documents/2024-06/mifo_ipac_instructions_revised-june-2024.pdf

- All Species Michigan Dkey:

<https://www.youtube.com/watch?v=FfcerNCiL0IDkey>

- Beta IPaC is found at <https://ipacb.ecosphere.fws.gov/> and is intended to be used for testing and training. Beta IPaC has the same functionality as production IPaC, but no official correspondence is created or distributed (see All Species Michigan Determination key in BETA to explore various site layouts etc. in terms of potential changes to BMPs etc.) **(18-4 [Hicks, Scott])**

Response: *The commenter, FWS, suggests that NRC consider using additional FWS tools for consultation in the future for projects in Michigan. NRC has provided FWS with the draft EA, including the biological evaluation and conclusions in Table J-5, and received concurrence on the NLAA conclusions (FWS 2025-TN11931, FWS 2025-TN11932) as required for Federal Interagency Cooperation in 50 CFR Part 402 (TN4312). No changes were made to the Palisades EA as a result of this comment.*

K.5.7.26 Ecology-Terrestrial Response 26

Comment: (23-28-10)

Comment: J.7 Biological Evaluation

If the preliminary information reveals that listed species or critical habitats may be present, the action agency then typically prepares a biological assessment or biological evaluation to

evaluate the potential effects of the action and determine whether the species or critical habitats are likely to be adversely affected (50 CFR 402.12(a); 16 U.S.C. 1536(c)-TN4459). [which is higher level and which is lower level review. PNP restart should always receive the highest level review available]

P..233/242 (page J-13)

Biological assessments are required for any Federal agency action that is a "major construction activity" (50 CFR 402.12(b) (TN4312). A major construction activity is a construction project or other undertaking having construction-type impacts that is a major Federal action significantly affecting the quality of the human environment under the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.)(NEPA)(51 FR 19926-TN7600). However, the proposed action to reauthorize Palisades is not a major construction activity and therefore does not require the preparation of a biological assessment. Nonetheless, the NRC staff still must consider the impacts of this action on federally listed species and designated critical habitats. This consideration is presented below as a biological evaluation. Whether through a biological assessment or biological evaluation, if an action agency such as NRC finds that a proposed action "may affect" ESA-protected species or habitats, it must seek written concurrence from the relevant Service(s) under ESA Section 7.

[it is too a major construction activity - an ongoing one that began in 1967. The SMR newbuilds will only exacerbate this] (23-28-10 [Kamps, Kevin])

Response: *The commenter requests clarification on the difference between a biological assessment and a biological evaluation and disagrees that the proposed Federal actions are not a major construction activity. As explained in EA Appendix J, Section J.7.1, a biological assessment is prepared for major construction activities, and a biological evaluation is a generic term covering other analyses (NMFS 2006-TN11911). The NRC staff have determined that the proposed Federal actions is not a major construction project and completed a biological evaluation to assess impacts on federally listed species and critical habitats. This comment does not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of this comment.*

K.5.8 Comments Concerning Geologic Environment

K.5.8.1 Geologic Environment Response 1

Comments: (20-2) (20-3)

Comment: No.: 2.

Section: 3.5.1

Page: 3-20

Comment: "Glacial deposits range from a few hundred feet to several hundred feet in thickness in the vicinity of the Palisades site. Sand dunes mantle the glacial deposits, rising from 582 ft (177.4 m) MSL on the shore of Lake Michigan to an elevation of 780 ft (237.7 m) MSL at the site of the containment vessel."

Cross sections presented on pages 95-97 of the Holtec request for additional information (RAI) response RAI-GW-2 (Reference 1) show the ground surface near the containment vessel is present at approximately 590 feet above mean sea level (MSL) . The 780 feet MSL referenced represents the maximum elevation of the sand dunes prior to excavation and construction of Palisades. (20-2 [Britting, J.])

Comment: No.: 3.

Section: 3.5.1

Page: 3-20

Comment: "Onsite, the dune sand is approximately 200–215 ft (60–65.5 m) thick, becoming dense to very dense below 590 ft (179.8 m) MSL".

Cross sections presented on pages 95-97 of the Holtec RAI response RAI-GW-2 (Reference 1) indicate that the thickness of the dune sand at the site is variable. Dune sand thicknesses shown in the cross sections range from approximately 40 feet near the shoreline to approximately 140 feet near the crest of the sand dunes.

Based on the maximum elevation of the sand dunes prior to the construction of the plant of 780 feet above MSL, the maximum thickness of the dune sand is 200-215 feet. **(20-3 [Britting, J.]**

Response: *In response to the comments, the EA has been updated to reflect the present-day ground surface elevation of 590 ft (180 m) mean sea level, as confirmed by Holtec's RAI response to RAI-GW-2 (HDI 2024-TN10670).*

K.5.8.2 Geologic Environment Response 2

Comment: (23-19-13)

Comment: This statement strikes me as odd. It makes the PNP site sound like a wasteland, worthless. They are striving to make it that, radioactively, it seems. So if PNP has already trashed the site for nearly 60 years, it's fine for PNP to continue trashing the site, for another 60 years or longer, if the SMRs' operations are also included, as they should be under NEPA/Cumulative Effectis. Segmentation is now allowable. This thinking means the site will never be allowed to heal from all PNP's abuse of it, not for a very long time, if ever. **(23-19-13 [Kamps, Kevin])**

Response: *The impact of the proposed Federal actions is assessed based on the environmental baseline. EA Section 1.3.4 describes this process for Palisades in more detail:*

The environmental effects of a proposed Federal action(s) are determined by comparing the environmental conditions at the point in time prior to the commencement of the proposed Federal action(s), known as the environmental baseline or affected environment, with those expected environmental conditions following the commencement of the Federal action(s). The affected environment for the potential reauthorization of power operations at Palisades is the current decommissioning state at Palisades prior to implementing any of the activities related to the preparation for the resumption of power operations. The corresponding impact determination analysis for each resource area comprises the impacts in relation to the affected environment from both the activities related to the preparations for the resumption of power operations and those related to the resumption of power operations.

Therefore, it is appropriate to determine the impact of cumulative effects, including the siting of potential SMRs, on the existing baseline environment, which includes the previously disturbed soils from construction of Palisades. In response to this comment, a clarifying statement has been added to Section 3.5.1 of the EA to indicate the use of the site as a sand quarry before construction and operation of Palisades began.

K.5.9 Comments Concerning Greenhouse Gas Emissions and Climate Change

K.5.9.1 Greenhouse Gas Emissions and Climate Change Response 1

Comment: (20-7)

Comment: No.: 7.

Section: Appendix F

Page: F-8, Table F-2

Comment: The Nuclear Regulatory Commission (NRC) estimates Greenhouse Gas Emissions for plant operations at 129 MT (CO₂eq) for seven years of plant operations appears lower than the range of values in Table 3.12-2 of the Generic Environmental Impact Statement for License Renewal issued in 2024 (Reference 4). While it does not appear to be material to the overall lifecycle emissions, NRC should confirm the value is not an error. **(20-7 [Britting, J.]**)

Response: *This comment questions the NRC staff's estimate of greenhouse gas (GHG) emissions as the numbers are lower than the values presented in the 2024 LR GEIS (NRC 2024-TN10161). The NRC staff reviewed the estimate and confirmed that the 129 MT CO₂(eq) value is accurate based on the site-specific assumptions applicable to the potential reauthorization of power operations at Palisades. As discussed in Section F.4 of the EA, nuclear power plants do not combust fossil fuels to produce electricity; instead, direct GHG emissions from operations are limited to ancillary activities, such as the operation of natural-gas boilers, diesel emergency generators, and worker vehicles. The emissions estimate also reflects Palisades' net electrical capacity of approximately 800 MWe and the limited 7-year operating period remaining on the Palisades renewed facility operating license (RFOL) on the, and that there would be no major refurbishment activities during this timeframe.*

The lower plant operations emissions estimate compared to fully operating nuclear power plants evaluated in the 2024 LR GEIS (NRC 2024-TN10161) is consistent with these site-specific operational assumptions and the previously decommissioned status of Palisades prior to the proposed restart.

As noted by the commenter, plant operations GHG emissions represent a very small fraction of the total life-cycle emissions, which are dominated by indirect emissions from the uranium fuel cycle. Therefore, even if minor adjustments to direct operational emissions were made, they would not materially affect the overall life-cycle impact assessment or the EA's environmental conclusions.

No changes were made to the Palisades EA as a result of this comment.

K.5.9.2 Greenhouse Gas Emissions and Climate Change Response 2

Comment: (23-23-15)

Comment: Climate change projections in the latest USGCRP reports (i.e., NCA5) cover the period through 2100 and are generally expressed as a change expected for the mid-21st century (e.g., 2036-2065) or late 21st century (e.g., 2071-2099) relative to average conditions existing in the near-present (1991-2020). These projections are relevant to the evaluation of Palisades' continued operation, particularly as the plant proposes to operate until 2031.

[But this is of course willfully blind and silent here to PNP's stated intent to apply for a 2031-

2051 license extension, not to mention two SMR-300s, which could operate past 2100.] (23-23-15 [Kamps, Kevin])

Response: The commenter questioned the timeframe the NRC staff used for evaluating climate change. As discussed in Section 3.1.5 and Appendix F of the EA, the NRC staff's evaluation considers climate change impacts through the remainder of the term of the Palisades RFOL—through March 24, 2031, under the current RFOL. The climate change evaluation includes a description of how the baseline environment, defined in Section 3 of the EA, might change as a result of climate change along with a discussion of how the impacts discussed in Sections 3 and 4 of the EA would either increase, decrease or remain the same in this new baseline environment. The NRC staff used climate change projections for the mid-21st century (i.e., 2036–2065) as the bounding climate scenario for the time period covering the resumption of power operations at Palisades until the end of the current operating license (March 24, 2031). The assessment ensures the potential environmental impacts for all resource areas under a changing climatic regime are conservatively considered in the context of NRC's evaluation of the preparations for and the resumption of power operations. The SMR 300s are considered in the NRC staff's cumulative analysis as a reasonably foreseeable project.

Therefore, the EA's timeframe for evaluating climate change impacts is appropriate for the proposed Federal actions. No changes were made to the Palisades EA as a result of this comment.

K.5.9.3 Greenhouse Gas Emissions and Climate Change Response 3

Comment: (23-24-1)

Comment: Starting from the table (NRC 2018-TN5405) that identifies plausible connections between nuclear power station resource area concerns and likely climate change-caused alterations to the existing environment, the NRC staff generated a resource table specific to the Palisades region by removing irrelevant USGCRP climate impacts and NRC resource area issues from the master table. For example, climate impacts related to sea level rise were removed because of the site's inland location.

[well, it may be "inland," as in not on an ocean coast, but it is on the shore of the Great Lakes, which are fresh water inland seas, the largest in the world, which could well also rise, with all that increased precipitation NRC just admitted to just above] (23-24-1 [Kamps, Kevin])

Response: The commenter questioned the removal of an evaluation of “sea level rise” in the NRC's climate change evaluation. As discussed in Section F.3 of Appendix F in the EA, the NRC staff developed a site-specific climate change resource table by adapting the Climate Change Master Table (NRC 2018-TN5405) to reflect the current regional characteristics of the Palisades site. Impacts related to global sea level rise were removed because they pertain specifically to coastal oceanic sites; however, the NRC staff evaluated regional precipitation changes, flood risks, and hydrologic impacts that could influence the Great Lakes, including Lake Michigan (see discussion in the EA in Appendix F, Section F.3).

The NRC staff considered projected increases in precipitation during winter and spring, as well as the potential for higher riverine and inland water body flooding. These projections capture the potential risks associated with seasonal variations in Lake Michigan water levels under changing climatic conditions. Based on this analysis, the NRC staff concludes that the proposed

Federal actions would not result in significant environmental impacts related to climate change-induced flooding or water level changes at the Palisades site.

No changes were made to the Palisades EA as a result of this comment.

K.5.9.4 Greenhouse Gas Emissions and Climate Change Response 4

Comment: (23-24-2)

Comment: This suggests that, although winter and spring flooding may pose significant challenges, drier summer conditions are likely to persist, potentially affecting water availability in the region.

[Water unavailability, in the Great Lakes State?! Just ask Flint, Benton Harbor, etc., albeit due to lead poisoning in their cases. But this flooding in the wet season, and drought in the dry season, growing more and more extreme over time with global warming, are severe risks to the safe and efficient and environmentally and health protective operations of a restarted PNP, as well as to new SMRs there. NRC and DOE have not meaningfully addressed such worsening climate risks and extreme weather events in its EA. An EIS/PEIS doing so is required.] (23-24-2 [Kamps, Kevin])

Response: As discussed in Appendix F of the EA, the NRC staff evaluated climate change projections for the Palisades region, including potential increases in winter and spring precipitation and flooding, drier summer conditions, temperature increases, and related impacts on water resources and infrastructure. These analyses are based on best available scientific sources, including the U.S. Global Change Research Program's Fifth National Climate Assessment (USGCRP 2023-TN9762) and other referenced studies.

In the EA, Appendix F, Sections F.3 and F.5, the NRC staff conclude that, although seasonal hydrologic variability is expected to increase, the proposed Federal actions—associated with the reauthorization of power operations through 2031 under the existing RFOL—would not result in significant effects to the affected baseline environment such that it would alter the environmental impact determinations related to climate change effects, including water availability or flooding risks. The SMR 300s are considered in the NRC staff's cumulative analysis as a reasonably foreseeable project. No changes were made to the Palisades EA as a result of this comment.

K.5.9.5 Greenhouse Gas Emissions and Climate Change Response 5

Comment: (23-24-13)

Comment: F.4 Greenhouse Gases

[See Dr. Jacobson's expert declarations - incorporated by reference as if fully written herein, above.]

As described in the 2024 LR GEIS, gases found in the Earth's atmosphere that trap heat and play a role in the Earth's climate are collectively termed greenhouse gases (GHGs). These GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), water vapor (H₂O), and fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons, and sulfur hexafluoride. Operations at nuclear power plants release GHGs from stationary combustion

sources (e.g., diesel generators, pumps, diesel engines, boilers), refrigeration systems, electrical transmission and distribution systems, and mobile sources (worker vehicles and delivery vehicles). However, the GHG emissions from nuclear power plants are typically very minor because such plants do not normally combust fossil fuels to generate electricity.

[and yet, GHG emissions associated with nuclear power are quite significant. U fuel chain. Forever waste management. Radioactive Carbon-14 generated by reactors, one of the most biologically hazardous of all artificial radioactive isotopes with a 5,500 year half-life, which means 55,000 to 110,000 years of hazardous persistence.

What about the impacts of CFC-114 generated at Paducah and Portsmouth U enrichment facilities, two of the largest industrial sources in the world. An ozone layer destroyer. A very potent GHG. Connected to nuclear power via U enrichment for nuclear fuel, including some of that used at PNP over the decades.

Also, 4,000 MW-e of dirty old coal, every kilowatt-hour going into U enrichment for several decades on end, at Paducah and Portsmouth - another significant contribution to GHG build up in the atmosphere, connected to nuclear power, including PNP. What about these cumulative impacts and effects? Nuclear power is not carbon-free.] (23-24-13 [Kamps, Kevin])

Response: *The commenter questioned the NRC staff's evaluation of GHG emissions associated with nuclear power, particularly those associated with the uranium fuel cycle. Section F.4 of the EA, the NRC staff evaluated GHG emissions related to the preparations for and the resumption of power operations and decommissioning at the Palisades site, as well as indirect GHG emissions from the uranium fuel cycle. The uranium fuel cycle emissions estimates are based on methodologies and factors presented in COL/ESP-ISG-026, Appendix A (NRC 2014-TN3768), and scaled to reflect current enrichment technologies, such as centrifuge enrichment, which have significantly lower GHG emissions compared to historical gaseous diffusion enrichment.*

Historical emissions associated with enrichment activities, including coal-fired power consumption at facilities such as Paducah Gaseous Diffusion Plant and Portsmouth Gaseous Diffusion Plant, are not within the scope of the EA's impact assessment, which focuses on impacts reasonably attributable to the proposed Federal actions under review. Similarly, long-term management of radioactive waste and associated radiological impacts, such as carbon-14 persistence, are addressed through separate NRC regulatory processes.

In Sections 3.3 and F.4 of the EA, the GHG emissions from the uranium fuel cycle are considered and were found to be NOT SIGNIFICANT.

With respect to the referenced material from Dr. Jacobson, it is primarily relevant to the construction of new nuclear reactors, which is not applicable to the reauthorization actions at Palisades.

Based on this analysis, no changes were made to the Palisades EA as a result of this comment.

K.5.9.6 Greenhouse Gas Emissions and Climate Change Response 6

Comments: (23-24-14) (23-25-1) (23-25-5)

Comment: During the resumption of operations, CO₂, and a small quantity of methane and N₂O will be emitted from natural gas boilers and diesel equipment as discussed for criteria pollutants. The applicant calculated these emissions for operations using standard emission factors like other pollutants (HDI 2024-TN10670: RAI-MET-6). The GHG emissions for workforce traffic during 40 years of operations have been provided for a 1,000 MW reactor in COL/ESP-ISG-026, Appendix A (NRC 2014-TN3768). ***These estimates were scaled down for 7 years of operation and 800 MWe power output. Similarly, these emissions were scaled down for the projected 18-month preparations duration. [emphasis added]***

[Compare Dr. Jacobson's opportunity costs analysis - also, it's not 2025 to 2031; it's clearly planned to be 2025 to 2051, and perhaps even longer if and when they go for a 100-year license; they also neglect the SMR new builds, yet again. The zombie reactor restart could also take significantly longer than 18 months. In fact, it already has. PNP shut down for good on May 20, 2022, nearly 3 years ago already, and still counting. The steam generator tube degradation risk alone demands steam generator replacement, not BAND-AID fixes. The 20-years overdue steam generators' replacement is now even more alarmingly needed than ever, and would take a couple years or more to do. To the best of our knowledge, that process has not even begun, such as the decision to replace the steam generators, and the \$510 million order to do so - Holtec's estimated price tag in its 7/5/22 bailout application to DOE.] (23-24-14 [Kamps, Kevin])

Comment: impacts of GHG emissions on climate change from continued operations and refurbishment during the initial LR and SLR terms and any refurbishment activities would be SMALL.

The indirect GHG emissions from uranium fuel cycle is also provided in COL/ESP-ISG-026 Appendix A that accounts for fossil fuel combustion for centrifuge enrichment and process heat. These emissions were also scaled down for 7 years of operations and 800 MWe for the Palisades unit.

[Not 2031, but 2051, and likely beyond, as with a 100-year license extension application. This is foreseeable under NEPA in terms of Cumulative Effects. What about SMRs, that would operate from 40 to 100 years into the future? What about cumulative impact of Portsmouth and Paducah's past effects? What about GHG emissions associated with imports of HEU from Russia, as well as U imports from Canada, Australia, etc.?] (23-25-1 [Kamps, Kevin])

Comment: Table F-2 Nuclear Power Plant Life-Cycle Greenhouse Gas Emissions Estimates for Preparation Activities at Palisades Nuclear Plant (18 months), Operations (7 years) and Decommissioning

[compare to Jacobson] (23-25-5 [Kamps, Kevin])

Response: *The commenter is questioning the NRC staff's GHG analysis, specifically, the timeframe used in the GHG analysis and cumulative effects from SMRs and operations of the plant for 40 to 100 years. The NRC acknowledges the incorporation of Dr. Jacobson's declarations by reference in the commenter's document. With respect to the referenced material from Dr. Jacobson, it is primarily relevant to the construction of new nuclear reactors, which is not applicable to the reauthorization actions at Palisades.*

As discussed in Section F.4 of the EA, the NRC staff evaluated direct and indirect GHG emissions associated with the preparation for and the resumption of power operations and decommissioning activities at Palisades using best available data sources and standard

methodologies, including guidance from COL/ESP-ISG-026 (NRC 2014-TN3768). Emissions were estimated using standard emission factors for stationary sources and workforce traffic and were appropriately scaled based on 7 years of operation at 800 MWe capacity. The scaling methodology follows practices presented in COL/ESP-ISG-026, Appendix A, and the EA conservatively includes both onsite and upstream uranium fuel cycle emissions.

Potential future projects at the Palisades site (subsequent license renewal and SMR 300s) are captured in the NRC's cumulative effects review. The potential subsequent license renewal and SMR projects are new and separate actions and would be independently evaluated under NEPA.

No changes were made to the Palisades EA as a result of these comments.

K.5.9.7 Greenhouse Gas Emissions and Climate Change Response 7

Comments: (23-24-15) (23-24-16)

Comment: The NRC staff estimated the life-cycle greenhouse gas (GHG) emissions of various activities associated with the preparations for resumption of power operations, resumption of power operations, and return to decommissioning for Palisades. The GHG emission estimates include direct emissions from the nuclear facility and indirect emissions from workforce and fuel transportation, decommissioning, and the uranium fuel cycle. The NRC staff estimated these emissions for the Palisades site using best available data from various sources.

[Has NRC ignored Dr. Jacobson's declarations, even though he is our environmental coalition's expert in this very ASLB proceeding? How does NRC's analyses compare to Jacobson's which they seem to have ignored? Dr. Jacobson's declarations have been incorporated by reference as if fully rewritten herein, so NRC should not ignore them any longer. Neither should DOE. To analyze Dr. Jacobson's declarations sufficiently, an EIS/PEIS is required.] (23-24-15 [Kamps, Kevin])

Comment: While the NRC staff does not have specific information for Palisades, NRC staff conservatively estimates that these gases are present in the transmission systems at Palisades as these gases are commonly used in transmission systems. However, even if present, they would not be significant contributors to total GHGs for Palisades. This is based on the NRC's analysis presented in Section 4.12.1 of the LR GEIS that shows that the quantified GHG emissions from nuclear power plant operations, when compared to annual State-level GHG emissions, or annual county-level GHG emissions, **or replacement power alternatives, are orders of magnitude lower across all nuclear power plant sites presented in Table 3.12-2.** Additionally, the 2024 LR GEIS found that the environmental impacts would be the same or similar at all nuclear plant sites, and that the **[emphasis added]**

[False. See Dr. Jacobson's declarations.] (23-24-16 [Kamps, Kevin])

Response: The commenter questioned if the NRC compared its analysis to Dr. Jacobson's analysis. The NRC acknowledges that the comment incorporates Dr. Jacobson's declarations by reference in the commenter's document. As discussed in Appendix F of the EA, the NRC staff evaluated GHG emissions and climate change impacts associated with the proposed Federal actions based on best available scientific sources, including U.S. Global Change Research Program reports, DOE guidance, and peer-reviewed technical resources. The life-cycle GHG emissions estimates include direct emissions from site activities and indirect

emissions from workforce transportation, fuel transportation, decommissioning activities, and the uranium fuel cycle. Although site-specific data regarding fluorinated gas (e.g., sulfur hexafluoride) use in Palisades' electrical transmission systems were not available, the EA conservatively assumed the presence of such gases, consistent with standard practices for nuclear power plants.

The EA's conclusion of "NOT SIGNIFICANT" related to GHG emissions from Palisades operations is supported by the findings of the 2024 LR GEIS (NRC 2024-TN10161), which demonstrates that operational GHG emissions from nuclear power plants are orders of magnitude lower than state-level, county-level, and replacement power alternative emissions.

With respect to the referenced material from Dr. Jacobson, it is primarily relevant to construction of new nuclear reactors, which is not applicable to the reauthorization actions at Palisades. The NRC staff's evaluation remains based on best available scientific sources and regulatory guidance. Based on the analysis presented in the EA, the potential GHG impacts from the proposed Federal actions are not significant, and no changes to the EA are warranted based on this comment. No changes were made to the Palisades EA as a result of these comments.

K.5.9.8 Greenhouse Gas Emissions and Climate Change Response 8

Comment: (23-25-4)

Comment: Table F-2 below provides the emissions estimates for each of these activities. The estimated emissions of the proposed actions are 1,444,739 MT CO₂(eq)-this includes emissions from preparation activities and resumption of operations. The total life-cycle emissions (which also include decommissioning) were estimated to be about 1,474,000 MT CO₂(eq).

[well that's a LOT!] (23-25-4 [Kamps, Kevin])

Response: *The commenter questioned the significance of value of the estimated GHG emissions. As discussed in Appendix F of the EA and Section 4.12.1 of the 2024 LR GEIS (NRC 2024-TN10161), the significance of GHG emissions is determined relative to appropriate benchmarks, such as State-level, 75,973,001 tons for Michigan annual GHG emissions, or emissions associated with replacement power generation alternatives (NRC 2024-TN10161: Table 3.12-1). In the EA Section 3.3 the NRC staff concluded that the environmental impacts from air emissions including GHG emissions are not significant. No changes were made to the Palisades EA as a result of this comment.*

K.5.10 Comments Concerning Historic and Cultural Resources

K.5.10.1 Historic and Cultural Resources Response 1

Comments: (23-8-11) (23-10-6) (23-14-6) (23-14-7) (23-14-9) (23-14-11) (23-20-2) (23-24-8) (23-27-12)

Comment: a new spent fuel pad

[What about Indigenous Nations' burial sites and other sacred cultural sites at PNP? What about that pledge to be careful and stop work that Consumers Energy and NRC made in 2006-7, in response to our coalition's warnings, in our 2006 comments on the SEIS draft mentioned

above? Indigenous Nations are supposed to trust Holtec to STOP WORK if burials or other sacred cultural sites are encountered during construction activities? What about Holtec's infamous record of dishonesty, for example, lying under oath on New Jersey tax break application forms, not once but twice. The AG of NJ fined Holtec \$5 million for one of those lies, and has appealed to the Supreme Court of NJ, in an attempt to claw back another \$260 million of tax breaks Holtec has enjoyed, based on a second lie. Holtec cannot and should not be trusted to STOP WORK if and when it encounters culturally significant Indigenous Nations sites at PNP during construction activities. (23-8-11 [Kamps, Kevin])

Comment: No mention - here anyways - re: Indigenous burials and other sacred, culturally significant sites. Will Holtec abide by what meager assurances Entergy and NRC gave in 2006 re: their supposed commitments to safeguard Indigenous sacred sites?

Talk is cheap. Are these safeguards worth the paper they are written on? Who is going hold Holtec and NRC's feet to the fire on all this? (23-10-6 [Kamps, Kevin])

Comment: a built-environment survey of the Palisades facilities conducted by an architectural historian.

[But should not the entire PNP be declared a National Historic Site - it was designed in the mid-1960s; constructed from 1967-1971; and began operating in 1971. It is 60 years old. It could be a monument to the folly of man, per the following song lyrics:

Godzilla

Song by Blue Oyster Cult - 1977 (23-14-6 [Kamps, Kevin])

Comment: Historic properties are defined as cultural resources which are eligible or listed on the National Register of Historic Places (NRHP) (NPS 2024-TN10772).

[The whole PNP site qualifies, per above. It is 1/4th as old as our country!] (23-14-7 [Kamps, Kevin])

Comment: Section 3.1 of this EA describes the activities Holtec is completing as part of the preparations for the resumption of power operations. Several of these activities have expected ground disturbance in and around the Palisades site. These ground-disturbing activities include the construction of a new access road, removal and construction of a new security fence, are-cabling project between the reactor facility and the cooling towers, demolition of two current radioactive storage facilities, and construction of a new radioactive waste storage facility and a new digital storage facility (see Table 3-1 of this EA). These activities, as shown in figure 3-1 of this EA, are all occurring within the western portion of the Palisades site, with the only exception being the construction of the digital storage facility.

[Potential harm to Indigenous sites]

The western portion of Palisades was considerably modified through ground disturbance, sand dune remediation, and shoreline modification during the original construction of Palisades in the late-1960s and early 1970s (Appendix I to this EA) (SEARCH 2024-TN10846). Although no archaeological survey (e.g., shovel testing) occurred in the critical dune environment within the western portion of Palisades, if future ground-disturbing activities occur within this area, then a Michigan State critical dune permit would be required.

[Remediation? Damage or destruction!]

Any Indigenous sites in that area were destroyed way back then, when no one involved really cared. Does Nobody Really Care (NRC), about the Destruction of Everthing (DOE) in 2025, as well?] (23-14-9 [Kamps, Kevin])

Comment: In 2006, the previous Palisades operator (Entergy) had existing historic and cultural resources procedures (NMC 2006-TN10743), which provided a screening tool and mechanism to protect archaeological sites and other resources that may be inadvertently encountered during day-to-day operations (NRC 2006-TN7346).

[Not true - Entergy didn't take over PNP till 2007.] (23-14-11 [Kamps, Kevin])

Comment: Historic and Cultural Resources

Historic properties under the NHPA do not occur within the APE, and thus there will be no historic properties affected as part of the preparations for resumption of power operations, and the resumption of operations. Additionally, no historic and cultural resources have been identified within the APE. Ground disturbance will occur in areas of previous ground disturbance, and Palisades-specific procedures provide a control to monitor and protect cultural resources, if encountered on Palisades site during the resumption of power operations (and for activities occurring as part of the preparations for resumption of power operations).

[What utter disregard for the Indigenous burials, and other culturally significant Indigenous sites that are very likely on the PNP site. Talk is cheap. Holtec, and NRC, lie. How can their word be trusted re: protecting Indigenous sites, if encounted, if they don't even bother to look for them very carefully, if at all, pre-restart? And then there is SMR construction. That will disturb the ground like nothing seen at that site since 1967-1971, the construction of the now would-be zombie. Of course, the radioactive contamination of the site is another LARGE impact, that NRC ignores. We quoted Upton Sinclair earlier as to why NRC, DOE, various State of MI agencies, etc., would allow such disregard for sacred Indigenous sites at PNP.]

We incorporate by reference, as if fully rewritten herein, a submission by NIRS and IEN in 2006, regarding this same subject matter:

<http://beyondnuclear.org/wp-content/uploads/2025/03/2006-NIRS-IEN-ML061570022.pdf> (23-20-2 [Kamps, Kevin])

Comment: Historic and Cultural

While rising temperatures and increased runoff during spring and winter could potentially expose additional historical and cultural resources at the Palisades site, no impacts from climatological changes are expected on currently identified resources. There are no historic properties or other historic and cultural resources identified within the area of potential effects. Therefore, the NRC staff expects that climate change would not alter conclusions made in this EA.

[If increased runoff due to climate change were to expose burials, or buried culturally significant Indigenous Nations' sites, this would be a MAJOR impact on those Indigenous sacred sites. Again, how can NRC and DOE downplay this to the point of insignificance? NEPA requires a ard look, not a flippant FONSI, not hardly a look] (23-24-8 [Kamps, Kevin])

Comment: [and how about that state park? And PPCC? These are all historic sites, worthy of protection. PNP could take them all out.]
[no mention of this in this EA. Why not? b/c it hasn't happened? In order to protect PNP? To grease the skids for it?] (23-27-12 [Kamps, Kevin])

Response: *The commenter expressed concern that there were/are: (1) unidentified archaeological sites impacted during the construction of Palisades, (2) currently unidentified archaeological sites that may be inadvertently discovered and impacted during operations activities at Palisades, (3) unidentified archaeological sites that could be impacted by future SMR construction, (4) unidentified archaeological sites that may be discovered as a result of climate change, (5) that the Palisades should be declared a national historic site, and (6) that the comments submitted in 2006 on the initial license renewal of Palisades need to be reconsidered. The commenter also expressed a related concern regarding the adequacy of Holtec's operating procedures as they relate to historic and cultural resources protection.*

As described in Section 3.8 and Appendix I of the EA, recent archaeological and built-environment surveys were conducted within the area of potential effects. No historic properties or historic and cultural resources were identified. The archaeological survey, along with Holtec's cultural resource procedures, were shared with the consulting parties for review and comment. The Michigan State Historic Preservation Officer concurred with a determination of "no historic properties affected" as there are no historic properties (as defined in 36 CFR Part 800 [TN513]) identified for this undertaking. This includes a lack of eligible or potentially eligible historic structures within the built environment, including the Palisades plant itself. This archaeological determination was also supported by Holtec's cultural resource procedures which stipulate the processes and controls for stopping work and notifying the NRC, the Michigan State Historic Preservation Office, and Indian Tribes, if inadvertent discoveries of artifacts or human remains occur.

The NRC staff reviewed comments incorporated by reference (which were submitted on the initial license renewal dated May 18, 2006, and addressed in the 2006 SEIS, see NRC 2006-TN7346, pages A-82 through A-89). The NRC staff determined that there was new or significant information that would change the determinations reached in the EA. No changes were made to the Palisades EA as a result of these comments or the referenced information.

K.5.10.2 Historic and Cultural Resources Response 2

Comments: (23-12-16) (23-21-10) (23-21-13) (23-23-4) (23-23-5) (23-23-6) (23-23-13) (23-27-5) (23-27-6) (23-27-7) (23-27-8)

Comment: And shouldn't the federal government be more than flippantly dismissive to the point of ignoring them completely, as appears to be the case in this NRC and DOE EA, about Indigenous treaty rights, such as to fisheries?! Treaties the highest law of the land, equal in stature to the constitution itself. And yet NRC and DOE disregard the dire condition of various Lake Michigan and Great Lakes fisheries. How is this not a violation of treaty rights, above and below? Not only individual U.S. citizens, but also certainly federal agencies like NRC and DOE, are duty bound to honor treaties with Indigenous Nations, including fishing rights, which of course begin with fisheries being protected against such impacts and risks as those coming from PNP. (23-12-16 [Kamps, Kevin])

Comment: Aren't there additional relevant Indigenous Nations that are missing from the listing above?

What about many and various bands of the Sauk (also known as the Asakiwaki) and Fox, as but one example? After all, Grace Thorpe of the Sauk and Fox of Oklahoma devoted decades of her life, helping her traditional friends and environmental colleagues in dozens of Indigenous Nations across Turtle Island in blocking nuke waste dumps that DOE, and NRC, were trying to shove down their throats, against their will and without their consent, an Environmental Justice violation. We incorporate by reference as if fully rewritten herein the following:

<https://archive.beyondnuclear.org/radioactive-waste-whatsnew/2018/2/14/president-obamahonored-grace-thorpe-re-her-resistance-to-nu.html>

<http://archives.nirs.us/radwaste/scullvalley/skullvalley.htm> (23-21-10 [Kamps, Kevin])

Comment: Why are numerous other relevant Indigenous Nations also excluded from NRC's and DOE's EA list above? What about the Mascouten (also known as the Mascoutin, Mathkoutench, Muscoden, and Musketoan)? What about the Kiash Matchitiwuk (aka the Menominee)? The Meshkwahkiha (Meshkwaki)? What about additional bands of the Myaamiaki (Miami) not listed above? What about the Waayaahatanwaki (Wea)? The Peeyankihsiki (Piankashaw)? What about the Kiikaapoi (Kickapoo)? What about the Huron? These are all Indigenous Nations with connections to southwest Michigan, or further downwind and downstream in the Great Lakes region and the Great Lakes State, that have been excluded by DOE and NRC, according to the list provided in the EA above. Thus, the EA should be withdrawn, and replaced with a EIS/PEIS, including all these, and any other Indigenous Nations with connections to s.w. MI, and all points downwind and downstream in the Great Lakes region that could be impacted by the PNP restart and SMR new builds, thus far neglected. In the PEIS, all Indigenous Nations with an interest in all of the proposed zombie reactor restart schemes across the US must be included.

What about "Canadian" tribes? Since many Indigenous Nations straddle the US/Canadian border, and are sovereign Indigenous Nations, why doesn't NRC have to notify them, too? What about the Western Shoshone, who could well be targeted again by NRC and DOE for the US HLRW dump long targeted at Yucca Mountain? What about the Skull Valley Goshutes? After all, PFS, LLC's CISF is still on the books at NRC as an approved license. PFS's license has never been terminated, even though NRC falsely reported it had been, in the ISP and Holtec CISF NEPA document executive summaries included in the related public comment proceedings of recent years. This remains the case, even though multiple commenters, including Don Hancock of SRIC, and Kevin Kamps of Beyond Nuclear, and others, called NRC's attention to this mistake in the NRC documents.

All the tribes impacted by the DOE's Orwellian "Consent-Based Siting" CISFs initiative should also be included in the EIS/PEIS for the PNP restart and SMR new builds schemes. After all, they could well end up "hosting" PNP's already vast, and perhaps growing quantity, of irradiated nuclear fuel - not on an "interim" basis, but forevermore. NRC should be fully aware of all of this, since they are central to licensing all these dumps. As has been asked before, given NRC's violation of EJ in approving licenses for highly radioactive waste dumps targeting Indigenous Nations communities, does NRC stand for Nuclear RACISM Commission?! Likewise, does DOE stand for Department of Environmental Injustice?! (23-21-13 [Kamps, Kevin])

Comment: P.156/242 ON PDF COUNTER (D-2)

Grand River Bands of Ottawa Indians

[Compare this mention of Grand River Bands of Ottawa Indians to the following in the EA:

P.131/242 ON PDF COUNTER (page 6-17)

NRC (U.S. Nuclear Regulatory Commission). 2024. Letter from T. Smith, Acting Deputy Director, Division of Rulemaking, Environmental, and financial Support, Office of Nuclear Material Safety and Safeguards, to R. Blanchard, Tribal Chairman, Bad River Band of the Lake Superior Tribe of Chippewa Indians (Wisconsin); W. Gravelle, President, Bay Mills Indian Community; C.J. Chavers, Tribal Chairwoman, Bois Forte Band (Nett Lake) of the Minnesota Chippewa Tribe; H. Baker; Chairman, Chippewa Cree Indians of the Rocky Boy's Reservation of Montana; J. Barrett, Chairman, Citizen Potawatomi Nation; J.A. Crawford, Chairman, Forest County Potawatomi Community; R. Deschampe, Chairman, Grand Portage Band of Lake Superior Chippewa; S. Witherspoon, Chairwoman, Grand Traverse Band; K. Meshigaud, Chairperson, Hannahville Indian Community; L.D. Taylor, Chairman, Lac Courte Oreilles Band of Lake Superior Chippewa; J.D. Johnson, Sr., President, Lac du flambeau Band of Lake Superior Chippewa Indians; J. Williams Jr., Chairman, Lac Vieux Desert Band of Lake Superior Chippewa Indians; F. Jackson, Sr., Chairperson, Leech Lake Band of Ojibwe; L. Romanelli, Ogema Little River Band of Ottawa Indians; R. Gasco, Chairperson, Little Traverse Bay Bands of Odawa Indians; B. Peters, Tribal Chairman, Match-e-be-nash-she-wish Band of Pottawatomi Indians; G. Kakkak, Chairwoman, Menominee Indian Tribe of Wisconsin; D.G. Lankford, Chief, Miami Tribe of Oklahoma; M. Benjamin, Chairperson, Mille Lacs Band of Ojibwe; D. Rios, Chairperson, Nottawaseppi Huron Band of the Potawatomi; K. Dixon, Chief, Ottawa Tribe of Oklahoma; M.J. Wesaw, Chairman, Pokagon Band of Potawatomi Indians; J. Rupnick, Chairman, Prairie Band Potawatomi Nation; G. Johnson, President, Prairie Island Indian Community; J.D. Joaquin, President, Quechan Tribe of the Fort Yuma Indian Reservation(California and Arizona); N. Boyd, Chairperson, Red Cliff Band of Lake Superior Chippewa Indians (Wisconsin); D.S. Sr., Chairperson, Red Lake Band of Chippewa Indians (Minnesota); T. Davis, Chief, Saginaw Chippewa Indian Tribe of Michigan; T. Fowler, Chairperson, Saint Croix Chippewa Indians of Wisconsin; A. Lowes, Chairperson, Sault Ste. Marie Tribe of Chippewa Indians; J. Azure, Chairperson Turtle Mountain Band of Chippewa Indians (North Dakota); and M. Fairbanks, Chairperson, White Earth Band of Minnesota Chippewa Tribe; dated November 4, 2024, regarding "Area of Potential Effects Notification and Continuing Section 106Consultation for the Environmental Review of Holtec Decommissioning International, LLC's Licensing and Regulatory Requests for Reauthorization of Power Operations at Palisades Nuclear Plant (EPID Number: L-2024-LNE-0003) (Docket Number: 50-255)." Washington, D.C.ADAMS Accession Package No. ML24292A044. TN10840.

They are not mentioned there. But they are metioned here, and later. These inconsistencies appear to just be in error, and have created unnecessary confusion. Another example of sloppy, imprecise work in this EA, about a most serious topic - government to government consultation with sovereign Indigenous Nations, with whom the US has entered into treaty relationships, the highest law of the land, equal in stature to the U.S. Constitution itself. NRC and DOE should withdraw this sloppy EA, and undertake a full EIS/PEIS, and not make such sloppy errors in it.]

P.157/242 ON PDF COUNTER (page D-3)

Prairie Band Potawatomi Nation

[Similarly here, it appears that Prairie Island was also mentioned above? But not here?

Inconsistency, sloppy, confusing. Serious errors that deserve correction in an EIS/PEIS.]
(23-23-4 [Kamps, Kevin])

Comment: Quechan Tribe of the Fort Yuma Indian Reservation

[Why are they listed? No specifics are given in the EA as to why certain Indigenous Nations are included - even one in the far Southwest - while others with clearer connections to s.w. MI are not included at all.]] (23-23-5 [Kamps, Kevin])

Comment: Table D-1 List of Agencies, Organizations, Indian Tribes, and Persons Contacted by NRC during the Environmental Review of the Draft Palisades Nuclear Plant Environmental Assessment

P.155/242 ON PDF COUNTER (page D-1), and following

[Compare to list above, especially re: Indigenous Nations. Consistency should be maintained throughout. All Indigenous Nations with connection to PNP site, and region that could be impacted by restart and SMR new builds - a very large region, should be included, as we commented above.] (23-23-6 [Kamps, Kevin])

Comment: Letter initiating the scoping process to prepare an environmental assessment to the Prairie Island Indian Community
ML24183A151

[it's mentioned here. It's mentioned above. But skipped in the section in between, as I noted not far above. More inconsistencies, sloppiness, confusion.] (23-23-13 [Kamps, Kevin])

Comment: I.1 National Historic Preservation Act Section 106 Consultation The National Historic Preservation Act of 1966, as amended (NHPA) (TN4157), requires Federal agencies to consider the effects of their undertakings on historic properties and consult with applicable Federal, State, Tribal, local groups or agencies, individuals, and organizations with demonstrated interest in the undertaking before taking the action.

[that's us! That's me!]

["protection of historic properties" - PNP, as monument to man's folly - quote Blue Oyster Cult Godzilla song]

12 federally recognized Indian Tribes.

[many more than that this go round yeah?]

35 federally recognized Indian Tribes

[yes indeed] (23-27-5 [Kamps, Kevin])

Comment: The NRC initiated consultation with the Advisory Council on Historic Preservation, Michigan State Historic Preservation Office (Michigan SHPO), and 35 federally recognized Indian Tribes via a letter dated July 1, 2024, with the Michigan SHPO, the ACHP and 35 federally recognized Indian Tribes. All consultation letters are presented in Appendix E to this environmental assessment (EA), with individual contacts presented in Appendix D to this EA. [a long and poorly written sentence] (23-27-6 [Kamps, Kevin])

Comment: The NRC sent a summary of the in-person site visit and information session with all federally recognized Indian Tribes on October 9, 2024.

[many hundreds, or just the 35?] (23-27-7 [Kamps, Kevin])

Comment: By emails dated September 18, 2024, and October 2, 2024 (NRC 2024-TN10879), the NRC sent Holtec's archaeological survey report (SEARCH 2024-TN10846) to federally recognized Tribes for review and comment. To date, no comments regarding the archaeological report have been received. On November 4, 2024 (NRC 2024-TN10879), Holtec sent its historic and cultural resource procedures to address inadvertent discoveries and notification protocols to federally recognized Indian Tribes. To date, no comments have been received.

[we helped win this victory. Larry guided us to.]

All consultation letters are presented in Appendix E to this environmental assessment (EA), with individual contacts presented in Appendix D to this EA.

[they may have been cited; they were not presented; we'd have to chase them down via the ML#, if ADAMS worked that day, it often doesn't]

On November 6, 2024, Michigan SHPO determined that the containment building could not be considered separately from the remaining parts of the Palisades facility and did not rise to the level of significance required for listing in the NRHP under Criteria C for

Architecture/Engineering (MI SHPO 2024-TN10844).

[ah c'mon! It IS of historic significance - as a monument to the folly of man! Quote Godzilla song; cite the English translation of the novel - incorporate by reference, as if fully written herein] (23-27-8 [Kamps, Kevin])

Response: *The commenter expressed concern regarding the adequacy of the NRC staff's consultation with Federally recognized Indian Tribes, recognition of Treaty Rights, and the presentation of consultation information within the Palisades EA. Section 101(d)(6)(B) of the National Historic Preservation Act of 1966, as amended (NHPA), and the regulations in 36 CFR Part 800, specifically, 36 CFR 800.2(c)(2)(ii), provide that Federal agencies must consult with any Federally recognized Indian Tribe that attaches religious and cultural significance to historic properties that may be affected by an undertaking (i.e., the proposed reauthorization of power operations at Palisades). With the SHPO's concurrence, the NRC and DOE LPO consulted with 35 federally recognized Indian Tribes with cultural affiliation to the region. Additionally, in accordance Policy Principle 6 of the NRC's Tribal Policy Statement (82 FR 2402-TN5500), the NRC staff notified State recognized Tribes of the environmental review. The commenters recommended that the NRC consult with additional Indian Tribes, but these Tribes were not identified as having ancestral ties to the project area.*

The NRC is not required to provide any specific consult with Canadian First Nations, because they are not Federally recognized Tribes in the United States. The NHPA applies only to federally recognized Tribes and because, per 10 CFR 51.1, the NRC's NEPA regulations "do not apply to...any environmental effects which NRC's domestic licensing and related regulatory functions may have upon the environment of foreign nations."

Government-to-government communications between the NRC, DOE LPO, and federally recognized Indian Tribes are protected and are considered confidential. Prior to placing any Tribal communication within the public domain, the NRC and DOE LPO must secure permission from the consulting Tribe. A summary of those consultations, and a list of government-to-government consultation and communication, is provided in Section 3.8.1.4 and Appendix D and Appendix E of the EA. A cultural history of the Palisades Nuclear Plant site is provided in EA Section 3.8.1.2. Inconsistencies identified by one of the commenters have been addressed in the EA.

Regarding comments that state that Palisades is of historic significance, results from the architectural survey recommended that only the containment building was potentially eligible for listing on National Register of Historic Places (NRHP), but after further evaluation and

consultation, the Michigan SHPO determined that the containment building cannot be considered separately from the remaining parts of the Palisades facility and does not rise to the level of significance required for listing in the NRHP under Criteria C for Architecture/Engineering by letter dated November 6, 2024 (MI SHPO 2024-TN10844). As noted in Section 3.8.2 and Section 3.8.3 of the EA, the Michigan SHPO concurred with the NRC's determination of "no historic properties affected" as there are no historic properties (i.e., archaeological or architectural as defined by 36 CFR Part 800 [TN513]) identified for this undertaking. This includes a lack of eligible or potentially eligible historic structures within the built environment, including the Palisades plant itself. No changes were made to the Palisades EA as a result of these comments or the referenced information.

K.5.11 Comments Concerning Human Health-Nonradiological

Comment: (23-17-12)

Comment: As described in detail in the 2024 LR GEIS (NRC 2024-TN10161), noise is an unwanted or unwelcome sound generated by various sources. According to Holtec's N&S Report, the nearest residence is approximately 0.5 mi (0.8 km) to the southwest of the Palisades site (Holtec 2023-TN10538). Noise measurements for the Palisades site are unavailable; however, the cooling towers that were replaced in 2012 and 2017 produce a maximum sound of 90 A-weighted decibel at 3 ft (0.9 m) when operational. **As the Palisades site is surrounded by sand dunes and vegetation and most equipment is inside the buildings, noise generation at Palisades is mitigated (NRC 2006-TN7346). [Emphasis added.]**

[PPCC residents have reported otherwise. Pressurized steam jet release roars, sirens, and/or alarms, etc., can make prolonged blaring noise at PNP, which are very audible at the PPCC, immediately south. This DOE and NRC statement above is such a whitewash. It so down plays the lived experience of PPCC residents. (23-17-12 [Kamps, Kevin])

Response: Noise levels are expected be comparable to those experienced during operation prior to decommissioning. The NRC acknowledges that there may be noises that could be heard offsite. However, the noise from the sources (pressurized steam jet release roars, sirens, and/or alarms, etc.) would be intermittent as comparable those of police vehicles and fire trucks which are only exercised for short time intervals to alert the public which would not be sufficient to cause hearing loss. In addition, the 2006 SEIS (NRC 2006-TN7346) refers to the conclusion made in the LR GEIS that noise has not been found to be a problem at operating plants. During the NEPA review for license renewal, NRC staff did not identify any new and significant information and concluded that "there would be no impacts of noise during the renewal term beyond those discussed in the GEIS." No changes were made to the Palisades EA as a result of this comment.

K.5.12 Comments Concerning Human Health-Radiological

K.5.12.1 Human Health-Radiological Response 1

Comments: (6-2) (10-16) (23-16-16) (23-17-3) (23-17-5) (23-26-13) (23-26-14) (23-26-15) (23-27-1) (23-27-4)

Comment: On July 11, 2024, I attended an NRC public meeting on the Palisades Repowering when the environmental review process was discussed in advance. During that meeting several

members of the Palisades Country Club neighborhood, located on the plant's southern boundary, claimed a cluster of thyroid diseases in their neighborhood had developed among their population, and then asked the NRC to conduct a study to determine if the cause might be the nuclear plant. I recall NRC officials had requested any supporting data from the neighborhood representatives, but none seems to have been published. NRC officials also explained the request was beyond the role of the NRC to evaluate a connection between the plant and thyroid diagnosis, and that the group needed to contact the State of Michigan, Department of Health, which Holtec would have cooperated with. I have not been successful in finding any data in public databases or news that supports the neighborhood's claim of elevated thyroid disease, and there does not appear to be any study planned or being conducted by the Michigan Department of Health related to this issue. NRC Officials also explained that tritium levels (a suspected carcinogen at high doses) emitted from the plant have never been detected at unsafe levels in any of the wells surrounding the plant. There has also never been an unsafe level of atmospheric radiation outside of the plant in its 54 years of operation.

I used a portion of my in person public comment on July 11th., 2024, to offer sympathy to the Palisades neighbors, but shared why I thought it was highly unlikely the plant was the cause of any elevation of thyroid disease in their community. If the neighborhood has not offered health officials a valid data set to back up their diagnostic claims, and the State of Michigan Department of Health has not been contacted or does not find merit in the concern, then there is no need for a full Environmental Impact Statement (EIS) as a result of this alleged issue. I mention the thyroid disease narrative put forth by Palisades Park Country Club neighborhood members because a lot of media attention and anecdotal articles have been published about it. Anti nuclear groups like Beyond Nuclear, The Sierra Club, and others have attempted to make broad claims of nuclear plants causing thyroid cancer, but none of the claims are tied to any peer reviewed medical studies.

(6-2 [Connors, Shawn])

Comment: The cumulative environmental and health consequences of additional decades of radionuclide emissions into the environment. This must include consideration of the current science, not just reference to outdated studies and regulations.

Impact analysis must incorporate the reality that the impacts of radioactive emissions are cumulative and affirm that impacts from additional releases from Palisades will be additive to all those released previously.

The NRC must consult with medical experts independent of the nuclear industry and acknowledge and incorporate the science pointing to the risks posed to those most susceptible to radiation and harmful chemicals, including women, adolescents, children, babies, breast-fed infants, the embryo/fetus, and persons exposed to radiation and chemicals from other sources such as medical diagnostic and treatment procedures. (Makhijani 2006; Mothersill 2014; Nichols 2024)

A central principle of environmental protection must be to protect those most at risk, but that principle is disregarded with respect to emissions, effluents, and waste products from the nuclear fuel cycle.

The EIS should explicitly state that the US radiological protection regime does not consider noncancer illnesses, early failed pregnancies, or developmental disorders.

Given the history of unplanned leaks, given that many have gone on for years before discovery, and given the fact acknowledged by the NRC that corrosion of buried pipes is likely to lead to more radioactive leaks in the future, any assessment must acknowledge and address these additional exposure risks to the public. Tritium leaks and tritium emitted into the air (for example through venting) must be given serious attention as newly emerging evidence indicates the isotope to be a far more pernicious pollutant than previously believed.

Additional radioactive exposures to beta, alpha, and gamma rays from a variety of types of additionally generated radioactive waste will also be incurred by members of the public through transportation activities. EIS should note that such exposures may be significant at an individual and population level, especially to those residing or working along road and rail routes.

Evaluation of the impacts of decades more of radioactive emissions must also include acknowledgement that nuclear power is neither a "zero-emission" nor a "carbon-free" industrial activity. Indeed, even during power generation, nuclear produces carbon-14, a radioactive form of carbon which will persist for some 5,700 years. Tritium is now recognized to be far more harmful than previously understood. (10-16 [Lee, Michel])

Comment: NRC has "bag limits," so to speak - how many people it allows itself to kill or injure, with radioactivity from nuclear power plants like PNP, and still call it "reasonable assurance of adequate protection of health and safety," the legal standard under the Atomic Energy Act of 1954, as Amended. These bag limits are referred to as QHOs. Does this translate as Quantitative, and/or Qualitative, Health Objectives. Jennifer Uhle, an NRC staffer from an agency technical and research branch, spoke about QHOs to the NRC Commissioners once, around 2014 or so. One QHO is for disasters, like reactor core meltdowns. Being "accidents," NRC reasoned that it would be reasonable to allow for a 1/10th of 1% increase in the number of accidental deaths in the U.S., as compared to all accidental deaths, from all accidental causes, that already occur in the country. This includes everything from car crashes, to falls in the shower, falls off ladders, and everything in between. But are reactor meltdowns "accidents"? Not really. They are calculated risks, gambles that go badly. Restarting PNP, and adding SMRs, is like playing radioactive Russian roulette on the Great Lakes shoreline. It could well end badly. NRC seems to think this is reasonable assurance of adequate protection. We do not feel adequately protected. We feel no such reasonable assurance. We find this all very unreasonable, and our protection very inadequate.

In terms of "routine" operations, NRC considers it reasonable to increase cancer rates in the US by 1/10th of 1%, due to the "routine" releases of radioactivity from operating atomic reactors, such as the restarted zombie reactor at PNP, as well as two SMR new builds. But it not reasonable, nor is it adequate protection, for there to have been dozens of thyroid cancers reported in Palisades Park Country Club alone, immediately adjacent to PNP on the south. There is a cancer epidemic in the US. PNP, and the entire nuclear power industry, contribute to this, with their emissions of hazardous radioactivity, and toxic chemicals, at each stage of the uranium fuel chain, including a restarted PNP zombie reactor, and two SMR new builds. Certain communities, such as PPCC, Covert Township, Benton Harbor, etc., bear a disproportionate burden, which is not reasonable, nor adequately protective. For the low income and/or people of color parts of these disproportionately impacted communities, that is also an EJ violation.

NRC and DOE are willfully blind to not see or acknowledge the unreasonableness and inadequacy of the protection, in regards to this EA's "not significant" conclusions across the board in this EA. It should be withdrawn, an EIS/PEIS undertaken in its place, and truthfulness made the guiding star, not "Lies, Damn Lies, and Statistics," and the unacceptable policy that

"bag limits" up to a certain number are acceptable, and this equates to reasonable assurance of adequate protection. We disagree with that ghoulish notion. (23-16-16 [Kamps, Kevin])

Comment: Based on its review of this data, the NRC staff did not identify any higher incident rates of cancer, specifically for thyroid cancer in the counties around Palisades. This information is discussed in further detail in Appendix H, "Discussion of Cancer Risks at and around Palisades Nuclear Plant." While Palisades did have enforcement actions applied during the time period reviewed (NRC 2024-TN10751), no enforcement actions were related to the radioactive emissions control systems described in Section 3.11.1.1 of this EA.

[So is NRC hiding the truth about PPCC behind county-wide numbers? Diluting the cancer rate across the whole county?

What about the fact that most PPCC residents are only there in the warm weather? Are their cancers recorded in their other county/state of residence, but not in Covert Township, and/or Van Buren County, and/or the State of MI? Such clever manipulations are ghoulish "Lies, Damn Lies, and Statistics," concealing the truth rather than revealing it. (23-17-3 [Kamps, Kevin])

Comment: PPCC reports from 20, up to 50, thyroid cancer cases. Are they lying? Why would they do such a thing? Do NRC and DOE deny that there have been up to 50 cases of thyroid cancer diagnosed in PPCC?

What about those whose cases never get diagnosed or recorded, such as local residents who lack health care coverage, and simply die eventually, undiagnosed and untreated? NRC and DOE acknowledged that low income rates in Covert likely have meant inadequate health care services, didn't they?

NRC's and MI DHHS's finding of no statistically significant rate of thyroid cancer at PPCC seems to be due to methodological flaws, incuriosity, and laziness. Would NRC and MI DHHS rather not find elevated thyroid cancer rates at PPCC, because this would be an inconvenient truth? There should not be a single thyroid cancer diagnosis at PPCC, given its small population size. But there have reportedly been up to 50. This is a shockingly high number. And NRC and MI DHHS seem to be behaving like such a shockingly high number is normal, to be expected. Thyroid cancer is an exceedingly rare disease, except in cases - like at Chornobyl, Fukushima Daiichi, and perhaps PNP - where large-scale releases of Iodine-131 have taken place. I-131 is highly radioactive because of its short 8-day half-life, and can do tremendous damage - including cause cancer - if inhaled, or ingested.

Many PPCC residents are only there on occasion, such as during the warm weather months. So what is the thyroid cancer rate in the African American and low income population of Covert Township - these residents live there year round.

Tellingly, there is evidence of high thyroid pathology rates in the local area around Big Rock Point as well, where large-scale I-131 releases took place and have been documented.

It seems NRC and MI DHHS have fallen down on their jobs, in terms of protecting human health against the harmful radioactive releases from PNP and Big Rock Point. So they conveniently deny this inconvenient truth of high thyroid cancer rates, as clearly are present in PPCC. (23-17-5 [Kamps, Kevin])

Comment: Total cancer rates and thyroid cancer rates were reviewed on these levels from 2006 (the year of publication of the license renewal) to the most recent data available. These statistics are shown in Table H-1 H-3 below and indicate that occurrences of cancer and thyroid cancer in the area surrounding Palisades do not vary from rates regionally.

[shouldn't NRC have gone back way earlier than 2006? If by 2006 - 35 years after Palisades fired up, and 31 years after Cook 1 & 2 fired up, to name but three reactors on Lake MI - cancer rates had already increased significantly, this would skew the analysis to make higher cancer rates, caused by nuclear power, look "normal" or "to be expected," as radiogenic cancer continued at the same high rates from 2006 to 2025. This seems methodologically flawed.

I wonder if the true extent of thyroid cancer and cancer in general at PPCC for one is hidden or masked by the cancers being recorded in the home county/state where the sufferers live for the rest of the year, while only living at PPCC (and contracting cancer due to radiation or toxic chemical releases from PNP) during the summer months?

Compare how childhood cancers in Morris, IL were hidden, on purpose, by the local pediatrician who also was a major real estate owner there - he didn't want his real estate values to decrease, so he intentionally concealed childhood cancers from the records. Also, the childhood cancer specialists were in Chicago, so sometimes the cancers got recorded in Chicago, not in Morris.

The same kinds of shenanigans were played in the USSR after Chornobyl, and in Japan after Fukushima.] (23-26-13 [Kamps, Kevin])

Comment: Table H-1 Age-Adjusted Incidence Rate of Thyroid Cancer Per 100,000 Individuals in a Population in Select Michigan Counties in Over 5 Years (CDC 2024-TN10845)

[Allegan County's thyroid cancer rate seems to have more than doubled from 2001 to 2020 - what explains that?

In Berrien County, it went up by 50% between 2001 and 2015 - what explains that?

Why is there no data in Cass County from 2001 to 2010, but then high rates from 2010 to 2020?

What explains the high rate in Kalamazoo County from 2006 to 2010?

For Van Buren County, again, are thyroid cancers in PPCC not even being counted as VB Co. thyroid cancer cases, because the sufferers' thyroid cancer are being recorded back in their home county, elsewhere in MI, or even in another state entirely, while the sufferers only spend the summer in PPCC?] (23-26-14 [Kamps, Kevin])

Comment: Although a number of studies of cancer incidence in the vicinity of nuclear power facilities have been conducted, there are no studies to date that definitively demonstrate a correlation between radiation dose from nuclear power facilities and cancer incidence in the general public.

[Oh really? How about the increased childhood leukemia in Germany? The still births and sterility at La Hague in France, and Sellafield in the UK? And how about around Chornobyl and Fukushima? How about around TMI per Steve Wing? This is a false and misleading statement by NRC.]

[Mention the canceled nuclear power-cancer causation study NRC cancelled, and the reasons why.]

The following is a listing of radiation health studies that the NRC recognizes:

-In 1990, at the request of Congress, the National Cancer Institute conducted a study of cancer mortality rates around 52 nuclear power plants and 10 other nuclear facilities. The study covered the period from 1950 to 1984 and evaluated the change in mortality rates before and during facility operations. The study concluded there was no evidence that nuclear facilities may be linked causally with excess deaths from leukemia or from other cancers in populations living nearby (NCI 2011-TN10889).

[methodologically flawed, according to Cindy Sauer. Also cite Joe Sauer's study]

In June 2000, investigators from the University of Pittsburgh found no link between radiation released during the 1979 accident at the Three Mile Island Nuclear Generating Station and cancer deaths among nearby residents. Their study followed 32,000 people who lived within 5 mi (8 km) of the plant at the time of the accident (Talbot et al. 2000-TN10890).

[rebut with Steve Wing's study] (23-26-15 [Kamps, Kevin])

Comment: The State of Michigan Department of Health and Human Services, Department of Environmental Health conducted a review of the thyroid cancer statistics for the area of Covert Township in Michigan (MDHHS 2024-TN10866). The State identified six instances of thyroid cancer in Covert Township from 1985 to 2021. The small number of recorded cases in a population of 2,510 was too low to conduct viable statistical analysis with other comparable locations. No temporal patterns were identified with regards to thyroid cancer for the location during the review. The data was obtained from the Michigan Cancer Surveillance Program. ***It is important to note that part-time residents with a separate primary residence or individuals that were diagnosed after moving away from the county would not be identified as individuals diagnosed in Covert Township.***

[well that's a huge methodological falw then, isn't it?]

[thyroid pathology after Chornobyl - an epidemic - "Belarus necklace" - cite Adi Roche]

[Gerald and Martha Drake - spina bifida near Big Rock Point - 3 M Curies of releases - compared to Sellafield - compare I-131 releases at the two - mention that BNFL was contracted to do BRP decommissioning, and reported it was the most radioactively contaminated decommissioning job in its history, which is really saying something, given the history at Sellafield] (23-27-1 [Kamps, Kevin])

Comment: ACS (American Cancer Society). 2001. Cancer Facts & figures-1998. Atlanta, Georgia. ADAMS Accession No. ML071640135. TN10891.

[that's nearly 30 years old!]

P.198/242 (page H-6)

MDHHS (Michigan Department of Health and Human Services). 2024. Letter from K. Vang, Unit Manager, Health Statistics Surveillance Unit, Environmental Health Surveillance Section, Division of Environmental Health, to D. Persky, Health Officer, Van Buren/Cass District Health Department, dated November 15, 2024, regarding "findings of investigation of cancer incidence among residents of Covert Township, Michigan." Lansing, Michigan. ADAMS Accession No.ML25006A210. TN10866.

[MDHHS as rear guard for industry; compare American Thyroid Assn. compare Peter Crane.]

MEGLE (Michigan State Department of Environment, Great Lakes, and Energy).

2016. "Radiological Monitoring & Reporting." Lansing, Michigan. Accessed September 18, 2024, at <https://www.michigan.gov/egle/about/organization/materialsmanagement/radiological/monitoring#:~:text=The%20state%20of%20Michigan%20established,environment%20are%20not%20adversely%20impacted>. TN10744

[this is nearly a decade old! What about 2016-2025?!]

P.199/242 (page H-7)

University of Kentucky. 2014. "Cancer Incidence and Mortality Inquiry System, Version 7.0, Michigan Cancer Surveillance Program." University of Kentucky/Kentucky Cancer Registry, Lexington, Kentucky. Accessed November 18, 2024, at <https://www.cancer-rates.info/mi/>. TN10851.

[even if accessed last year, the data appears to be 12 years old - need for updated data, eh?]

[UNSCEAR - cite Alfred's critiques]

[Cite Ian Fairlie's TORCH report in 2006, compare it to IAEA - 93,000 deaths attributable to

Chornobyl, instead of just 40 - cite Yablokov, Nesterenko, and Nesterenko - 986,000 deaths, just from 1986 to 2004.] (23-27-4 [Kamps, Kevin])

Response: Commenters expressed concerns regarding human health risks resulting from the operation of Palisades, including the risk the cancer. EA Section 3.11.1 discusses the impact to radiological health from normal operations of Palisades. During the scoping public comment period, local residents indicated concerns about local health outcomes that could be related to Palisades operations. This led the NRC staff to further review data that is specific to Palisades with regards to emissions, health concerns, and confirmed health impacts. The results of this review resulted in the inclusion of Appendix H to the EA.

The review was coordinated with the Michigan State Department of Health and Human Services to understand the rate of documented health issues that are known to the State at areas local to and surrounding Palisades. This coordination identified the rates of thyroid cancer for Covert Township through the Michigan Cancer Surveillance Program. Additionally, thyroid cancer rates for the counties surrounding Palisades were determined using data from the U.S. Centers for Disease Control and Prevention. Comparison of county rates of thyroid cancer and the rates of Covert Township did not show temporal patterns for the time period reviewed. It is important to note that individuals that do not currently live, or only reside part time in Covert Township may not be included in these statistics.

To further identify potential impact from Palisades emissions, the NRC staff conducted a literature review that is summarized in EA Appendix H. The staff reviewed current publications that discuss the relationship between dose and cancer rates. A number of studies have been conducted to identify the relationship between nuclear power plant operation and cancer rates. These studies concluded that the operational radiological emissions, including tritium, from nuclear power plants would not contribute to individual radiological exposure levels that would affect the cancer rates in the surrounding populace. Additionally, the NRC staff specifically reviewed the relationship of radioiodine and thyroid cancer. In 1957, a fire at the Sellafield Windscale reactor (United Kingdom) resulted in the release of nearly 50,000 curies (Ci) of radioiodine into the atmosphere. This resulted in doses up to 10 rad (0.1 gray [Gy]) to children. As noted in Appendix H of the EA, a longitudinal study of 193,500 individuals in areas impacted and unimpacted by the release was completed from 1950 through 1980 to identify if impacts to the thyroid could be determined. There were no changes to the rates of thyroid cancer in either population. With this in mind, the NRC staff also reviewed REMP reports from Palisades and the State of Michigan to determine whether releases of radioiodine had occurred during previous operations.

The results of recent REMP and annual effluent reports are discussed within the EA and information back to the previous license renewal was reviewed to understand long-term environmental trends. The reported information indicates that long-term trends demonstrated full compliance with emissions requirements and equate to a very low dose. The REMP and effluent release data in the reports would include tritium and radioiodine effluent releases. The radioiodine effluent releases could only result in a much smaller dose compared to the doses received by individuals exposed in the 1957 Sellafield Windscale release where no changes in cancer rates were found. Therefore, it is unlikely that trends in thyroid cancer and other thyroid related illnesses are related to radiological emissions from Palisades or other power plants in the State of Michigan.

No changes were made to the Palisades EA as a result of these comments or supplied references.

K.5.12.2 Human Health-Radiological Response 2

Comments: (23-4-3) (23-5-17)

Comment: Fig. 2-2 shows just how close the dry cask storage is to the Van Buren State Park campground. What is the radiation dose, from gamma and neutron "shine," from the dry casks to people staying at the campground area? (23-4-3 [Kamps, Kevin])

Comment: Palisades is bordered by Van Buren State Park on the north and a privately owned residential and lakefront recreational community, Palisades Park Country Club, on the south (see figure 2-3 of this EA). {**Emphasis added.**}

[This is one of the first explicit mentions of PPCC in this EA. Given the extremely high cancer incidence allegations coming from PPCC, NRC and DOE should have done a much more careful and methodologically robust analysis of negative health impacts on PNP's immediate neighbors to the south. Instead, NRC and DOE have engaged in a whitewash, and a greenwash, of these issues of the utmost importance.] (23-5-17 [Kamps, Kevin])

Response: The dose to members of the public located at the boundary or very near to an ISFSI should receive very low or limited radiation dose from storage of spent nuclear fuel (SNF) within an ISFSI. SNF storage at an ISFSI must comply with 10 CFR 72.104 (TN4884), which limits radiation dose beyond the controlled area to 25 mrem per year from direct radiation dose. These doses are typically measured at the fence line of the site and any dose to an offsite member of the public would be lower than the limit. These comments do not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the EA as a result of these comments.

K.5.12.3 Human Health-Radiological Response 3

Comments: (7-6) (23-7-7) (23-10-1) (23-13-17) (23-16-6) (23-16-17) (23-26-8) (23-26-12)

Comment: During normal operation, Palisades routinely vented radioactive gases to the air and discharged radioactive effluents to Lake Michigan. (7-6 [McCardle, Edward])

Comment: Emissions of hazardous compound are also negligible (HDI 2024-TN10670: RAI-MET-6).

[Certainly that statement is false re: radioactivity emitted from PNP, as well as toxic chemicals. As Benton Harbor resident Barbara Pellegrini, an outspoken critic of PNP, has stated to NRC in the past, the discharge of radioactive contaminants such as tritium into Lake Michigan from PNP does not dilute to safe levels in the Lake. It is concentrating artificial tritium in the Lake, more and more over time. Tritium has a 12.3 year half-life, so persists as a hazard for 123 to 246 years. Artificial tritium from PNP, and other atomic reactors on Lake Michigan, and the Great Lakes, is additive to the natural tritium, originated from cosmic radiation interacting with the Earth's atmosphere. But surface waters like Lake Michigan and the Great Lakes have a natural concentration of tritium of only 3 to 24 pico-Curies per liter. Joe Mangano of the Radiation and Public Health Project cited an EPA data point from a measuring station in South Haven, several miles north of PNP, that measured 2,500 pCi/L in open Lake Michigan surface water. While below the very lax and permissive (that is, not adequately protective, far from it) EPA Safe Drinking Water Act limit of 20,000 pCi/L, it is still a shocking measurement. It means that a tritium wastewater plume, likely originating from PNP, diluted across several miles of open Lake

Michigan surface water, but the plume still measured 2,500 pCi/L, when measured at South Haven. How concentrated was the plume immediately upon entering the Lake at PNP? This event is but one of countless tritium discharges from PNP into the air and water since 1971. While this discussion of radioactive hazards is relevant to those particular sections of the EA, it is nonetheless instructive here. The Earth's atmosphere, and its soil for that matter, is thin. Humankind needs to stop discharging hazardous pollutant, radioactive and non-radioactive (toxic chemical) into the environment. Or else the environment, and human health, will continue to suffer major impacts, including from cumulative and even synergistic effects. By the way, above should be .] (23-7-7 [Kamps, Kevin])

Comment: Palisades discharges some radiological waste into Lake Michigan after dilution in the mixing basin in accordance with criteria established in 10 CFR Part 50, Appendix I (NRC2006-TN7346).

[Per Barbara Pellegrini, it is not dilution, it is increasing concentration of hazardous artificial radioactive isotopes, generated at PNP, in Lake Michigan. Where is the environmental and health protection we pay for as U.S. and State of Michigan taxpayers?] (23-10-1 [Kamps, Kevin])

Comment: The 2021 and 2022 REMP report did not show any measurable levels of radiation, above baseline environmental levels, detected in the vicinity of Palisades. If power operations resume, Palisades would be required to remain in compliance with NRC radiological effluent limits and reimplement the REMP to ensure aquatic organisms' exposure to any radionuclides are within acceptable limits. **[Emphasis added.]**

[What does this even mean? It sounds like a whitewash/greenwash. This flippant statement should be compared to the actual annual radiological effluent reports from 2021 and 2022. Are NRC and DOE masking radioactive releases behind a vague and misleading claim about "background" radiation levels? Of course, the "background radiation" around PNP has gone up and up since 1971, when PNP began operations. This is because PNP releases radioactivity, and it increases in concentration in the environment, as more and more gets released, as PNP continues operation. Dr. Arjun Makhijain of IEER has reported that natural background radiation levels are less than 200 mR/yr. And yet, NRC and DOE have reported, since about the year 2010, that "background" radiation is more than 600 mR/yr. Lies, Damn Lies, and Statistics comes to mind. NRC and DOE included all exposures to radioactivity, including very high doses from certain medical procedures to a relatively small segment of the population, but then divided those doses across the entire (even medically untreated) population. They then declared an "average radiation dose" that an American person receives, even though most people do not have exposures to such high radiation doses for rare medical procedures. Instead of a natural background dose less than 200 mR/year being acknowledged, now "background" is considered to be more than three times higher. This is playing fast and loose with very vital health matters. DOE, NRC, and the nuclear industry are trying to normalize hazardous radioactivity, make it seem reasonable, how much radiation PNP is allowed to release into the environment. This is unacceptable behavior by NRC in particular, given its mandate to protect public health, public safety, and the environment. Instead, NRC and DOE seem to be trying to "confuse the public with fission and fusion," to downplay human health consequences from exposures to hazardous ionizing radiation released into the environment from PNP.] (23-13-17 [Kamps, Kevin])

Comment: It's quite odd that NRC and DOE say that. 900 metric tons of highly radioactive irradiated nuclear fuel at PNP is one of the greatest concentrations of any single nuclear power plant site in the US. It has nowhere else to go. It is de facto permanent on-site storage. Some of the highly radioactive waste has been stored on-site since 1971, 54 years ago, with no end in

sight. It is vulnerable to catastrophic releases of hazardous radioactivity into the environment, as we've said a million times over to NRC and DOE. But our warnings have fallen on deaf ears, every single time.

It is audacious that NRC and DOE and the State of Michigan have consistently denied health impacts coming from PNP. After all, there are annual effluent reports, showing that PNP discharges a certain amount of radioactivity into the air and water, year after year. The U.S. National Academies of Science have simultaneously warned, under the Linear, No Threshold theory, that any exposure to radioactivity carries a health risk. There is no threshold below which the risk is zero. And these risks accumulate over a lifetime. See:

<http://archives.nirs.us/press/06-30-2005/1>

which we incorporate by reference, as if fully rewritten herein.

This is **willful blindness** by the powers that be. But the company town, company county, company multi-county area, and company state are all a part of this gaslighting too. It must stop. It is an EJ violation. (23-16-6 [Kamps, Kevin])

Comment: The data collected by Michigan EGLE for the majority of plant operations demonstrate that Palisades emissions are low and confirms submitted Annual Radioactive Effluent Reports for the same time frame are within regulatory limits.

[Why did the collection of sampling data end in 2016?! With PNP, Cook 1 & 2, and Fermi 2 still operating?! And what about research reactors in MI, as at colleges/universities/hospitals/in industry? Are any still operating? After all, emissions from all such reactors would represent cumulative effects, which should be addressed in an EIS/PEIS here, not a lower-level EA.] (23-16-17 [Kamps, Kevin])

Comment: The amount of radioactive material released from nuclear power facilities is well-measured, well-monitored, and known to be very small.
[uh, not BRP - more than 3 million Curies, with numerous years missing from the accounting] (23-26-8 [Kamps, Kevin])

Comment: The State of Michigan conducts an independent REMP program through the Michigan Department of Environment, Great Lakes, and Energy (MEGLE 2016-TN10744). The Michigan Radiation Environmental Monitoring Program monitors ambient radiation levels, and collects air, water, precipitation, and milk samples from areas surrounding all of the nuclear power plants in Michigan, including Palisades.

[cites figures for dairies from Corey's milk jugs in 1999]

This program has been operated by the State since 1958.

[b/c of Fermi 1? Phoenix/Ford research reactor at U of M?]

The collected and analyzed data is published periodically and is currently reported through 2016.

[that's nearly a decade ago now!] (23-26-12 [Kamps, Kevin])

Response: Commenters express concern related to potential radiological emissions from Palisades operation. Section 3.11.1 of the EA discusses the human health impacts from radiological emissions. For Palisades, the dose requirements for emissions that are applicable are specified in 10 CFR Part 50 (TN249), Appendix I. Emissions are estimated using the Offsite Dose Calculation Manual written in accordance with guidance found in NUREG-1301, Offsite

Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors (NRC 1991-TN5758). A REMP is used to validate the estimation methods in Palisades' Offsite Dose Calculation Manual. The results of the REMP are reported annually, though data collection occurs throughout the year. In addition to the REMP enacted by Palisades, the State of Michigan enacted a State REMP that has reported data from 1958 to 2016. The Michigan State REMP includes sampling locations that are representative of all reactors in Michigan. The information published by Michigan State Department of Environment, Great Lakes, and Energy was reviewed to the previous Palisades license renewal in 2006. There were no data points that indicated a significant release occurred from Palisades, or any power plant in Michigan, during that time period. The data provided in the State REMP is consistent with what was annually reported by Palisades in their annual ERs. The data provided by Palisades and supplemented by Michigan State Department of Environment, Great Lakes, and Energy show the radiological effluent releases have been in compliance with NRC's 10 CFR Part 20 (TN283) and Appendix I to 10 CFR Part 50 regulations.

The NRC applies the linear no-threshold dose response relationship as a regulatory basis as recommended by the National Council on Radiation Protection and Measurements and International Commission on Radiological Protection. This theory is accepted by the NRC as a conservative model for estimating health risks from radiation exposure, recognizing that the model probably overestimates those risks. Based on this theory, the NRC conservatively establishes radiation dose limits, in 10 CFR Part 20 and 10 CFR Part 50, Appendix I, to ensure adequate protection of workers and members of the public.

No changes were made to the Palisades EA as a result of these comments.

K.5.12.4 Human Health-Radiological Response 4

Comments: (23-16-18) (23-16-19) (23-17-1) (23-17-2) (23-17-7) (23-22-9) (23-26-9) (23-27-2) (23-27-3)

Comment: The N&S Report (Holtec 2023-TN10538) provides the most recent (2018-2022) **average occupational radiation dose per individual**; the total effective dose equivalent (TEDE) was 0.225 roentgen equivalent(s) man (rem). The annual occupational TEDE limit is 5 rem, as outlined in 10 CFR 20.1201(a)(1).

[Well, that is for PNP workers - what about local area and broader regional residents?] **(23-16-18 [Kamps, Kevin])**

Comment: Around 2014, a one-month-long job, re: CRDM seal leakage replacement, turned into a scandal and fiasco. Average doses to nearly 200 workers were a whopping 2.8 Rem. Some of the exposed workers were women of child bearing age, which Entergy at first denied, but then quickly admitted to. This took place at a meeting between NRC and Entergy at Region III HQ in Alsie, IL. Beyond Nuclear's Kevin Kamps was in attendance in person to witness the meeting, while our intervening environmental coalition's expert witness, chief engineer at Fairewinds, Arnie Gundersen, took part by phone.

What made this scandal even worse is that PNP has the worst Operating Experience in the US industry re: CRDM seal leakage. The problem first appeared in 1972 - just one year into operations - and has never been solved since. In fact, it is why PNP was closed for good by Entergy on May 20, 2022, 11 days earlier than planned - because the latest CRDM seal leak took place that day, and it just wasn't worth the time and money (not to mention worker

exposures to hazardous radiation) that would have been required, for just 11 more days of operations. The CRDM replacement job would have taken way longer than 11 days, for another thing.

Making the 2014 worker exposure incident all the worse was the fact that many workers were not wearing their radiation detection film badges correctly. Given that mistake, and the fact that the 2.8 Rem figure for the one-month-long job was an average across nearly 200 workers, it is very possible that some of the workers got much higher doses than 2.8 Rem.

Did any get more than 5 Rem? If not, since Entergy was given so much carte blanche to "do the math," how can we be sure Entergy was telling the truth?

We incorporate by reference, as if fully rewritten herein, the following:

<https://archive.beyondnuclear.org/home/2015/1/9/192-entergy-palisades-workers-exposed-to-28-r-in-month-long.html>

<http://beyondnuclear.org/wp-content/uploads/2024/03/Lochbaum-Headaches-at-Palisades-CRD-seals-new-LG2-20100716-pal-ucs-brief-leaking-crd-seals-5.pdf>

And why is the allowable US worker dose up to 5 Rem per year, while internationally it is only 2 Rem/yr?! (23-16-19 [Kamps, Kevin])

Comment: Also provided in the N&S Report (Holtec 2023-TN10538) are the doses to a member of the public for the last full year of operation (2021), which were: 0.112 millirem (mrem) for whole body, 0.117 mrem for thyroid, and 0.522 mrem for other organs.

[That's starting really to add up!]

0.112 mR
+0.117 mR
+0.522 mR

0.751 mR

That is approaching 1 Rem.

That is half an international worker dose limit for one year.

What about other radiation exposures to this same generic individual? From natural radiation, and other artificial sources, such as medicine, legacy pollution, and other reactors nearby - 2 reactors at Cook, 2 more SMRs at PNP in addition to the zombie reactor, so many more upwind and upstream in IL & WI, etc. Why isn't all this included in Cumulative Effects analysis? Radium contamination in Benton Harbor at Jean Klock Park, now a gated community and golf course with hiking trails that require elevated board walks, so hikers don't hike in radium contaminated soil. All these cumulative exposures, just in s.w. MI. NRC and DOE are not adequately accounting for them all.] (23-17-1 [Kamps, Kevin])

Comment: The average occupational radiation exposure TEDE dose for the operational years 2006 to 2021 ranged from 0.09 rem to 0.39 rem (NRC 2024-TN9915). These dose results confirm that Palisades was operating in compliance with 10 CFR Part 50, Appendix I, 10 CFR

Part 20, and 40 CFR Part 190.

[How can this be, given the 2014 CRDM incident alone, described above, impacting nearly 200 workers? Are more "Lies, Damn Lies, and Statistics" being deployed here by DOE and NRC?] (23-17-2 [Kamps, Kevin])

Comment: The proposed Federal actions would not have an incremental cumulative effect on the design configuration, operational changes, or radiological monitoring at Palisades. The facility would return to the same operational state prior to decommissioning and would have the same level of impacts. The addition of SMRs, if pursued, must also meet the NRC regulatory requirements for effluent releases. Additionally, the combination of all nuclear power plants on the site and within 50 mi (80 km) of Palisades would be required to meet the regulations of 40 CFR Part 190 (e.g., maximum annual dose equivalent no greater than 25 mrem for whole body) (TN739)

[Is that per reactor, or for all 5 reactors combined - 3 at PNP, and 2 at Cook? Even that is not made clear here. Are the dry cask storage exposures in addition to what is admitted to/accounted for above, as unclear as it is?] (23-17-7 [Kamps, Kevin])

Comment: *DOES NRC have exclusive jurisdiction over radiological health, or does this indicate it does NOT have exclusive jurisdiction over radiological health? What other federal executive branch agencies have jurisdiction over radiological health? What jurisdiction do states have over radiological health? If DOE and NRC would provide answers to these questions in an EIS/PEIS, we would appreciate it. And if NRC and DOE would notify those other agencies, and the State of Michigan government, as well as other states impacted by the PNP restart and SMR new builds, of this information, that too would be very appreciated. (23-22-9 [Kamps, Kevin])*

Comment: The doses of radiation that are received by members of the public as a result of exposure to nuclear power facilities are so low (i.e., less than a few millirem) that resulting cancers attributed to the radiation have not been observed and would not be expected. [uh, not at Chernobyl; not at Fukushima; so the radioactivity disappears into nothingness? What about bioaccumulation?]
[this section is a whitewash, and a greenwash]
[incorporate by reference:
Fairlie and Folkers; Bertell; Gofman; Makhiani; etc.] (23-26-9 [Kamps, Kevin])

Comment: The average occupational radiation exposure TEDE dose for the operational years 2006 to 2021 ranged from 0.09 rem to 0.39 rem (NRC 2024-TN9915). These dose results confirm that Palisades was operating in compliance with 10 CFR Part 50 (TN249), Appendix I, 10 CFR Part 20 (TN283), and 40 CFR Part 190 (TN739) for members of the public and occupational dose limits.

[compare to the 2.8 R average dose, on a one month long job, gotten by close to 200 workers at PNP, including some women of child bearing age - CRDM seal leak repair job, in 2014] [so the studies above are mostly to entirely the ones NRC likes, and which affirm their predetermined and desired result; the only one that seemed to indicate a problem was this one:] (23-27-2 [Kamps, Kevin])

Comment: Nuclear workers provide valuable information on the effects of ionizing radiation in contemporary exposure scenarios relevant to workers and the public. A 2023 article presented in the International Journal of Epidemiology titled, "Ionizing Radiation and Solid Cancer Mortality Among U.S. Nuclear Facility Workers," included an analysis of greater than 100,000 nuclear

workers in the United States, exposed to an average 2,650 mrem (26.5 mSv) of external penetrating ionizing radiation. This study notes that higher rates of solid cancers including lung cancers were observed for workers of five nuclear facilities between the years of 1944 to 2016. ***The analysis given in the article bolsters the body of evidence suggesting there are radiogenic risks associated with several types of solid cancers (Kelly-Reif et al. 2023-TN10917).***

[why did NRC ignore all those studies I've listed, which is just a small number of examples that could be given? What about the Downs syndrome study in MA near Yankee Rowe? What about the many anti-nuclear groups that grew out of childhood cancer support groups, from CORE in the UK near Sellafield, to Parents Against Santa Susana field Lab in CA?] (23-27-3 [Kamps, Kevin])

Response: One commenter expressed concern related to occupational radiological dose limits. The radiological impacts on human health are discussed in Section 3.11.1 of the EA. A licensee is required to meet the regulatory requirements of 10 CFR Part 20 (TN283) for occupational exposure and ALARA (as low as reasonably achievable) occupational exposures. Occupational exposures by collective dose and data on individuals receiving a measurable dose can be found in the annual report entitled "Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities," in the volumes of NUREG-0713. Volume 44 of NUREG-0713 (NRC 2024-TN11165) presents the result that 99.9 percent of radiation workers with measurable doses received less than 2 rem (the mentioned International occupational exposure limit). Also, the Commission has considered the potential impact of lowering the occupational dose limit. In the SRM for SECY-12-0064, (NRC 2012-TN11928) the Commission disapproved the NRC staff's recommendations to develop a draft regulatory basis to reduce the occupational total effective dose equivalent from 5 rem (50 mSv) per year. Finally, if a licensee violates NRC requirements, enforcement action can be taken by the NRC staff. Since these comments refer to past situations that the NRC investigated or assessed, they have provided no new information to be considered in the EA. No changes were made to the Palisades EA as a result of this comment.

K.5.13 Comments Concerning Hydrology-Groundwater Resources

K.5.13.1 Hydrology-Groundwater Response 1

Comments: (23-9-1) (23-9-3) (23-9-4) (23-10-10) (23-22-12)

Comment: 3.5 Geologic Environment and Groundwater Resources

[How about those drinking water wells the supply PPCC? If they've dodged bullets all these decades, will they continue to?] (23-9-1 [Kamps, Kevin])

Comment: There are no noted geologic resources in the vicinity of Palisades.

[This statement contradicts another admission in the EA, that the PNP site served as a sand quarry, before PNP broke ground in 1967. And what about groundwater used as drinking water via wells, as at Palisades Park Country Club. Groundwater beneath PNP, and groundwater beneath PPCC, being so closely adjacent, could well be connected in ways yet unknown, since very little to no studies have been undertaken about it.] (23-9-3 [Kamps, Kevin])

Comment: There are 187 known active wells within 2 mi (3.2 km) of Palisades, the majority of which are domestic wells completed in unconsolidated glacial deposits (DTMB 2024-TN10677).

[That's a lot of potential contamination of drinking water by PNP. Are any of these known active wells uphill from PNP's radioactive areas? Even despite this, Ian Fairlie has warned that tritium can travel upstream, even in surface waters like rivers. What is the potential in contained groundwater, even just through diffusion, let alone tritium's capacity to flow upstream? What dangers does PNP's contamination of groundwater pose for nearby drinking water wells, such as those used in PPCC? Why have NRC and DOE not undertaken studies of the interconnections between aquifers under PNP and PPCC? What impacts will fluctuating levels of water in Lake Michigan have on these dynamics, and risks of PNP contamination entering groundwater tapped via wells for drinking water? If climate change causes Lake Michigan's water levels to rise (as they rose to historic high levels in spring 2020), could this drive contamination in groundwater beneath PNP further inland and even uphill, such as contaminating PPCC drinking water/well water? Why was no such analysis included in the EA?] (23-9-4 [Kamps, Kevin])

Comment: No radiological material attributed to Palisades has been detected in drinking water or surface water samples near the plant, and there are no registered groundwater wells downgradient of groundwater flow from the Palisades site.

[How can that possibly be? Doesn't this violate physics, chemistry, biology? South Haven's drinking water intakes are 4 miles or less away. How can the tritium and other radioactive waste have disappeared into absolute nothingness after being leaked, spilled, or intentionally discharged into the Lake? Clearly, Holtec, NRC, and DOE are not looking very hard at this. This is magical thinking, which is dangerous, willfully blind to risks, impacts, and consequences. How can DOE and NRC say this, when Mangano cited EPA as having measured tritium at concentrations of 2,500 pCi/L at South Haven, very near the municipal drinking water intake pathways drawing water from Lake Michigan there?] (23-10-10 [Kamps, Kevin])

Comment: Aren't private drinking water wells a major loophole - there are no environmental and health protection standards whatsoever, right?! This is of utmost relevance to the PNP restart scheme, and SMRs new build scheme, in that the lack of MCL in PNP groundwater means PPCC drinking water wells could become dangerously contaminated with hazardous radioactive isotopes and hazardous toxic chemicals. PPCC residents will drink such hazardous well water, unless careful monitoring against all such hazards takes place regularly, going forward. Why is such a risk and burden put on the residents of PPCC?! (23-22-12 [Kamps, Kevin])

Response: A commenter expressed concern that potential releases of radionuclides to groundwater at Palisades may impact drinking water sources, including the supply at South Haven, Palisades Park Country Club (PPCC) (also known as Palisades Park Community [PPC]), and private wells in the vicinity of the site. The commenter also expressed concern with the possible connection between onsite groundwater and groundwater used offsite as drinking water under future climatological scenarios.

Section 3.5.1 of the EA summarizes the affected environment of geology and groundwater. The EA describes the site's adherence to the Industry Groundwater Protection Initiative, in accordance with NEI 07-07 (NRC 2007-TN8483), to ensure timely and effective management of inadvertent releases to groundwater. The site monitors onsite wells quarterly for tritium and gamma-emitters which provides an indication of the fate and transport of potential contaminants which may migrate offsite. Additionally, as stated in Section 3.5.1 of the EA, the NRC reviewed 5 years of available REMP results. As part of the REMP during operations, Palisades samples the South Haven and PPC drinking water source daily for a composite monthly sample or

monthly during seasonal operation, respectively. The PPC supply samples was removed from the REMP in 2023 due to the changing source term, which was an expected result of power cessation which occurred in May 2022 (HDI 2024-TN10771). As stated in the site's Annual Radiological Environmental Operating Reports, a baseline (e.g., background) gross-beta concentration for drinking water samples was determined to be 11–18 (± 5) pCi/L prior to Palisades operations. Reviewed Annual Radiological Environmental Operating Reports reported an average gross-beta activity for South Haven and PPC ranging from non-detect to 3.27 pCi/L (maximum measured in 2019).

In addition to the site's on and offsite monitoring programs, the risk to offsite groundwater uses is considered to be low due to the hydraulic setting of the site. As described in Section 3.5.1 of the EA, groundwater in the vicinity of the site is unconfined within the Dune Sand and flows toward Lake Michigan. As described in Section 3.5.1 of the EA, groundwater elevations at the site indicate flow is perpendicular to the shoreline, not toward the offsite users to the north, east, or south. Groundwater moves from areas of recharge to areas of discharge (where the water table is at or near the ground surface). Groundwater elevations of onsite groundwater within the upper Dune Sand indicate groundwater discharges to Lake Michigan (HDI 2024-TN10670). There are no major sources of pumping in the vicinity of the site that would alter the flow of groundwater. The commenter expressed concern of rising lake levels on groundwater flow paths under future climatological conditions. The NRC staff evaluated the potential effects of climate change on its evaluation of the environmental impacts of the proposed continued operation of Palisades for water resources in Appendix F Section F.3 of the Palisades EA and expects that climate change would not alter the conclusions made in the EA.

Further information on tritium, radiation protection limits, and drinking water standards can be found at NRC 2024-TN11293.

One commentator questioned the statement that there are no noted geological resources at Palisades based on the historical use as a sand quarry. In Palisades EA Section 3.5.1 clarification was provided. Also, the following statement has been added to Section 3.5.1 of the EA in response to these comments: There are no registered domestic wells downgradient of onsite groundwater flow, and there are no major sources of groundwater withdrawal, such as large-scale industrial or agricultural pumping, that might change the flow direction of the groundwater (DTMB 2024-TN10677; Entergy 2021-TN10998).

K.5.13.2 Hydrology-Groundwater Response 2

Comments: (7-7) (23-9-5)

Comment: The NRC review of the site indicates groundwater movement which likely flows to Lake Michigan. Dozens of monitoring wells have shown tritium contamination of the groundwater. (7-7 [Mcardle, Edward])

Comment: Within the vicinity of the Palisades site, groundwater is unconfined within the dune sand and flows toward Lake Michigan (NMC 2005-TN10678).

[Are NRC and DOE so sure of this? There are no connections whatsoever between groundwater at PNP and groundwater, used as well water for domestic use, at PPCC? Recall, Yucca Mountain, Nevada is one of the best known/most studied sites on Earth re: hydrogeology. After all, billions of dollars were spent on such site studies there - which showed, by the way, how unsuitable, from a technical and scientific perspective, Yucca Mountain is for highly radioactive

waste disposal. Dr. Arjun Makhijani of IEER has stated that Yucca Mountain, Nevada - Western Shoshone Indian land - is the worst site ever contemplated for a highly radioactive waste dump, from a scientific and technical perspective alone. And yet even at Yucca Mountain, despite the vast sums spent to study hydrogeology, there are still many significant gaps in knowledge. At PNP and PPCC, little to know hydrogeologic studies - such as connections between the two adjacent sites' groundwaters - have ever been undertaken, to the best of our knowledge.

Also, Holtec has big plans to dig up and disturb the site, such as building two SMR-300s. Who is to say Holtec won't even unknowingly and inadvertently pierce a geologic aquifer divider, allowing PNP's contaminated groundwater to flow into PPCC drinking water aquifers?

Regardless, Lake Michigan is also a source of drinking water. So PNP's contaminated groundwater flowing into Lake Michigan - as well as surface contamination flowing downwards deeper into sand and soil, or flowing directly into Lake Michigan as surface runoff - will do so as well.

PNP is treating groundwater as a radioactive industrial septic field. PNP is treating Lake Michigan as a radioactive and toxic chemical nuclear-industrial wastewater sewer. Such abuses must stop.] (23-9-5 [Kamps, Kevin])

Response: Section 3.5.1 of the EA summarizes the affected environment relating to geology and groundwater and includes the following statements:

- The site consists of glacial deposits, including the upper layer of dune sand and lower layers of relatively impermeable clayey glacial till.
- Field data reported in the updated safety analysis reports indicates groundwater at Palisades is unconfined within the dune sand and flows toward Lake Michigan.
- Palisades monitors groundwater in accordance with NEI 07-07 (NRC 2007-TN8483). Wells are sampled quarterly for gamma activity and tritium.
- Elevated tritium has been detected in onsite groundwater wells screened in the upper (within 15 feet (ft) (4.5 meters [m]) of ground surface) dune sand.
- None of the surface water and drinking water samples collected as part of the plant's REMP contained measurable radiological materials attributed to Palisades' effluents in the past 5 years.

Additionally, several prior studies completed at Palisades and incorporated by reference in Section 3.5 of the EA indicate groundwater flow is from east to west toward Lake Michigan, perpendicular to the shoreline. A groundwater contour map is provided in Holtec's request for additional information (HDI 2024-TN10670) confirming the flow direction of onsite groundwater is westward, based on groundwater elevations collected in April 2023, indicating groundwater does not flow to the south toward PPCC. Furthermore, the groundwater monitoring data collected in April 2023 and initial site investigation data confirm groundwater elevations at the site correspond to the approximate mean level of Lake Michigan. Any increase of mean lake level above onsite groundwater elevations may cause a groundwater flow reversal to the east, not to the south toward PPCC. Monthly mean lake levels for Lake Michigan are published by the National Oceanic and Atmospheric Administration Great Lakes Environmental Research Laboratory (NOAA 2024-TN10023). The data indicate the historical maximum (January 1918–March 2025) lake-wide level occurred in 1986 at 582.35 ft (177.5 m) above mean sea level (AMSL). In 2020, the maximum lake-wide level reached 582.18 ft (177.4 m)

AMSL. The maximum onsite groundwater elevation recorded in April 2023 was 608.81 ft (185.6 m) AMSL at MW-20. Therefore, it is considered unlikely lake levels in 2020 caused a groundwater flow reversal offsite. Under current groundwater conditions, an increase of more than 18 ft (5.5 m) AMSL in lake levels would be required to reverse groundwater flow offsite. Furthermore, as stated in Appendix F, Section F.2 of the EA, the observed climatological changes in the Great Lakes regions include variability (i.e., both highs and lows) of lake levels.

As stated in Section 3.5.1 and Section 3.5.3 of the EA, groundwater containing tritium that discharges to Lake Michigan represents a small portion (typically ≤ 1 percent) of the total tritium discharged to the lake via regulated batch liquid effluent releases.

The cumulative effects related to groundwater resources from the potential construction of multiple SMRs at Palisades are discussed in Section 3.5.4 of the EA. As stated in the EA, the excavation of the nuclear power block associated with SMR modules may extend to a depth of 140 ft (63 m) below ground surface. A change has been made to the EA to indicate that at 140 ft (63 m) below ground surface, the base of the SMR nuclear power block would likely intersect the clay till that overlies the onsite bedrock (Coldwater Shale). The till is anticipated to be of relatively low hydraulic conductivity (10^{-9} to 10^{-4} centimeter per second [cm/s] based on published values for this type of material [Freeze and Cherry 1979-TN3275]) and any potential releases of radionuclides in this stratum would move west toward Lake Michigan. As stated in EA Section 3.5.1, groundwater present within the Coldwater Shale is of low yield and quality, and most domestic wells are screened within unconsolidated glacial deposits.

No other changes were made to the Palisades EA as a result of these comments.

K.5.13.3 Hydrology-Groundwater Response 3

Comments: (23-5-11) (23-9-6) (23-9-8) (23-9-12) (23-9-16) (23-10-8)

Comment: Repair underground pipe, leaking condensate storage tank (T-2) piping, and leaking Utility Water Storage Tank (T-91) piping.

[Are these radioactive leaks? Are these toxic chemical leaks? Why is this not clearly explained?] (23-5-11 [Kamps, Kevin])

Comment: However, tritium has not been detected in groundwater in the lower dunes and, indicating that impacted groundwater is within the upper 10-15 ft (3-4.6 m) of the aquifer (Holtec 2023-TN10538: Section 3.2.1.2).

[But what about the 645,000 pCi/L tritium concentration leak or spill, recently revealed - as in an NRC inspection report - at about the same time as the 11/20/24 NRC meeting in Benton Harbor, MI? How come that is not included here? This is but the latest tritium leak/spill/discharge to the environment revealed at PNP.

For that reason, we incorporate by reference as if fully rewritten herein, a report by Paul Gunter at Beyond Nuclear, about tritium leaks/spills/discharges, including a section about PNP itself:

<https://archive.beyondnuclear.org/reports/> (23-9-6 [Kamps, Kevin])

Comment: Why is 2009 the oldest/earliest date in EA Table 3-4? After all, PNP had a tritium leak scandal in 2007, as documented in Paul Gunter's report above.

See Kay Drey's "routine releases releases" pamphlet, above, for more information on the hazards of tritium being leaked, spilled, and intentionally discharged into the air and water, as at PNP. It includes a photograph, taken by Gabriela Bulisova, showing the PNP surface water wastewater discharge pathway, used for tritium and other radioactive wastewater, toxic chemical wastewater, and thermal heat pollution wastewater dumping inot Lake Michigan.] (23-9-8 [Kamps, Kevin])

Comment: No action taken as no new significant dose pathway and release previously reported under a batch release process.

[In other words, just let it wash out into the Lake? Who cares? Does NRC = Nobody Really Cares? PNP batch realeases are problematic themselves. Performed once per season, does this mean that PNP, without having to warn swimmers, beachgoers, and boaters, could do a batch release of radioactive and toxic chemical wastewater, built up over three months, on a hot August Saturday? There could be hundreds of people impacted by that, a concentrated radioactive and toxic chemical exposure, at point blank range. (23-9-12 [Kamps, Kevin])

Comment: Elevated tritium detected in a water sample collected from the 1C switchgear sump within the protected area at a maximum concentration of 645,255 pCi/L.

[Why did it take till 11/20/24 for us to find out about this? And from a reporter at WWMT, not from Holtec nor NRC. Nor from Entergy, nor MI EGLE, etc. The public had to wait 2.5 years to learn about this highly concentrated tritium leak? What possible excuse do the companies and government agencies have for not disclosing this leak promptly?

As 645,255 pCi/L is significantly more than 600,000, those figures calculated just above in our comments are very conservative.] (23-9-16 [Kamps, Kevin])

Comment: Tritium is often but the leading edge - the canary in the coal mine - for other even more hazardous radionuclides to follow. This is due to its extremely small molecular size, water solubility, volatility, chemistry, etc. Tritium is hazardous enough, but even more hazardous radioactive pollutants could well follow in its wake. For example, strontium-90 followed tritium out a leak in Indian Point, New York indoor wet storage pool for highly radioactive waste, into groundwater, and then into the Hudson River, contaminating fisheries. (23-10-8 [Kamps, Kevin])

Response: One commenter expressed concern regarding inadvertent releases of radionuclides, including tritium, at Palisades. Section 3.5.1 of the EA summarizes groundwater quality at Palisades and includes descriptions of the site's groundwater protection program to ensure timely and effective management of situations involving inadvertent releases of licensed material to groundwater. Table 3-4 of the EA also summarized tritium releases and elevated detection of onsite groundwater from 2009 through 2024. Table 3-4 of the EA, includes a description of the May 2022 release in which a water sample collected from the 1C switchgear sump within the protected area contained a concentration of 645,288 pCi/L of tritium. A sample collected in a Groundwater Protection Initiative (GPI) monitoring well (TW-6) contained tritium at a concentration of 10,370 pCi/L, which is a more accurate representative of concentration within the aquifer as a result of the release. As stated in EA Section 3.5.1, by June 2024, maximum concentrations of tritium in GPI wells had decreased to a maximum concentration of 1,441 pCi/L. Tritium concentrations in onsite wells were not measured above the EPA's maximum contaminant level for tritium in drinking water (20,000 pCi/L) from January 2023 to June 2024. As stated in Section 3.5.1 of the EA, the tritium discharged to Lake Michigan via

groundwater over the past 5 years, including the May 2022 release, represents a small portion (≤ 1 percent in any given year) of the total liquid tritium discharged from Palisades per permitted pathways in accordance with 10 CFR Part 50 (TN249), Appendix I. None of the surface water and drinking water samples collected as part of the plant's REMP monitoring contained measurable radiological materials attributed to Palisades' effluents in the past 5 years.

Table 3-4 of the EA also includes details of the intended repairs to the T-91 (utility water storage tank) and T-2 (condensate storage tank) piping, both of which were isolated and drained/flushed to cease the impacts to groundwater until repairs can be made for the preparation for the resumption of power operations.

A statement was added to Table 3-1 of the EA to point readers to Table 3-4 in Section 3.5.1 of the EA for additional information on these leaks and repairs.

In addition to tritium, the site's groundwater protection program monitors gamma-emitters quarterly, as stated in Section 3.5.1 of the EA. Palisades also implements an "as low as reasonably achievable" program in accordance with Federal regulations and all work activities are screened for appropriate radiological controls in accordance with occupational radiological control regulations, as stated in Section 3.5.2 of the EA. As reported in the 2024 Annual Radiological Effluent Release Report, radiological effluents via groundwater are quantified according to the methodology described in Regulatory Guide 4.25, "Assessment of Abnormal Radionuclide Discharges in Ground Water to the Unrestricted Area at Nuclear Power Plant Sites" (NRC 2017-TN11912). No additional changes were made to the Palisades EA in response to these comments or referenced materials.

K.5.13.4 Hydrology-Groundwater Response 4

Comment: (20-4)

Comment: No.: 4.

Section: 3.5.1

Page: 3-21

Comment: "Palisades monitors 29 groundwater wells in support of the Industry Groundwater Protection Initiative."

The 2023 Annual Radioactive Effluent Release Report for Palisades (Reference 2) indicates that Palisades has 23 groundwater monitoring wells and also monitors 16 temporary monitoring wells as part of the Groundwater Protection Initiative. **(20-4** [Britting, J.]

Response: In response to this comment, the EA was updated globally to state, "Palisades monitors 39 groundwater wells in support of the Industry GPI (NEI 2019-TN6775)."

K.5.13.5 Hydrology-Groundwater Response 5

Comments: (23-9-9) (23-9-11)

Comment: "less than the EPA drinking water MCL of 20,000 pCi/L."

[In 2009-2013 Description. As if that is all right, acceptable, or protective of human health and the environment. It is not. Dr. Arjun Makhijani has written articles about much stricter tritium standards in place elsewhere, such as in the State of Colorado, and the State of California, as well as a Province of Ontario advisory board's recommendation for much more strict tritium

contamination standards than the current US EPA's SDWA standard.

We thus incorporate by reference as if fully rewritten herein the following relevant articles by IEER, including "Health Risks of Tritium: The Case for Strengthened Standard," as well as "Healthy from the Start: Building a Better Basis for Environmental Health Standards - Starting with Radiation," both articles by Arjun Makhijani, Brice Smith, and Michael C. Thorne, contained in IEER's newsletter dated Feb. 5, 2007, dedicated to Healthy from the Start / Tritium (Vol. 14, No. 4) at the following link:

<https://ieer.org/wp/wp-content/uploads/2012/01/SDA-14-4.pdf>

We also incorporate by reference as if fully rewritten herein Dr. Makhijani's Feb., 2023 book, *Exploring Tritium Dangers*, posted online at this link:

<https://ieer.org/wp/wp-content/uploads/2023/02/Exploring-Tritium-Dangers.pdf>

We also incorporate by reference as if fully rewritten herein a 2005 NIRS press release about the NAS BEIR Committee's reaffirmation of the linear, no threshold theory regarding radiation harm to human health:

<http://archives.nirs.us/press/06-30-2005/1> (23-9-9 [Kamps, Kevin])

Comment: Tritium concentrations decreased below EPA MCL.

[Again, per above, that's not saying much. EPA SDWA MCL of 20,000 pCi/L for tritium is very high, and not health protective.] (23-9-11 [Kamps, Kevin])

Response: Commenters expressed concern with the drinking water standards set by the EPA for tritium and other protective limits for tritium. Radiological releases to groundwater are discussed in Section 3.5.1 of the EA. The responsibility for licensing and regulating the use and handling of certain radioactive materials, including tritium, is shared by multiple governmental organizations, including the NRC and the EPA. Releases of radionuclides from nuclear power plants must meet radiation dose-based limits specified in 40 CFR Part 190 (TN739), 10 CFR Part 20 (TN283), and 10 CFR Part 50 (TN249), Appendix I. The regulations specify that the dose to individual members of the public from all exposure pathways, including both internal and external exposure, due to nuclear fuel cycle facilities be less than 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ (40 CFR Part 190 and 10 CFR Part 20). In 10 CFR Part 50, dose design objectives are specified for both air and liquid effluents consistent with the requirements of 40 CFR Part 190 and 10 CFR Part 20. The EPA sets drinking water standards per the national primary drinking water regulations per 40 CFR 141 (TN4456) to section 1412 of the Public Health Service Act, as amended by the Safe Drinking Water Act (TN1337), including beta particles and photon emitters. The drinking water standard for beta particles (e.g., tritium) and photon emitters is 4 millirems per year (mrem/year) in drinking water. Each national primary drinking water regulation is reviewed at least once every 6 years per requirements set by the Safe Drinking Water Act (for more information, visit <https://www.epa.gov/dwsixyearreview>). The most recent Six-Year Review, initiated in 2018 and concluded in July 2024, did not recommend beta/photon emitters for regulatory revision. No changes were made to the Palisades EA in response to these comments or referenced materials.

K.5.13.6 Hydrology-Groundwater Response 6

Comment: (23-10-2)

Comment: The NRC staff reviewed 5 years of available radiological release reports (2019-2023 monitoring results), in addition to radiological environmental monitoring program (REMP) results. REMP results are provided in Annual Radiological Environmental Operating Reports (Entergy 2020TN10687, Entergy 2021-TN10686, Entergy 2022-TN10685; HDI 2023-TN10684, HDI 2024TN10771).

[Why just five years of look back data? Why not look back to 1971, when radiological operations began at PNP? Why such a shallow review? 5 years back, instead of 50?] (23-10-2 [Kamps, Kevin])

Response: The following is stated in Section 1.3.4 of the EA:

The environmental effects of a proposed Federal action(s) are determined by comparing the environmental conditions at the point in time prior to the commencement of the proposed Federal action(s), known as the environmental baseline or affected environment, with those expected environmental conditions following the commencement of the Federal action(s). The affected environment for the potential reauthorization of power operations at Palisades is the current decommissioning state at Palisades prior to implementing any of the activities related to the preparation for the resumption of power operations. The corresponding impact determination analysis for each resource area comprises the impacts in relation to the affected environment from both the activities related to the preparations for the resumption of power operations and those related to the resumption of power operations.

Therefore, while operations at Palisades began in in the early 1970s, the environmental baseline reflects the nearer term history of Palisades, whereby the radiological concentrations in groundwater, frequency and magnitude of inadvertent release, adherence to current regulations, and mitigating actions, is indicative of those environmental conditions expected following the commencement of the Federal action(s). The NRC staff determined 5 years to be appropriate for establishing the environmental baseline but included instances of inadvertent radiological releases reported as part of the site's adherence to the current industry standard GPI, which began at Palisades in 2008. No changes were made to the Palisades EA in response to these comments.

K.5.13.7 Hydrology-Groundwater Response 7

Comment: (23-9-10)

Comment: MW-11 and T-91 are mentioned more than once, over time. So they never really did fix the leaks to begin with? They allowed continuing leakage from the same source? So, poor Root Cause Analysis and Corrective Action? Holtec will likely be even worse than Entergy in this regard, given its inexperience, incompetence, corruption, and the fact it just doesn't care. At least Entergy had a lot more experience, even if it was also incompetent and just didn't care. Holtec has never operated a reactor before, let alone one as problem-plagued for more than half a century as PNP. (23-9-10 [Kamps, Kevin])

Response: Table 3-4 of the EA summarizes tritium releases and elevated detection of onsite groundwater from 2009-2024. As summarized in Table 3-4 of the EA, the T-91 Utility Water Storage tanks were first identified as a source of elevated tritium concentrations in MW-11 in 2016. The tanks and associated piping were repaired as a result, and monitoring data indicated tritium elevations decreased following the repair. In May 2022, a new source of elevated tritium concentrations was identified from either the T-91 recirculation line or the transfer line between T-87 and T-91. Pipe repair of these lines is planned as part of the preparations for the resumption of power operations, as indicated by Table 3-1 in the EA. The sources of identified leaks in the vicinity of T-91 are being addressed by Holtec in accordance with plant-specific procedures.

No changes were made to the Palisades EA in response to this comment.

K.5.14 Comments Concerning Hydrology-Surface Water Resources

K.5.14.1 Hydrology-Surface Water Response 1

Comments: (6-3) (23-8-6) (23-8-8) (23-8-9) (23-8-10) (23-13-10)

Comment: Public comments have also been made suggesting nuclear plants in general and Palisades specifically may not have access to cool water because Lake Michigan may be warming due to climate change. First, the water intake to Palisades is approximately 20 feet below the surface, where the water is cooler. Lake Michigan averages 60 degrees fahrenheit in the summer months, with 81.3 degrees fahrenheit the high recorded in 1995. Also, as part of the plant's upgrade Holtec is to install a new Cooling Water Heat Exchanger which will cool water in the primary loop if need be to keep the reactor running efficiently. It appears that top water temperature requirements are different for each nuclear plant. Someone in the crowd mentioned Palisades upper limit was 77 degrees fahrenheit, but I was unable to verify that information. The NRC did allow the Millstone Power Plant to use 80 degree fahrenheit temperature intake water from the Long Island Sound, which has a previous limit of 75 degrees. The temperature of Lake Michigan's intake water should not be a concern, and the temperature of the discharge water will be within the NRC's regulatory parameters. (6-3 [Connors, Shawn])

Comment: The evaporative loss in the cooling tower would be 12,000 gpm and the remaining 80,000 gpm of the withdrawn water would be returned to Lake Michigan.

[Some of the evaporative losses would fall back into Lake Michigan and other Great Lakes, but not all. Some would be lost to the Great Lakes basin, by blowing away as steam and water vapor, then returning to Earth in other watersheds downwind.]

12,000 gallons/minute X 60 minutes/hour = 720,000 gallons/hour

720,000 gallons/hour X 24 hours/day = 17,280,000 gallons/day

17,280,000 gallons/day X ~30 days/month = ~518,400,000 gallons/month

~518,400,000 gallons/month X 12 months/year = 6.22 billion gallons/year

6.22 billion gallons/year X 26 years (Holtec has indicated it wants to operate the restarted PNP from 2025 to 2051) = more than 161 billion gallons of Lake Michigan water, turned to steam, to blow downwind, resulting from the PNP restart (not accounting for refueling outages and other

non-operational status periods of time, such as unexpected shutdowns).

161 billion gallons of Lake Michigan water turned to steam is a lot. How much of that would fallout outside of the Great Lakes basin, into other watersheds? Why was this figure not provided in this EA? It should be provided, in an EIS/PEIS.

What environmental impacts will result from 161 billion gallons of Lake Michigan surface water turned to steam, so that PNP can restart and operate from 2025 to 2051?

But how much worse will such consumptive water use become once two SMR-300s are also operational at PNP? Are NRC and DOE accounting for such cumulative impacts? Not adequately, it appears - far from it. Such cumulative effects, and such clearly major impacts, should be addressed in an EIS/PEIS. We don't want the Great Lakes State to turn into the Not So Great Lakes State, given such Holtec schemes.] (23-8-6 [Kamps, Kevin])

Comment: The NRC staff has concluded that the plant water use following resumption of reactor power operation would be similar to Palisades' previous power operation. In the 2006 SEIS, the NRC staff determined that all cooling system-related surface water use impacts for power operations at Palisades were small (NRC 2006-TN7346).

[Have there been any power uprates at PNP since 2006? If yes, why was that information not provided here? Are there any planned by 2051? If yes, why has that information not been disclosed here? This would make the "zombie" reactor itself worse in these regards.] (23-8-8 [Kamps, Kevin])

Comment: Because there would not be any changes to power generation capacity and the circulating water system, the NRC staff expects that the thermal discharges to Lake Michigan would be comparable to previous power operations.

[But this is not correct. See Arnie Gundersen's expert witness submissions on the CCW heat exchangers being doubled in size, cooling tower implications, etc., above.] (23-8-9 [Kamps, Kevin])

Comment: The proposed CCW heat exchangers will each have a nominal 100 percent capacity, which allows operational flexibility. Holtec would not make any changes to the service water side of the CCW heat exchangers and therefore no changes to the interface to the surface water environment are expected.

There is no change to the heat loads that are serviced by the proposed CCW heat exchangers. The total service water flow rate is also not expected to change; the service water flow may be through one or both proposed CCW heat exchangers depending on whether one or both proposed CCW heat exchangers are in use. There is no consumptive water use associated with the CCW heat exchangers. Therefore the proposed CCW heat exchangers would not affect surface water resources. **[Emphasis added]**

[Again, compare NRC and DOE's statements here, with Arnie Gundersen's critiques, above. Holtec's doubling of the size and capacity of the CCW heat exchangers makes no good sense, other than perhaps as a make work to make money scheme for Holtec, utilizing vast amounts of public funding, yet another instance of waste, fraud, and abuse associated with the PNP restart scheme. If they were to undertake doing any such modifications, it should be to add more cooling tower arrays, not to double the size/capacity of the CCW heat exchangers, per expert witness Arnie Gundersen.

The highlighted part also makes no sense, given Holtec's press release admission, cited by Gundersen in his testimony, acknowledging that Lake Michigan surface water temperatures are significantly increasing due to global warming.] (23-8-10 [Kamps, Kevin])

Comment: While most of the water used for cooling would be returned to the lake, the cooling system would lose approximately 12,000 gpm or 0.0006 percent of the total volume of water in Lake Michigan to evaporation from the cooling towers each year.

[Still, water vapor that blows with the wind out of the Great Lakes basin watershed before condensing back into liquid is lost to the Great Lakes, which is a significant impact.] (23-13-10 [Kamps, Kevin])

Response: *Palisades was authorized to operate at 2,530 MWt on November 1, 1977. On June 23, 2004, Palisades received NRC authorization to operate at 2,565.4 MWt. There have been no requests for power uprate since the 2006 SEIS (NRC 2006-TN7346) for license renewal.*

Palisades' mechanical draft cooling towers and their operations are described in NUREG-1437, Supplement 27, Section 2.1.3 (NRC 2006-TN7346); Holtec's Environmental New and Significant Review (Holtec 2023-TN10538), Section 3.2.2.1; and Palisades EA Section 2.1. During the NRC Environmental Regulatory Audit, the applicant confirmed that the original cooling towers were replaced during 2012 and 2017 with exactly the same configurations except for reducing 18 cells to 16 cells in Cooling Tower A. The new cooling towers have drift eliminators that were independently verified to limit the drift rate not to exceed 0.001 percent of the circulating water flow rate. In addition, the plant stopped adding sulfuric acid to the cooling water prior to 1987 (CPC 1987-TN11913) to limit the deposition effects downstream of the cooling tower plume.

As stated in the Palisades EA, the NRC's action, if approved, would reauthorize power operations of Palisades through March 24, 2031. Surface water resources impacts are considered for the duration of reauthorized operations. Palisades EA, Section 3.4.3 describes environmental impacts on surface water resources from the resumption of power operations. The NRC staff determined that the annual evaporative loss due to Palisades operations would be insignificant, approximately 0.0006 percent of Lake Michigan's volume, as described in Palisades EA Sections 3.4.3 and 3.7.3.1. Natural evaporation from the Lake itself is not caused by Palisades' operations. Holtec is considering building and operating two SMRs with a total energy generation capacity of 600 MWe, somewhat less than that of Palisades, 800 MWe. The NRC staff expect that if surface water is used by the SMRs, their water use would be comparable to, most likely less than Palisades,' and their impact on Lake Michigan would also be insignificant (less than 0.0006 percent of Lake Michigan's volume). The potential SMRs and their resource use at the Palisades site were considered in the cumulative effects analyses within Chapter 3 of the Palisades EA.

The CCW heat exchangers and their operation is described in Palisades EA Section 3.4.2 and Section 3.4.3. Currently, two CCW heat exchangers are installed, each with a nominal flow capacity of 50 percent. Therefore, both CCW heat exchangers must be operated concurrently. Replacing the current CCW heat exchangers with new ones, each with nominal 100 percent capacity would allow for operational flexibility by routing all cooling flow through one heat exchanger while the other could be under maintenance. The plant configuration, including ultimate heat sink water use and the flow through the CCW heat exchangers, would remain unaltered, even if new CCW heat exchangers are installed.

The consumptive water use for power production at Palisades is described in Section 3.4.3 of the Palisades EA. Appendix F of the EA described the effects of climate change on water resources.

These comments and the referenced material do not provide new and significant information that would alter the conclusions in the Palisades EA; therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.14.2 Hydrology-Surface Water Response 2

Comments: (6-5) (7-8) (23-3-13) (23-5-2) (23-7-12) (23-13-2) (23-17-8) (23-20-17)

Comment: I also made a public comment on the reissuance of NPDES Permit M10001457, which was approved. Here is an excerpt of my comment, "It appears Palisades is meeting all the standards for effluent limitation guidelines under Part 31 of the Natural Resource and Environmental Protection Act (NREPA), Part 21 Rules, Wastewater Discharge Permits, Part 4 Rules, Water Quality Standards, and Part 8 Rules, Water Quality Based Effluent Limit Development for Toxic Substances." (6-5 [Connors, Shawn])

Comment: The State of Michigan water discharge draft permit (NPDES) allows huge amounts of lake water withdrawn up to 390,000 gal./minute, most is returned to the lake as heated water with the balance emitted through the cooling towers as water vapor (itself a greenhouse gas). The Great Lakes water temperatures have been increasing and Palisades effluent would add to that. (7-8 [McCardle, Edward])

Comment: [Sensitive resources at/near PNP, which would be significantly impacted by reactor restart, include the Great Lakes: 21% of world's surface fresh water, 84% of North America's surface fresh water, and 95% of the USA's surface fresh water. The Great Lakes are the drinking water supply for more than 40 million people in 8 U.S. states, 2 Canadian provinces, and a large number of Indigenous Nations. Lake Michigan alone is drinking water supply for 16 million people in 4 U.S. states, and a large number of Indigenous Nations. These figures are for current generations alone, let alone future generations yet to be born. Any impacts on Lake Michigan, from "routine operations" or catastrophes at PNP, would blow with the wind, flow with the water, and contaminate the food supply, with negative impacts lasting a very long time, given the hazardous persistence of various radioactive isotopes released, measured as 10 to 20 half-lives. (23-3-13 [Kamps, Kevin])

Comment: What about the use of hydrazine and other chemical toxins at PNP, such as for "cleaning" SSCs, as biocides in the cooling water intake and discharge pathways, etc.? Hydrazine is ultra-toxic in very small quantities, and yet Holtec has requested permission in PNP's NPDES permit to discharge large amounts into Lake Michigan, which would be a major negative impact on the environment and human health. (23-5-2 [Kamps, Kevin])

Comment: What biocides does PNP use? In what quantities? To kill zebra mussels, quagga mussels, and what else? NRC and DOE should be fully transparent about biocide use at PNP. The EA's coverage is inadequate. Full transparency should be provided in an EIS/PEIS. (23-7-12 [Kamps, Kevin])

Comment: Speaking of biocides, was the frothing white-ish wastewater flush discharged into Lake Michigan in the spring of 2017, or summer/fall of 2016, biocides, or some other substance? A Palisades Park Country Club resident spoke about it during her public comment

testimony at a Michigan Public Service Commission public meeting held at the Van Buren Conference Center, in Lawrence, MI on May 8, 2017, about Palisades. Here is the link to a Beyond Nuclear press release and action alert about, and summary report back from that meeting:

<https://archive.beyondnuclear.org/nuclear-subsidies/2017/5/8/beyond-nuclear-media-statement-re-mpsc-public-comment-mtgs-a.html>

The PPCC resident, a grandmother, was watching her young grandchildren swim and play in Lake Michigan, just offshore from PPCC. All of sudden, this frothing flush was released from PNP. She did not what it was, and feared it was dangerous. She yelled and screamed for her grandchildren to get out of the Lake, before the frothing flush overtook them, but they could do do so fast enough. She did not know what that frothing flush was, and still feared it may have harmed her grandchildren's health. It certainly traumatized her, and her grandchildren. Why are such traumatic impacts as this woman and her grandchildren suffered not mentioned in this EA? They should be addressed in an EIS/PEIS.

For that matter, why does NRC have no regulatory requirements that batch releases of radioactive wastewater, toxic chemical wastewater, and biocide wastewater, discharged into Lake Michigan from PNP, do not involve a clear warning to swimmers, boaters, fishers, and other beachgoers in Lake Michigan, about what is about to happen? Especially in the summertime, the beach at Van Buren State Park to the immediate north of PNP, and the beach at PPCC to the immediate south of PNP, can be filled with many hundreds of people, including children. The Lake just offshore from PNP can be filled with dozens or more of boats. Many boats and people are drawn to PNP's discharge pathway into the Lake, because of the thermal discharge, the warm water. So when the hazardous seasonal batch release takes place, in the summer especially, depending on what day and time it takes place, many hundreds of people could be impacted directly. No LIES, DAMN LIES, AND STATISTICS - this would be a direct exposure to concentrated radioactivity, toxic chemicals, and biocides.

This appears to be what may have happened to the PPCC grandmother and her grandchildren, reported above.

How can NRC have no regulations about when such batch releases take place? And no regulations about warnings to those who could be harmed and traumatized by it? Is PNP's owner/operator supposed to voluntarily take precautions before batch releasing radioactive, toxic chemical, and biocide wastewater into the Lake, when it is occupied by hundreds of swimmers and boaters on a Saturday in July or August, for example? Because it appears that Entergy took no such precautions in 2016 or 2017, according to the traumatized PPCC grandmother above. Such occurrences are unacceptable. (23-13-2 [Kamps, Kevin])

Comment: Hydrazine is ultra-hazardous. And yet Holtec has requested MI EGLE give it permission, in its NPDES, to release large amounts into Lake Michigan. What about the many other toxic chemicals to be used at the restarted PNP, and at the SMR new builds, such as other biocides in addition to hydrazine. What will be the human health and ecological impacts of this? NRC and DOE seem willfully blind to conclude there will be no significant impacts. They have done hardly a look, rather than a hard look. An EIS/PEIS is required. (23-17-8 [Kamps, Kevin])

Comment: HDI (Holtec Decommissioning International, LLC). 2023. Notification from B. Turco, Holtec Palisades LLC, Chemistry/Environmental Supervisor - Palisades, to J. Rubio, Michigan

Department of Environment, Great Lakes, and Energy, Water Resources - Kalamazoo District Office, regarding "an Upset Non-Compliance incident of the Station's [Palisades Power Plant] NPDES permit." Palisades Power Plant, Covert, Michigan. TN10674.

[Why was no more detail readily provided in the EA about this? So DOE and NRC put the burden on the public to track down any specifics about what happened? Even the scant information provided here shows that PNP is far from "clean" energy, undermining this EA's Purpose and Need section, as well as the so-called "clean" energy State of Michigan law cited by DOE and NRC.] (23-20-17 [Kamps, Kevin])

Response: These comments addressed potential impacts to water resources from the reauthorization of Palisades related to releases of radiological and nonradiological constituents. Discharge of nonradioactive effluents including thermal discharges are authorized under the Federal Water Pollution Control Act of 1972 (also known as the CWA; 33 U.S.C. 1251 et seq. [TN662]) by the EPA, or by a State, territory, or Tribe to which the EPA has delegated the responsibility. Since October 17, 1973, Michigan is an authorized State for NPDES permitting. The NRC retains the authority to license discharge of radioactive effluents from Palisades in accordance with its regulations at 10 CFR Part 20 (TN283). Palisades' NPDES Permit, MI0001457, issued by the Michigan EGLE, had an expiration date of October 1, 2018, but is currently under administrative extension as EGLE is reviewing Palisades' NPDES Permit renewal application. EGLE has issued a draft NPDES Permit for which a public hearing was held on October 1, 2024 (MEGLE 2023-TN10739). The draft NPDES Permit specifies effluent limitations for flow, temperature, thermal discharge, total residual oxidant, total residual chlorine, total mercury, pH, hydrazine, chloride, sulfate, and the use of Spectrus CT-1300 (a microbial control agent). The draft permit also specifies monitoring and reporting requirements for specified pollutants. The draft permit is publicly available from EGLE. The October 30, 2023, noncompliance of the NPDES Permit is described in the Palisades EA, Section 3.4.1. This noncompliance was caused by overapplication of sodium hypochlorite and following the event, Holtec appropriately notified EGLE and took corrective action.

The "frothing white-ish wastewater flush" was a result of the molluscicide treatment on August 3, 2016. This treatment involves the use of Spectrus CT-1300 and bentonite clay to detoxify the treated effluent as described in Palisades' NPDES Permit MI0001457. Entergy, the Palisades operator at the time, notified the Michigan Department of Environmental Quality (MDEQ, now EGLE) on July 28, 2016, about the upcoming treatment and effluent discharge. On August 3, 2016, at 2:51 p.m. Eastern Time, the MDEQ/EGLE received a call reporting foam being ejected into Lake Michigan from Palisades. In a follow-up email to MDEQ/EGLE on August 3, 2016, 5:27 p.m. Eastern Time, Entergy staff explained that the reported plume consisted of remnants of the bentonite clay powder used in the molluscicide treatment. The Entergy staff stated that the clay powder was not harmful to aquatic life or to the public and would eventually settle to the bottom of the Lake. The clay plume was visible because of the calm Lake conditions. This molluscicide treatment is a widely accepted practice in industrial water treatment (MDEQ 2016-TN11929).

Separately from the NPDES Permit renewal, Holtec has also requested EGLE for a CWA Section 401 State water quality certification. EGLE is currently reviewing Holtec's request whether Palisades' effluent discharge meets Michigan's Water Quality Standards. A CWA Section 401 water quality certification or a waiver is needed for NRC to reauthorize power operations.

If liquid effluents contain radiological material, they are further regulated under 10 CFR Part 50 Appendix I requirements (10 CFR Part 50-TN249). The 10 CFR Part 50 Appendix I identifies restrictions on dose from effluents related to power operations from water cooled nuclear power reactors and directs licensees that each individual power station must comply with effluent limits of 3 mrem to the total body and 10 mrem to any organ. Continuous or batch releases must be monitored and may be done following the guidance provided in Regulatory Guide 1.21, Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste (NRC 2021-TN7227). Appendix G of the EA lists construction and operation of future SMRs as a reasonably foreseeable future actions—each of the resource areas in EA Chapter 3 analyzed environmental effects of these actions.

One commentor expressed concerns about potential accidents at Palisades. Section 3.14 of the EA described environmental impacts of postulated accidents. One commentor expressed that water vapor is a GHG itself. Appendix F of the EA analyzed effects from GHGs including water vapor. These comments and the referenced material do not provide new and significant information that would alter the conclusions in the Palisades EA; therefore, no changes were made to the EA as a result of these comments.

K.5.14.3 Hydrology-Surface Water Response 3

Comment: (23-5-19)

Comment: "Armored" is a strange word choice. During the historic high Lake Michigan water levels of spring 2020, significant erosion took place, not far from PNP. This is a cautionary tale for what could happen at PNP itself in the future, meaning major impacts on the environment and health, if radioactive contamination is washed into the Lake or groundwater, if dry cask storage pads are destabilized, and if even reactor operations are threatened by this form of flooding, especially during extreme weather events connected to climate chaos. **(23-5-19 [Kamps, Kevin])**

Response: "Armoring" is the practice of using physical structures to protect shorelines from coastal erosion and is a common practice with both beneficial and detrimental effects. Armored shorelines can prevent sandy beaches, wetlands, and other intertidal areas from moving inland as the land erodes or lake levels rise, but they also have the potential to eliminate habitat for marine organisms and beach front by restricting the natural movement of sediments. Shoreline armoring along Lake Michigan in Michigan is permitted jointly by EGLE (previously DEQ) and U.S. Army Corps of Engineers (USACE). Effects of the environment, including those from extreme weather events and flooding, on the safety and performance of plant structures, systems, and components are evaluated in the NRC staff's safety evaluation and are outside the scope of the Palisades EA. Safety concerns regarding the ISFSI are evaluated separately and are outside the scope of the Palisades EA. The effects of climate change on the environmental conditions near Palisades were considered in the Palisades EA, Appendix F.

This comment does not provide new and significant information that would alter the conclusions in the Palisades EA; therefore, no changes were made to the EA as a result of this comment.

K.5.14.4 Hydrology-Surface Water Response 4

Comments: (23-7-13) (23-7-14) (23-7-15) (23-10-5)

Comment: Many members of our environmental coalition opposed to Holtec's restart of PNP, as well as opposed to Holtec's SMR new builds at PNP and Big Rock Point NPP site, testified at MI EGLE public comment hearings in October 2024. We testified against renewal or extension of PNP's NPDES permit, which would allow the dumping of hazardous substances into Lake Michigan, for many years or even decades to come, to enable PNP's restarted operations, and also Holtec's SMR new builds' operation. Similarly, we oppose any granting by EGLE of certifications or waivers, such as re: CWA Section 401 water quality requirements. PNP should be retired, for good, as long planned, in order to allow Lake Michigan's aquatic ecosystem to heal from more than a half-century of abuse by PNP. Water is life. Lake Michigan is not a radioactive and toxic chemical and thermal wastewater industrial sewer. Drinking water, and habitat for indigenous biological diversity, is a more important value than treating the Lake as an industrial sewer for PNP's ongoing abuse.]

On October 30, 2023, a noncompliance of the NPDES permit occurred due to overapplication of sodium hypochlorite in the service water system that resulted in an exceedance of total residual oxidant (TRO) permit limit of a daily maximum of 300 ug/L because of one TRO sample measuring 360 ug/L (HDI 2023-TN10674). The daily average TRO limit of 200 ug/L was not exceeded. Holtec notified Michigan EGLE and took corrective actions. The event was documented in Palisades' corrective action process (HDI 2023-TN10674)

[This is yet another example of Holtec violating state and federal environmental laws and regulations at PNP. Holtec's misdeeds should be stopped by state and federal agencies, not enabled, accommodated, permitted, etc.] (23-7-13 [Kamps, Kevin])

Comment: This topographic configuration supports surface runoff from cooling tower B area to the south toward grassy and wooded areas.

[Are there any hazardous substances flowing with that, building up where it lands/settles/pools? What are the biological impacts, as on habitat in the critical dunes, on flora and fauna and fungi, including endangered, threatened, and species of special concern?] (23-7-14 [Kamps, Kevin])

Comment: P. 56 ON PDF COUNTER (page 3-16)

Stormwater for the rest of the Palisades site is drained by a stormwater drainage system that eventually discharges into Lake Michigan (figure 3-3 below).

[How much radioactive and other hazardous contamination flows with that, into the Lake? Which substances, specifically? What are the biological impacts on the ecosystem? NRC and DOE should address these questions, comprehensively, in an EIS/PEIS.] (23-7-15 [Kamps, Kevin])

Comment: Have there been any "shortcuts" taken at PNP? Like just dumping directly in the Lake, intentionally, or allowing to flow into the Lake, with water flows at the surface as runoff? (23-10-5 [Kamps, Kevin])

Response: *Palisades' stormwater drainage system and stormwater management are described in the Palisades EA, Section 3.4.1. Palisades' stormwater discharge is permitted under NPDES Permit No. MI0001457, which is currently under review for renewal by EGLE (MDEQ 2014-TN10665, MEGLE 2023-TN10739). The draft NPDES Permit issued by EGLE requires development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP identifies potential sources of pollutants in stormwater and includes procedures to reduce pollutants in stormwater runoff. Palisades also has a Spill Prevention, Control, and*

Countermeasures (SPCC) plan under which accidental spills of oil, salt, and other polluting materials are managed. The SPCC plan includes procedures for quickly identifying, controlling, and cleaning up spills and reporting to appropriate authorities. Palisades has a Storm Water Management Industrial Site Certification, I-18257, with an expiration date of July 1, 2026, that certifies plant personnel as stormwater operators for industrial facilities.

Separately from the NPDES Permit renewal, Holtec also requested EGLE for a CWA Section 401 State water quality certification. Holtec received their CWA Section 401 water quality certification on May 5, 2025 (EPA 2025-TN11930; MEGLE 2025-TN11933). This information was added to Table C-2 in the EA.

Palisades' NPDES Permit, MI0001457, establishes limits on Palisades discharges to ensure protection of the aquatic, riparian, and wetland environments. As stated in the EA (Sections 3.6.3, 3.7.3) adherence to permit conditions, as well as SPCC, SWPPP, and other site-specific BMPs would continue to minimize impacts to the aquatic and terrestrial ecosystem.

Other than the EA revision mentioned above, these comments and the referenced material do not provide new and significant information that would alter the conclusions in the Palisades EA; therefore, no changes were made to the EA as a result of these comments.

K.5.14.5 Hydrology-Surface Water Response 5

Comments: (23-9-7) (23-9-14) (23-24-6) (23-26-11)

Comment: *As NRC and DOE admitted above, tritium in sand dune groundwater flows into Lake Michigan, another impact on Lake Michigan, and its drinking water supply.*

In a 2013 report about health impacts at/near PNP, Joe Mangano at Radiation and Public Health Project, cited a US EPA data point, a snapshot figure of 2,500 pCi/L, from the mid-1990s in open Lake Michigan surface water, several miles dilution factor north, at South Haven. What much higher concentration must it have been at when it was discharged at PNP?]

We thus incorporate by reference as if fully rewritten herein Mangano's 2013 report on PNP:

<https://static1.1.sqspcdn.com/static/f/356082/23338979/1376923567073/8+19+13+Mangano+Palisades+report.pdf?token=kktM17PzcXPbZE5P9G2pP3ttgUA%3D> (23-9-7 [Kamps, Kevin])

Comment: *Per Benton Harbor resident Barbara Pellegrini above, tritiumj leaks, spills, and intentional discharges into Lake Michigan from PNP represent an increase of tritium concentrations in the Lake, because it is not natural - it is artificial - and it's not just PNP - it's all the tritium sources around the Lake, including all the atomic reactors, but also tritium contaminated exit signs buried in leaking landfills, the flow then entering local surface and groundwaters, so of which ultimately flow into the Great Lakes. Only 3 to 24 pCi/L is natural tritium in surface water, as mentioned previously. So the EPA data point measured in South Haven, several miles from PNP, cited by Mangano above, of 2,500 pCi/L in open Lake Michigan surface water in the mid-1990s, is more than 100 to 800 times natural concentration levels - very likely discharged from PNP.*

The recently disclosed PNP measurement of tritium contamination at concentrations above 600,000 pCi/L is more than 25,000 to 200,000 times higher than natural tritium concentrations in our planet's surface waters.

All such leaks can be expected to grow worse over time, especially given restarted operations, and renewed artificial tritium generation (23-9-14 [Kamps, Kevin])

Comment: [climate change could inflict LARGE impacts on PNP, meaning large impacts on Lake Michigan and the Great Lakes downstream, and all who depend on them. Rising Lake levels could alter flow dynamics at and around PNP. Radioactive contamination could find fast flow pathways into groundwater, and/or the Lake, both of which are drinking water supplies. fisheries in the Lake could experience bioaccumulation of radioactivity. Irrigation water, whether drawn from groundwater or the Lake, could contaminate the food supply. Apex predators on the food chain, from humans to eagles and other carnivorous wildlife, would then be exposed to the worst, bioaccumulated doses.

Radioactive contaminants from PNP do not dilute in Lake Michigan, they build up. They are artificial, not natural. Artificial tritium doesn't dilute, it builds up. It should not be there in the first place. And it also bio-accumulates/magnifies/concentrates. (23-24-6 [Kamps, Kevin])

Comment: To obtain information on radioactivity around the plant, samples of environmental media (e.g., surface water, groundwater, drinking water, air, milk, locally grown crops, locally produced food products, river, ocean, or lake sediment, and fish and other aquatic biota) are collected from areas surrounding the plant for analysis to measure the amount of radioactivity, if any, in the samples.

[cite Mangano's 2013 citation of EPA tritium figure from mid-1990s]

As part of its environmental review, the NRC staff reviews REMP reports to look for adverse data or evidence of a buildup of radioactivity in the environment.

[as Barbara pellegrini has pointed out, above, radioactive discharges into Lake MI from PNP are artificial. They do not dilute. They build up.] (23-26-11 [Kamps, Kevin])

Response: *One commenter expressed concerns regarding tritium in Lake Michigan. The tritium data referred to in the comment appears to come from Appendix 1 of the cited source (Joseph Mangano report). The October 1995–June 1999 tritium data reported for Lake Michigan near Palisades consisted of 15 samples with a total of 2,758 pCi/L and an average of 183.9 pCi/L. One measurement of 2,500 pCi/L was reported for July 12, 1993. All these values are below the EPA maximum contaminant level for tritium of 20,000 pCi/L in drinking water. Further information on tritium, radiation protection limits, and drinking water standards can be found in NRC 2024-TN11293. Palisades monitors the buildup of radiological material by conducting a REMP. An annual REMP report describes the impacts to the local environment from any radiological release. As described in REMP reports from 2019 through 2023 in the text above, no measurable effects of radiation above baseline levels have been detected.*

These comments and the referenced material do not provide new and significant information that would alter the conclusions in the Palisades EA; therefore, no changes were made to the EA as a result of these comments.

K.5.14.6 Hydrology-Surface Water Response 6

Comment: (23-8-3)

Comment: Water withdrawn to support spent fuel pool cooling would continue to be returned to Lake Michigan and therefore would result in no consumptive water use. Therefore, the impact of this water use on surface water resources would be minor

[But what about radioactive contamination of that water returned to Lake MI? What about the tritium concentration in it? Other chemical toxins? (23-8-3 [Kamps, Kevin])

Response: *The spent fuel pool cooling system, described in Palisades' Updated Final Safety Analysis Report Section 9.4 (Entergy 2021-TN10998), is the primary system that may be impacted by radioactive material. This system contains filters that remove any contamination within the primary coolant. The heat from the spent fuel pool is removed by the spent fuel pool heat exchanger with the secondary, physically separated, CCW system. The CCW system transfers its heat load to the service water system via the CCW heat exchangers. The service water system, a tertiary cooling system, is the open-loop system comprising the ultimate heat sink and interfaces with Lake Michigan. Because there is no direct interface to Lake Michigan from the spent fuel pool cooling system, the service water is unlikely to contain radioactive material from the primary coolant loop.*

This comment does not provide new and significant information that would alter the conclusions in the Palisades EA; therefore, no changes were made to the EA as a result of this comment.

K.5.15 Comments Concerning Land Use and Visual Resources

Comments: (23-4-1) (23-4-2) (23-4-4) (23-5-1) (23-5-10) (23-5-16) (23-20-12)

Comment: The nearest population center is the township of Covert, which is approximately 2.5 mi (4 km) southeast of the Palisades site.

Van Buren State Park is located immediately to the north of the Palisades site, and Van Buren Trail State Park is located northeast of the site. The local terrain consists of wooded sand dunes along the lakeshore, and the area surrounding the plant is largely rural.

[Why is there no mention whatsoever here of PPCC, the 120-year old Palisades Park Country Club resort community, of more than 200 households, with a population of 2,000 people in the peak of summertime? Doesn't PPCC qualify as a population center?! It is located immediately south of Palisades Nuclear Plant (PNP). In fact, PNP displaced a number of former PPCC cottages. PPCC is the name origin of PNP - and the towering sand dunes in the area are the origin of PPCC's name.] (23-4-1 [Kamps, Kevin])

Comment: The dunes are relatively stable topographic features with occasional blowout caused by wind action. The majority of the land area is heavily wooded, with occasional wetlands. Besides the transmission line and corridor, the facilities at Palisades are only publicly visible from Lake Michigan and the beach areas to the north and south of the plant boundary.

[The dunes are critically endangered habitat for biodiversity - there are even forested wetlands amongst the sand dunes. These are rare and fragile ecosystems. PNP has had major impacts on them since 1967, when ground was broken.

Why is there no mention of the significance of blowouts, wind-driven displacement of large amounts of sand from the dunes. Blowouts could have major impacts on reactor, radioactive waste, and radioactive contamination, in terms of safety, health, and environmental protection.

PNP is "nestled in the dunes," to borrow a phrase from a top spokesman at Cook nuclear plant 30 miles south of PNP. But PNP's misdeeds, and their impacts, are not confined "just" to the dunes, which is bad enough; the impacts and potential consequences extend over a very large

region actually. One can see Palisades Nuclear Plant (PNP) from the bluffs above the beach at South Haven, several miles away, a real eyesore. PNP can be seen from many miles out on Lake Michigan, again, a real eyesore. But also a cause for tremendous concern, if one understands what they are looking at, and the long, controversial (for good reason), and troubled history of PNP.] (23-4-2 [Kamps, Kevin])

Comment: Fig. 2-3 - finally a mention of PPCC (Palisades Park Country Club! Why was it not mentioned above? The figure also shows how very close dry cask storage is to the Van Buren State Park campground. Routine operations at PNP are bad enough impacts on these very close by population centers. Catastrophic releases of hazardous radioactivity at PNP would be even worse for people at these immediately adjacent locations, in terms of human health and environmental impacts. (23-4-4 [Kamps, Kevin])

Comment: PNP is an eyesore on what would otherwise be a very beautiful Lake Michigan shoreline.

Nature's and the land's purpose and need, just to be left alone in a healthy state, should trump Holtec's purported purpose and need, and even the State of MI's misguided so-called purpose and need. (23-5-1 [Kamps, Kevin])

Comment: The deepest point into the previously disturbed critical dune will be approximately 45 vertical ft and is located on the east end of the roadway.

[45 feet deep is a huge negative impact, very destabilizing for these fragile, critically endangered sand dunes. Isn't the State of Michigan supposed to protect the dunes? Why is it not?] (23-5-10 [Kamps, Kevin])

Comment: 3.2 Land Use and Visual Resources

[At nighttime, PNP is all lit up by glaring bright lights. In daytime, an operating PNP emits a large amount of steam. These are major eyesores, all the way to South Haven, and a great distance out to sea for boaters. Otherwise, the Lake Michigan shoreline here would be quite beautiful, but for this "monster on the beach," as the PPCC 100th anniversary yearbook (1905 to 2005) put it, in its chapter about PNP.] (23-5-16 [Kamps, Kevin])

Comment: However, building new facilities would result in additional environmental impacts related to land disturbance and use of construction equipment. These impacts would be greater than those needed to put the already built Palisades facilities back into operation.

[Interesting NRC and DOE say this, since Holtec also proposes building 2 SMR-300s on the very same site as the restarted PNP zombie reactor. And yet there is no mention of that here?!] (23-20-12 [Kamps, Kevin])

Response: Commenters expressed concern that the Palisades draft EA did not adequately characterize the local community of Palisades Park Country Club, immediately to the south of Palisades, as well as the potential land use and visual impacts to critical dunes, their ecosystems, Lake Michigan and the lakeshore, safety risks from the ISFSI being near a campground, and the potential for increased fog and lights from plant operations. The NRC staff determined the nearest population center based on permanent residence. However, the Palisades Park Country Club was discussed as part of the affected environment in Section 3.2.1 of the EA. On February 13, 2025, Palisades was issued a critical dune permit from the Michigan

Department of Environmental, Great Lakes, and Energy (MEGLE 2025-TN11940). This permit, which facilitates work and work controls within critical dune environments, expires on February 13, 2030. The updated permit information is found in Appendix C, Table C-2. The NRC staff analyses of potential impacts to dune ecosystems, visual impacts, and the local community are described in the Palisades EA Sections 3.2 (Land Use and Visual Resources), 3.3 (Meteorology and Air Quality), 3.6 (Terrestrial Ecology), and 3.9 (Socioeconomics). Safety concerns regarding the ISFSI are not within the scope of the Palisades EA. This comment does not provide new and significant information that would alter the conclusions in the Palisades EA; therefore, no changes were made to the EA as a result of this comment. The NRC staff notes that permitting information in Table C-2 was updated in the final EA.

K.5.16 Comments Concerning Meteorology and Air Quality

K.5.16.1 Meteorology and Air Quality Response 1

Comment: (23-17-9), (23-4-6)

Comment: *What about PPCC and Van Buren State Park - lots of folks swimming or wading, as well as boating and fishing, as well as beachgoing, in or near the Lake, in very close proximity - the PNP cooling towers are immediately adjacent to PPCC - are some cabins continually exposed to cooling tower plume fallout? Kevin Kamps once experienced very thick "pea soup" fog at Van Buren State Park. When he asked the park ranger if the fog was natural, or artificial cooling tower plume fallout from PNP, the park ranger said they did not know for sure. Arnie Gundersen, chief engineer of Fairewinds, has raised related concerns in his expert witness declaration testimony in this very ASLB proceeding, per above. (23-17-9 [Kamps, Kevin])*

Comment: The replacement towers are crossflow mechanical draft cooling towers, designed for a 32 degrees Fahrenheit (°F) (17.8 degrees Celsius [°C]) range and a maximum sound level of 90 A-weighted decibels at 3 ft (0.9 m) from the equipment (HDI 2023-TN10712; Holtec 2023TN10538). The replacement towers included drift eliminators with a guaranteed drift rate of 0.001 percent of the circulating water flow rate (HDI 2024-TN10670: RAI-TE-1).

[Does the drift contain hazardous, toxic chemicals, such as biocides? Does it contain radioactivity, such as tritium? If yes to either question, why is that not spelled out clearly here?

Even 0.001% of the flow is still a lot of drift.

The commenter recalls very thick "fog" experienced at Van Buren State Park in the past. Given the shoreline in Lake Michigan (such as from road salts used to de-ice roads in the wintertime), what kind of CISCC (Chlorine-Induced Stress Corrosion Cracking) risk/damage does that mean for all things metallic and corrodable at PNP, including safety-significant systems, structures, and components (SSCs)? Our environmental coalition intervening against Palisades' restart has retained Arnie Gundersen, chief engineer at Fairewinds, as an expert witness in that proceeding. Gundersen has warned about drift fog obscuring drivers' visibility on nearby roadways, which includes Blue Star Highway and Interstate-196, just east, inland from PNP. Why has such hazards for drivers from the cooling tower drift at PNP not been addressed in this EA? (23-4-6 [Kamps, Kevin])

Response: As described in Sections 3.2, 3.3, and 3.6 of the Palisades EA, the originally constructed cooling towers at Palisades would create occasional fog and ice—including vegetation damage—under certain climatic and water chemistry conditions. Icing occurred up to

400 m (1,300 ft) downwind during cold seasons depending on the wind speed (Ryznar et al. 1980-TN11923), but the impact of this ice (and fog) was negligible at Palisades and in adjacent areas. Rochow (1978-TN10666) also noted most vegetation damage occurred to the south and southeast of the cooling towers up to 140 m (460 ft) downwind. Plume downwash occasionally descended to the ground up to 0.7 km (0.4 mi) east of the cooling tower as reported in Rochow 1978 (TN10666). However, Palisades stopped using sulfuric acid in the cooling tower water by 1987 (Rochow 1978-TN10666) and consequently no additional impact has been further observed to the surrounding vegetation.

All other chemical constituents at Palisades, and within the cooling tower water and plume, are regulated by the NPDES permit. The cooling water should not have any radionuclides under normal operating conditions, and no radionuclides are expected in the cooling plume drift. The Chlorine-Induced Stress Corrosion Cracking related damage is safety related, which is discussed in the Final Safety Analyses Report submitted to NRC.

While areas in the immediate vicinity of Palisades, including Van Buren State Park, may experience occasional cooling tower plume downwash in the form of fog under certain climatic conditions, previously analyzed meteorological data indicate that there is no significant impact from this downwash (Ryznar et al. 1980-TN11923). The construction of new cooling towers in 2012 and 2017 also further increased drift elimination from the cooling towers by a rate of between 0.005 and 0.2 percent in the original towers, to an updated rate of drift not to exceed 0.001 percent. As a result of this comment, a reference citation to the original fogging and icing study for the Palisades cooling towers was added in Sections 3.2.2 and 3.3.3 of the EA. The date that sulfuric acid was removed from the cooling tower water was also added to the Palisades EA.

K.5.16.2 Meteorology and Air Quality Response 2

Comment: (23-6-10)

Comment: There are no Prevention of Significant Deterioration Class I areas located within 100 mi(161 km) radius of the Palisades site.

[Not even Michigan City, IN? Gary, IN? Chicago, IL? Is that because they just over 100-miles away? Or not even? NRC needs to expand its radius of concern, and recognize the areas of significant concern that southern ring Lake Michigan, including at the PNP itself.] (23-6-10 [Kamps, Kevin])

Response: The Clean Air Act gives special air quality and visibility protection to national parks larger than 6,000 acres (ac) (2,400 ha) and national wilderness areas larger than 5,000 ac (2,000 ha) that were in existence when it was amended in 1977. These are “Class I” areas. All other areas are “Class II” allowing for a moderate amount of air quality deterioration. Class I areas receive extra protection from the impacts of air pollution. The classification was established under the Clean Air Act Prevention of Significant Deterioration (PSD) program to limit the amount of additional pollution to these areas resulting from construction or modification of major sources of air emissions. There are no Class I areas within 250 km of the site. For a complete list of Class I areas, please refer to 40 CFR Part 81, subpart D (40 CFR Part 81-TN7226).

The comment cited some examples of nearby major metropolitan cities which may be designated as non-attainment regions. However, the site itself is currently in an attainment area

for all criteria pollutants. In Section 3.3.2 and 3.3.3 of the EA, the NRC staff assessed the impact of air emissions of criteria and hazardous pollutants as having no significant impact for those emissions that are evaluated under the Clean Air Act.

No changes were made to the Palisades EA as a result of this comment.

K.5.16.3 Meteorology and Air Quality Response 3

Comment: (23-7-4)

Comment: The NO_x emissions from fossil fuel combustion are relatively higher than other pollutants, but still much below than the threshold of 100 TPY. Additional contribution to ozone formation from NO_x and VOC emissions **should be insignificant. [Emphasis added]**

[Should be? But may be worse than that? But NRC and DOE don't care enough to look into that possibility? (23-7-4 [Kamps, Kevin])

Response: The ozone formation due to a certain emission rate of nitrogen oxides (NO_x) and volatile organic compounds are calculated using regionally complex photochemical transport models such as Community Multiscale Air Quality and Comprehensive Air Quality Model with extensions. Palisades emits less than 10 tons per year of NO_x and less than 1 tons per year of volatile organic compounds emissions, and therefore the contribution to any tropospheric ozone formation is negligible. Additionally, the site is in attainment for ozone; thus, the contribution of Palisades emissions to local ozone formation and pushing the region to non-attainment is improbable. No changes were made to the Palisades EA as a result of this comment.

K.5.16.4 Meteorology and Air Quality Response 4

Comment: (23-6-12)

Comment: That's a lot of GHG from Palisades restarting. Especially compared to just decommissioning it. And what about the GHG from Holtec's 2 SMRs? What about cumulative impacts? And perhaps most significantly of all, what about the climate impacts on PNP, both "zombie" reactor and SMR new builds. Extreme weather driven by climate chaos has the potential for catastrophic meltdowns at PNP, as well as radioactive waste fires. Dr. Mark Jacobson's expert witness testimony, above, clearly shows that renewables are much more cost- and time-effective at reducing GHG emissions than is nuclear power, such as the PNP restart and/or SMR new build schemes. (23-6-12 [Kamps, Kevin])

Response: The direct GHG emissions are very small from the Palisades. The GHG estimates in EA include the contribution to indirect CO₂ emissions from electricity consumption during fuel enrichment for 7 years of operation. More detailed information about the estimation methodology and sources for the uranium fuel cycle is provided in Napier 2020-TN6443. The annual direct and indirect emissions during operations is 205,000 MT CO₂(e) (see Table F-2 of the Palisades EA), which is much less than the GHG emissions from a nearby natural-gas fired power plant i.e., 2,950,609 MT CO₂(e) (EPA 2023-TN11949). This comparison is only to demonstrate that the GHG emissions from the Palisades including the indirect CO₂ emissions are much less than a fossil-fuel fired power plant with similar electricity generation capacity. As stated in the Palisades EA Section 2.2.2.2, to contribute to Michigan's clean energy goals the NRC staff considered alternatives including solar and wind. However, these were not carried forward for detailed analysis because of the additional time and cost needed to build the

alternative facilities and greater environmental impacts relative to resuming operation of the existing reactor. Climate impacts on the operation and safety has been discussed in Appendix F of the EA. With respect to the referenced material from Dr. Jacobson, it is primarily relevant to the construction of new nuclear reactors, which is not applicable to the reauthorization actions at Palisades.

As stated in Section F.4 of the Palisades EA, "the GHG emissions from nuclear power plants are typically very minor because such plants do not normally combust fossil fuels to generate electricity." GHG from the two proposed SMRs would be analyzed as part of a separate application. No changes were made to the Palisades EA as a result of this comment.

K.5.16.5 Meteorology and Air Quality Response 5

Comment: (23-7-8)

Comment: Table 3-3

[*Why is CO₂ not included? How large are the CO₂ emissions?*] **(23-7-8 [Kamps, Kevin])**

Response: *The direct and indirect GHG emissions are provided in EA Appendix F, Table F-2. The yearly GHG emissions estimates are about 18 MT CO₂(e) from boilers and generators, 2720 MT CO₂(e) from workforce vehicles, and 202,000 MT CO₂(e) from indirect emissions due to electricity consumption and natural gas combustion during uranium fuel processing. No changes were made to the Palisades EA as a result of this comment.*

K.5.16.6 Meteorology and Air Quality Response 6

Comment: (23-7-1)

Comment: The two boilers will have a stack height of 100 ft (30.5 m) above the ground with **no pollutant control** equipment. **[Emphasis added]**

[*So much for "carbon-free" nuclear power - it's another lie. **Why "no pollutant control," in the year 2025?** We thought Holtec cared about climate change? On the contrary, they've long had a fossil fuel division.*] **(23-7-1 [Kamps, Kevin])**

Response: *The commenter questioned the need of pollutant control for two boilers at Palisades. The State permit does not require any pollution control equipment since the low air emissions from these two boilers does not cause any significant degradation in air quality. The applicant provided detailed emission estimates from all its emission components as provided in the renewable air permit from the MDEQ. No changes were made to the Palisades EA as a result of this comment.*

K.5.16.7 Meteorology and Air Quality Response 7

Comment: (23-7-6)

Comment: The Palisades site has surrounding counties which are in maintenance status for lead and sulfur dioxide.

[*Lead poisoning via drinking water in Benton Harbor, MI is not unlike lead poisoning via drinking water in flint, MI. NRC and DOE should be more concerned about cumulative impacts, from*

multiple lead exposure pathways (drinking water, air, soil contamination, etc., especially in environmental justice (EJ) communities near PNP, like Covert Twp., Benton Harbor, etc.). This should be addressed in an EIS/PEIS.] (23-7-6 [Kamps, Kevin])

Response: The air emissions of lead are very low in the range of 10^{-5} tons per year. These slight emissions can occur due to diesel oil combustion in the boilers and emergency generators. However, the atmospheric concentration and consequent deposition of lead will be very small as a result of these emission sources. Changes have been made to EA Section 3.3.3 to state that emissions from the proposed Federal actions would not affect the surrounding counties' maintenance status. Comments related to surface water quality are discussed in this report in Section K.5.14. Because the atmospheric concentrations of lead are small from emissions from Palisades, any subsequent deposition of lead in nearby surface water bodies is also expected to be not significant. No further changes were made to the EA.

K.5.16.8 Meteorology and Air Quality Response 8

Comment: (23-22-10)

Comment: Please explain more about this relationship between federal or state law. Which "department" above is the EA referring to? If such technology has no better competition, it is declared best available then? (See MgCl facility comments made above - a unique facility, by definition, is "best available technology," even if it also the worst available technology, because there is no better technology. No matter how polluting it is. The federal agencies really should be required to do better than this in the Year 2025, shouldn't they, as public health and environmental health continue to decline dangerously, given such loopholes in environmental protection and health protection laws - wide enough to drive a Mobile Chornobyl Heavy Haul Truck through! If DOE and NRC could clarify all this in an EIS/PEIS, we'd really appreciate it. (23-22-10 [Kamps, Kevin])

Response: Section 112 of the Clean Air Act (TN1141) addresses emissions of hazardous air pollutants. This law requires major polluters to install "maximum achievable control technology" if the emissions are more than the Federal thresholds. However, this is not required for facilities that have equipment that burn natural gas or diesel fuel less than 100 MMBTU per hour. Palisades has boilers with maximum capacity of 23 MMBTU per hour, below the Federal threshold, and therefore this exemption applies.

EPA is authorized to implement Clean Air Act including Section 112 while the implementation is delegated to states. The Michigan law regarding Best Available Control Technology for Toxics (T-BACT) in Michigan Administrative Code R. 336.1224 (MI Admin. Code R. 336.1201-1299-TN11942) that is referred here is directly incorporated from the Federal law i.e., Clean Air Act Section 112. No changes were made to the Palisades EA as a result of this comment.

K.5.16.9 Meteorology and Air Quality Response 9

Comment: (23-6-17)

Comment: Since there would be no significant changes in the manner in which the cooling towers are operated (e.g., cooling-water chemistry), and Palisades has replaced the original cooling towers with new towers with drift eliminators, there would be no significant impact from the operations of the cooling towers

[IS NRC so sure? What WERE the "minor modifications" mentioned above? Why didn't NRC and DOE even mention them here? Our environmental coalition expert witness, Arnie Gundersen, chief engineer of Fairewinds, has testified in the connected ASLB proceedings re: Holtec's work and plans re: cooling system modifications. In Gundersen's expert opinion, and judgment, there WILL be significant changes to the cooling system, and they are flawed. Instead of doubling the size of the CCW (Component Cooling Water) heat exchangers, to deal with Lake Michigan's water temperatures increasing with global warming and climate change, he testified that additional cooling tower arrays would need to be installed.]

Gundersen's relevant testimony is cut and pasted in below. Note that Gundersen's testimony is relevant to other sections of the EA in addition to this one, which we will note as we go along. It comes from the environmental coalition's petition and request, dated October 7, 2024, the entirety of which is incorporated by reference, as if fully rewritten herein:

<https://beyondnuclear.org/wp-content/uploads/2024/10/10-7-24-Palisades-Petn-Intervene-PalisadesInterventionPetition-2.pdf>

See Exhibit A: Arnold Gundersen Declaration and CV, beginning on Page 77 of 303 on the PDF counter in the above linked petition and request. (23-6-17 [Kamps, Kevin])

Response: *As described in Section 3.3.3 of the EA, the minor modifications to the cooling towers which occurred during past operation included removing sulfuric acid and adding drift eliminators. While the cooling towers were replaced in 2012 and 2017, they are of a similar design as the previous towers. Even with installation of the proposed CCW heat exchangers, the operation of the cooling towers would be similar to the previous operation in 2022 (see additional discussion in this report Section K.5.14.1). Therefore, no changes were made to the Palisades EA as a result of this comment and associated reference information.*

K.5.16.10 Meteorology and Air Quality Response 10

Comment: (23-7-3)

Comment: The annual emissions reported during 2018, 2022, and 2023 are provided in Table 3-3 below. The NRC staff notes that Palisades shut down in May 2022, therefore the emissions from 2022 are representative of air emissions during partial operation and decommissioning, while 2023 is representative of air emissions during decommissioning.

[Why is there no data from 2019, 2020, and 2021? Did they turn the monitors off those years? Were those years especially bad, so they decided to not report them here?] (23-7-3 [Kamps, Kevin])

Response: *The Palisades EA in Section 3.3.3, Table 3-3, was revised to include estimated emissions for 2019, 2020, and 2021. The applicant submits their estimates to the MDEQ State agency which reviews and records the data to comply with their permit requirements.*

K.5.17 Comments Concerning Need for Project/Purpose and Need

Comments: (17-16) (23-2-2) (23-2-3) (23-3-10) (23-4-12) (23-19-9)

Comment: **The Purpose and Need of the Proposed Action Artificially Cabins the Energy Production Goals to Baseload Power and Restricts the Range of Alternatives.**

The Draft EA states that the purpose and need of the proposed action is to “provide an option that allows for **baseload** clean energy power generation capability within the term of the Palisades’ RFOL to meet current system generating needs.”⁴⁷ This characterization of the energy needed as baseload power creates the presumption that nuclear energy is the only viable path forward because renewable energy sources such as wind and solar are more intermittent than nuclear power. This, however, fails to consider the current technology landscape for renewable energy production.

⁴⁷ Id., pg. 1-3. (17-16 [Scott, David C.])

Comment: NRC's Purpose and Need Statement is unacceptably shallow and woefully inadequate. NRC has stated that a recently enacted State of Michigan "clean energy" law mandates the Palisades restart. But nuclear power is not clean - far from it -- despite misguided and wrongheaded claims in the state law. Greenhouse gas emissions, radioactivity releases, and toxic chemical impacts take place at every stage of the uranium fuel chain. Besides, various other supposed reasons have been given, as by Holtec and Michigan Governor Gretchen Whitmer, for Palisades' restart, from supposedly restoring good paying jobs, to electricity needed for Artificial Intelligence (A.I.) data centers, energy storage battery facilities, charging the electric vehicle fleet, climate mitigation, reliability of electricity supply and the electrical grid, etc. We challenge and rebut all these moving target, throwing-spaghetti-against-the-wall-to-see-what-sticks, supposed justifications for Palisades' restart, just below, although NRC and DOE did not even bring them up in the EA. Rather, the agencies only briefly mentioned Michigan's recently passed "clean energy" law, and also very briefly mentioned Holtec's purported claims of electric reliability enhancement, and supposed independence from energy imports from other states/provinces. (23-2-2 [Kamps, Kevin])

Comment: Rebuttals of these supposed purposes and needs:

Re: AI data centers, recent news about China's Deep Seek AI system sent shock waves around the world, in terms of how efficiently it could be operated. That is, massive expansions of electricity supply would not be needed.

Besides, where is the NEPA-compliant treatment of these nascent AI data center proposals? Treating AI data centers as a done deal, somehow justifying massive increases in electricity supply, including from restarting closed for good, dangerously age-degraded atomic reactors like PNP, is putting the cart before the horse. This lemming-like societal rush, perhaps over a cliff edge, is unwise in the extreme, and illegal under NEPA's "hard look" requirement. We should resist the rush job, and question such proposals carefully.

Energy storage battery facilities could be supplied by renewables like wind and solar. They do not need to be supplied by electricity from PNP. Besides, the Power Purchase Agreement between Holtec and the rural electric co-ops, Wolverine in Michigan, and Hoosier in Indiana and Illinois, is supposedly for all, 100%, of PNP's electricity supply from 2025 to 2051. Are the rural electric co-ops associated with the purported AI data centers? If not, then there would be no PNP-generated electricity left over for use at AI data centers. If these rural electric co-ops are involved with powering ravenous AI data centers, how can \$1.3 billion in USDA grants be justified? Are AI data centers projects that USDA grants are meant to support? This makes no sense.

Re: charging electric vehicle fleets, renewables, backed up by energy storage battery facilities, could do this, instead of PNP.

Re: climate mitigation, the expert witness testimony provided by Dr. Mark Jacobson of Stanford University, in support of the environmental coalition opposing Palisades' restart before the NRC's Atomic Safety and Licensing Board, shows that renewables such as wind and solar are much more cost-effective and time-effective at reducing greenhouse gas emissions, than is restarting the PNP, and than are Small Modular Reactor new builds at Palisades and/or Big Rock Point, PNP's sibling atomic reactor site, 250 miles north, also on the Lake Michigan shore.

Re: reliability of electricity supply and the electrical grid, "the lights have stayed on" in Michigan since Entergy closed Palisades for good on May 20, 2022. This is because there is excess electricity on the grid, put in place to accommodate PNP's retirement, as long planned, as well as to accommodate other anticipated or unanticipated peaks in demand, or anticipated or unanticipated temporary shutdowns of electricity generators, or transmission disruptions, in the service area, as due to weather-related events, such as power outages due to ice storms, wind storms, blizzards, etc. Decentralization in the form of micro-grids is another alternative approach to electricity reliability. It is also ironic that Holtec, NRC and DOE are attempting to somehow claim the electric "reliability" high ground at PNP. PNP's 51 years of operations has a low ranking, compared to other nuclear power plants, in terms of capacity factor performance overall. Holtec has tried to portray the interlude between operations at PNP as a long-term refueling outage, instead of the unprecedented permanent-shutdown-reversal-back-to-operational-status that they actually seek. The now three year long and still counting shutdown further reduces PNP's overall capacity factor performance, even if and when it restarts.

Re: reducing the need for importation of electricity into Michigan, this is an ironic Purpose and Need argument to make, given that Holtec plans to export electricity to Indiana and Illinois, as well as to distant parts of Michigan, such as the northern part of the Lower Peninsula, under the PNP Power Purchase Agreement scheme. (23-2-3 [Kamps, Kevin])

Comment: By the way, this further undermines NRC's and DOE's purpose and need statement. Current State of Michigan policies could well change in the future, and hopefully will vis-a-vis PNP. Consider, for example, the global push back against nuclear power in the aftermath of the Fukushima Daiichi nuclear catastrophe in Japan, which began on March 11, 2011. Yet another reactor core meltdown, or highly radioactive waste fire, in the U.S. or even overseas, could well lead to a worldwide clamor against nuclear power, extending to Michigan and surrounding states, strong enough to force a restarted PNP back into retirement.] (23-3-10 [Kamps, Kevin])

Comment: The no-action alternative would not meet the purpose and need of the proposed Federal actions to provide an option for baseload power and contribute to Michigan's clean energy goal.

[Palisades is not clean energy - far from it. The negative impacts on the environment and human health from the entire uranium fuel chain, including operation of PNP, are immense. But NRC and DOE are willfully blind to them, including in this EA. The State of Michigan, thus far anyway, is also willfully blind to them. Including nuclear power in the definition of "clean energy" is Orwellian.] (23-4-12 [Kamps, Kevin])

Comment: Well the purpose and need have been violated then, because PNP is not clean energy. It is also not baseload. After all, it has been shut down for nearly 3 years - it has not generated a single kilowatt-hour of electricity that entire time. This long term shut down should be included in any capacity factor determinations going forward, if it ever restarts. (23-19-9 [Kamps, Kevin])

Response: Two commenters express concern regarding the NRC's purpose and need statement for the proposed reauthorization of power operations at Palisades and, in particular, with the classification of nuclear energy under Michigan's clean energy law. As stated in Section 1.2.3 of the EA, the State of Michigan's Public Acts of 2023, Act No. 235 defines clean energy as including a system that "Generates electricity or steam without emitting greenhouse gas, including nuclear generation." This classification is consistent with the Energy Policy Act and under Title 17, Clean Energy Financing Program (Energy Policy Act of 2005-TN738) which supports advancements in nuclear facilities as part of a broader strategy to modernize energy infrastructure. The NRC's purpose and need statement as stated in Section 1.2 of the EA states that, "The purpose and need for approval of the proposed Federal actions (identified in Table 1-1 above), collectively supporting the reauthorization of power operations and refueling of the reactor under the existing Palisades' RFOL, is to provide an option that allows for baseload clean energy power generation capability within the term of the Palisades' RFOL to meet current system generating needs," which reflects the need to provide a stable baseload power option while contributing to clean energy objectives as defined by Michigan's clean energy law.

Commenters also expressed concern with giving substantial weight to the applicant's purpose and need statement. Where a federal agency is not the sponsor of the project, the consideration of alternatives may accord substantial weight to the preferences of the applicant and/or sponsor (68 FR 55905-TN733). Additionally, NEPA, as recently amended through the enactment of the Fiscal Responsibility Act of 2023 (TN9775), places a limitation on an agency's alternatives analysis to include only those alternatives "that are technically and economically feasible, and meet the purpose and need of the proposal".

Section 2.2 of the EA, for EAs, NRC regulations in 10 CFR 51.30(a)(1)(ii) (TN10253) call for a brief discussion of alternatives as required by NEPA. NEPA Section 102(2)(F) requires Federal agencies to, "consistent with the provisions of this Act, study, develop, and describe technically and economically feasible alternatives." The analysis of alternatives in Sections 2.2 and 4.2 of the EA identified a range of technically and economically feasible alternatives to resuming operations of Palisades. Section 2.2 of the EA considers several alternatives to the proposed action, including: 1) the no-action alternative; 2) replacing the Palisades reactor with a new reactor; 3) replacing the Palisades reactor with other power generation technologies; and 4) installing system design alternatives at the current Palisades Reactor.

Additionally, one commenter expressed concern with dismissal of renewable energy sources, such as wind and solar based on wind and solar being more intermittent than nuclear. Section 2.2 of the EA discusses reasons other than intermittency of the source for not carrying those alternatives forward.

These comments and the reference materials do not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.18 Comments Concerning Socioeconomics

K.5.18.1 Socioeconomics Response 1

Comments: (23-5-5) (23-7-10) (23-14-15) (23-14-16) (23-15-5) (23-15-9) (23-20-4)

Comment: The estimate for the number of jobs that would be "restored" if PNP restarts has been all over the place. This was on full display on March 27, 2024, at the PNP restart lovefest,

starring Energy Secretary (and former Michigan Governor) Jennifer Granholm, and current Michigan Governor, Gretchen Whitmer. Granholm and Whitmer cited one set of inflated figures for the number of jobs that would be "restored," while Holtec cited another, significantly lower figure. Holtec's own figures have varied dramatically, including a significant lowering of the number of jobs, as compared to the company's own figures given recently before that.

Even NRC's figure of 550 jobs above is dubious. PNP has claimed in the past to have provided up to 650 jobs. With such significant disparities, it is impossible for the public to determine the truth of the matter. **(23-5-5 [Kamps, Kevin])**

Comment: reduction in potable and sanitary water use because the workforce decreased from approximately 550 in 2022 to 218 in 2023 and 449 currently (HDI 2024-TN10670: RAI-SE-1, RAI-SE-2).

*[Again, as we previously commented above, the figure for "restored" jobs, if PNP restarts, has been wildly all over the place, depending on the source, or even depending on when the same source spoke. We have seen claims of up to 650 jobs at PNP claimed in the past, but here they admit it was only 550 at closure. NRC and DOE should provide a table showing the number of jobs at PNP, by year, or even more detailed than that, by month, going all the way back to the beginning, in 1967, when ground was first broken, all the way to the present day. This is important transparency for many reason, including water usage, per just above, but also so the cost per job, in terms of public subsidies, can be determined. Depending on the number of jobs to be "restored" at PNP, as well as the amount of bailouts received by Holtec for the restart scheme, a cost per "restored" job can be calculated. At one point in the past nearly three years, a figure of \$12 million per "restored" job was calculated. Another time, after more subsidies were awarded to Holtec, a cost per "restored" job calculation resulted in \$29 million. This figure was a thousand times more expensive, than the average cost of creating a new job with state subsidies in Michigan, on average, in 2023. The reason this is important is that NEPA, and NRC's implementing regulations, require a socioeconomics analysis. DOE was also required to do a community benefits report regarding the awarding of massive bailouts to Holtec for the restart scheme. Clearly, the EA's analyses are far from adequate. An EIS/PEIS is needed. If the same amount of public subsidies could create a thousand jobs, instead of "restoring" just one job at PNP, then clearly, in terms of job creation/"restoration," PNP's restart is a non-starter. This is relevant because Governor Whitmer, Holtec, and other PNP restart proponents have, at various times, touted the jobs to be "restored" as justification for the PNP restart scheme. But clearly, the opportunity costs are off the charts.] **(23-7-10 [Kamps, Kevin])***

Comment: P. 87/242 ON PDF COUNTER (page 3-47)

The following tables present demographic, income, and housing information about the two-county region of influence (ROI) from the Census Bureau. Based on the information presented in Table 3-6, racial and ethnic diversity in the ROI is similar to the State of Michigan as a whole.

*[But Covert Twp. has a large African American percentage of the population - significantly higher than the State of Michigan and U.S.A. averages. Covert also has a large percentage of the populations below the poverty line.] **(23-14-15 [Kamps, Kevin])***

Comment: Table 3-6

Percent Black or African American race alone

MI - 13.5%

[But Covert Township has a percentage of the populatiuon that is Black or African American that is much higher than this figure for the State of Michigan. Are NRC and DOE intentionally ignoring and concealing this in the EA? (23-14-16 [Kamps, Kevin])

Comment: *PNP restart, and SMR new builds, threatens this agricultural heartland of Michigan. If radioactive foodstuffs are sold and consumed, the health damage would extend far away, across the entire state, and beyond.*

Why are other impacted counties, like Kalamazoo downwind, not mentioned? Elsewhere in the EA, nearly ten counties are listed, for certain EA analyses. Why doesn't every analysis in this EA extend to the same nearly ten county area?

Why is Benton Harbor in Berrien Co. not mentioned? It has a majority African American population. It has a high poverty rate. It is about 15 miles in either direction from both PNP, as well as from Cook nuclear power plant. What about the Cumulative Effects from PNP and Cook NPP on the African American and low income community of Benton Harbor, MI?

Such more extensive and in depth analysis should be carried out, in the EIS/PEIS we have requested. This shallow EA does not suffice. (23-15-5 [Kamps, Kevin])

Comment: Table 3-8 Housing in the Region of Influence of Palisades Nuclear Plant, 2018-2022, 5-Year Estimate

[Former President Jimmy Carter and former first Lady Rosalyn Carter did Habitat for Humanity house-building volunteer work in Benton Harbor, MI, as reported on local s.w. MI television during the honors after President Carter's passing on in late 2024. This is another indication of low income households in this majority African American community, socioeconomic issues either unintentionally missed, or intentionally left out, of NRC and DOE's EA. Also left out, for some reason or other, is a tragic lead poisoning epidemic via the water supply in Benton Harbor, not unlike what happened to the residents of Flint, MI, many of whom are African American and low income. Another issue left out of this EA by DOE and NRC was the theft of Jean Klock Park for a PGA golf course and high income gated community in Benton Harbor. DOE and NRC could and should include these important socioeconomics and EJ issues in the EIS/PEIS we've requested.] (23-15-9 [Kamps, Kevin])

Comment: At one time, over the years or *dedades*, a figure of only 450 workers at PNP was reported. Was it still during Consumers Energy's ownership tenure, when NMC was contracted to actually operate PNP? Or was it during Entergy's reign. The various owners' figures for the number of workers at PNP has fluctuated wildly over the years and decades. Even since Holtec took over, on June 28, 2022, the numbers of workers figure has fluctuated wildly. During an NRC-Holtec technical meeting a year or two ago, Holtec reported, in writing in a slideshow presentation, that only 500 workers would be employed at the restarted PNP reactor. This was significant, because it was 100 workers less than had previously reported, meaning the cost per job would increase dramatically, in terms of how much money in public bailouts would be required, per "restored" job. If the 220 workers still employed when Holtec took over on 6/28/22 would only be complemented by 280 "restored" jobs, for a total of 500 workers at the restarted PNP, each "restored" job would have cost \$29 million, a thousand times more than an average new job created with the help of subsidies from the State of MI in 2023. That figure was \$29,000 per new job *creaeted*. Now NRC and DOE report 600 jobs again, above. In the past 650 jobs have been reported at PNP. Proponents of restart really need to get their figures together, and

in agreement. If a total number of jobs is promised, then that promise gets broken in the future, that is a very big deal.

We incorporate by reference as if fully rewritten herein a Breakdown of Bailouts at Palisades, prepared by Beyond Nuclear's Kevin Kamps:

<https://beyondnuclear.org/breakdown-of-bailouts-at-holtecs-palisades/> (23-20-4 [Kamps, Kevin])

Response: These comments address the reporting of demographic and employment estimates cited in the EA and issues related to “costs per restored job” use of “public subsidies.” The NRC staff relied upon the most recent Census data available to summarize the demographic characteristics of an area within 50 mi (80 km) of the Palisades site. The tabular information presented in Table 3-6 describes the percentage of low-income and minority populations, which is based on data provided by Census respondents and compiled by the U.S. Census Bureau. In addition, the NRC staff visited the region, and their observations confirmed that the Census data indicate pockets of minority and low-income populations found throughout the counties in the 50 mi (80 km) radius.

As with all environmental reviews, the NRC relies upon information from license applicants with an independent verification, regarding plant-specific estimates of employment. The employment estimates provided by Holtec and cited in EA Section 3.9 (HDI 2024-TN10670: RAI-SE-1) were relied upon for all impact analyses. The issues of cost per job or use of public subsidies are political issues outside the scope of the environmental review. Comments pertaining to out of scope issues are addressed in Section K.6, including Section K.6.10.3. These comments provide no new and significant information and, therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.18.2 Socioeconomics Response 2

Comment: (23-15-2)

Comment: NRC's scope is too narrow - for example, what about the Gun Lake Potawatomi in Barry Co., the Pokagon Potawatomi in Cass Co., etc.? (23-15-2 [Kamps, Kevin])

Response: This comment questions the reporting of Native American population estimates cited in the EA. The NRC staff relied upon the most recent Census data available to summarize the demographic characteristics of an area within 50 mi (80 km) of the Palisades site, which includes the Pokagon Potawatomi Tribe. The Gun Lake Potawatomi Tribe is located more than 50 miles from Palisades but was consulted as part of this project (see Palisades EA Section 3.8). The tabular information presented in Table 3-6 describes the percentage of low-income and minority populations, which is based on data provided by Census respondents and compiled by the U.S. Census Bureau. The U.S. Census Bureau only provides general demographic information and does not provide population estimates by individual Native American Tribe. However, the assessment of cultural resource impacts considered all recognized Tribes and the NRC staff solicited engagement from interested Tribes as part of the environmental review as indicated in Section 3.8 and Appendix D of the EA. This comment provides no new and significant information and, therefore, no changes were made to the Palisades EA as a result of this comment.

K.5.18.3 Socioeconomics Response 3

Comment: (23-15-10)

Comment: Why would Holtec pay property taxes to the City of Benton Harbor, which is located in Berrien Co.? This would be news to us. Do NRC and DOE actually mean Covert Twp., in Van Buren Co.? **(23-15-10 [Kamps, Kevin])**

Response: *This comment questions reporting of tax revenues cited in the EA. As with all environmental reviews, the NRC relies upon information from license applicants, with an independent verification, regarding plant-specific estimates of tax payments to affected jurisdictions. The NRC staff relied upon Holtec's characterization of their tax payments to affected jurisdictions, including the City of Benton Harbor (Holtec 2023-TN10538). This comment provides no new and significant information and, therefore, no changes were made to the Palisades EA as a result of this comment.*

K.5.18.4 Socioeconomics Response 4

Comment: 23-24-9)

Comment: Socioeconomics

The resumption of operations at Palisades is not expected to have a significant impact on local socioeconomic factors, including housing, public schools, recreational resources, emergency services, or transportation infrastructure. Although southwest Michigan may face increased rainfall and flood risks midcentury, potentially challenging transportation resilience, the plant's operations are not anticipated to affect these infrastructure systems. Impacts on employment, income, output, and tax revenue are projected to remain stable, with no additional climate change mitigation measures required. Therefore, anticipated climatological changes are unlikely to alter the established socioeconomic impacts for Palisades. The NRC staff expects that climate change would not alter conclusions made in this EA.

[We thought "jobs jobs jobs!!!" was purportedly part of the purpose and need, at least in the words of Gov. Whitmer and Energy Secretary Granholm on March 27, 2024 (the restart love fest hosted by Holtec at PNP), before, and since? And what about DOE's so-called Community Benefits Plan? But now socioeconomics will barely notice PNP's restart? Proponents of restart can't have it both ways.

*Low income and/or people of color communities will be disproportionately impacted by climate change. They already are so by PNP. So the synergism of the two in the local region will be a double-whammy on these vulnerable communities.] **(23-24-9 [Kamps, Kevin])***

Response: *These comments question the climate-related cumulative socioeconomic impacts reported in the EA. The EA indicates that the resumption of power operations at Palisades has the effect of restoring socioeconomic conditions that existed when the plant was operating in the recent past. The NRC staff's independent assessment of climate-related socioeconomic impacts is focused on whether the anticipated climatological changes would alter the established socioeconomic impacts for Palisades and do not rely upon political statements related to the impacts of reauthorization of power operations at Palisades. These comments provide no new and significant information and, therefore, no changes were made to the Palisades EA as a result of these comments.*

K.5.19 Comments Concerning Waste Management-Nonradioactive Waste

Comments: (23-18-2) (23-18-9)

Comment: *However, in 2015, 2017, and 2019, Palisades has also been classified as large quantity hazardous waste generator due to occasional episodic events (MEGLE 2021-TN10753).* **[Emphasis added.]**

[What were those? Why did NRC and DOE not provide any specifics? The burden is on the concerned public to track down those specifics on our our? What are DOE and NRC trying to keep as quiet as possible? Yet again, PNP, like nuclear power in general, is not "clean," far from it. So Michigan's "clean" energy law including nuclear power is a tragic, fatal mistake.]

Palisades has typically been classified as a small or very small quantity hazardous waste generator. **However, in 2015, 2017, and 2019, Palisades has also been classified as large quantity hazardous waste generator due to occasional episodic events (MEGLE 2021TN10753).** The NRC staff expects that Holtec would continue to implement plans and procedures for management of its waste types including **an asbestos abatement or human-made mineral fiber removal plan** (HDI 2024-TN10670: RAI-WM-1). **[Emphases added.]**

[Again, per just above: What were those "large quantity hazardous waste generator...episodic events"? Why did NRC and DOE not provide any specifics? The burden is on the concerned public to track down those specifics on our our? What are DOE and NRC trying to keep as quiet as possible? Yet again, PNP, like nuclear power in general, is not "clean," far from it. So Michigan's "clean" energy law including nuclear power is a tragic, fatal mistake.
(23-18-2 [Kamps, Kevin])

Comment: As described in the N&S Report, Palisades is expected to continue as a small or very small hazardous waste generator upon renewed operations, but certain events such as cleaning of storage tanks may result in generation of large quantities of hazardous waste (Holtec2023-TN10538).

[So it will be small, unless it's large? This is nonsensical! (23-18-9 [Kamps, Kevin])]

Response: As described in Section 3.12 of the Palisades EA, Palisades has a nonradioactive waste management program and procedures to handle and dispose of nonradioactive waste in accordance with Federal, State, and local regulations. Palisades has primarily been categorized as a small quantity hazardous waste generator except for certain preplanned and approved episodic events. The State of Michigan publishes the category of hazardous waste generator status of regulated entities either as very small, small or large. However, this typically does not include specifics of the waste that caused the change in status. One example of an episodic event would be the disposal of sulfuric acid in 2019 (MEGLE 2021-TN10753). These comments do not provide any new and significant information related to the environmental effects of the proposed Federal actions and, therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.20 Comments Concerning Waste Management-Radioactive Waste

K.5.20.1 Waste Management-Radiological Response 1

Comments: (7-5) (8-1) (15-2) (23-1-12) (23-18-8) (23-18-11) (23-18-12)

Comment: Palisades already has 869 tons of high-level nuclear waste stored in 48 cement and metal casks plus some in the cooling pool. Re-starting the plant would create the need for 16 additional casks. Any problem with them could be very “significant”. (7-5 [McCardle, Edward])

Comment: The report is shallow and vague. There are no details about how much nuclear waste is stored there now, and how much more will be added. (8-1 [Anonymous, Anonymous])

Comment: Another issue is storage of the highly radioactive nuclear waste that the plant generates. Currently the plant’s nearly 700 tons of waste are stored precariously close to the Lake Michigan shoreline, some of it in a defective, unsafe dry cask.

Before Palisades is reopened, provisions must be made for a better system and location for radioactive waste storage. Also, its steam generators must be replaced, and any other mechanisms impairing proper plant function must be repaired. (15-2 [Anonymous, Anonymous])

Comment: Radioactive Waste concerns: PNP already has more than 900 metric tons of irradiated nuclear fuel on-site, from 51 years of reactor operations. If restarted, PNP would generate around 15 metric tons more each and every year, from 2025 to 2051. (23-1-12 [Kamps, Kevin])

Comment: More than 900 MT of HLRW stored on-site is already an EXTRA LARGE IMPACT! Restart would add 15 MT per year, from 2025 to 2051. SMRs would generate 2 to 30 times the amount of HLRW, per unit of electricity generated, than the current reactor, per Macfarlane and Ewing a couple years ago (President Obama's NRC and USNWTRB chairs). (23-18-8 [Kamps, Kevin])

Comment: Clearly, NRC and DOE would not recognize an Extra Large/Major Impact if it...introduced itself to them on the street - or in this case, on the beach - for the umpteenth time. Past radioactive waste generation has been a large impact. Future radioactive waste generation will exacerbate this large impact, for many decades to come. 900 tons of HLRW on the Lake Michigan shore, to grow by 15 MT per year from 2025 to 2030, and then at an even greater rate than that once the SMRs begin operating, will significantly exacerbate an already large impact. It already puts the Great Lakes and Great Lakes State at existential risk, a risk that will only grow even larger in the future. (23-18-11 [Kamps, Kevin])

Comment: Radioactive waste generation ad nauseum, a curse on all future generations, for a little electricity, the fleeting byproduct - per song lyrics by Victor McManemy and a talk by Michael Keegan - is a major negative impact. NRC regulatory requirements have failed numerous times. The cask dangle in Oct. 2005 is but one example of a close call with catastrophe. SMR operation would be a significant operational change - 2 to 30 times the amount of HLRW will be generated at them, as compared to the same megawatt-hours generated at the restarted zombie reactor, due to loss of economy of scale. Of course, accumulation of more and more HLRW, year after year, is a large cumulative effect. DOE and NRC are willfully blind to all this. (23-18-12 [Kamps, Kevin])

Response: *Spent nuclear fuel management will continue as discussed in Section 3.13, Uranium Fuel Cycle. Spent nuclear fuel has been previously assessed in the NRC Palisades 2006 SEIS (NRC 2006-TN7346), the 2024 LR GEIS (NRC 2024-TN10161) for impacts during continued operations, and the Continued Storage GEIS (NRC 2014-TN4117) for the time period beyond the reactor’s licensed life for operation and prior to ultimate disposal. The management of spent fuel must be in accordance with NRC regulations including placement into the spent*

fuel pool and later transfer and storage in an onsite ISFSI. In 1990, the NRC issued an amendment to 10 CFR Part 72 (TN4884) to provide for the storage of spent fuel under a general license, such as the one Palisades has, in storage cask designs approved by the NRC. As part of the rulemaking process, an EA was prepared: "Environmental Assessment for 10 CFR Part 72 'Licensing Requirements for the Independent Spent Fuel and High-Level Radioactive Waste'" (NRC 1984-TN11943). In that Environmental Assessment, the NRC concluded that the storage of spent nuclear fuel and high-level radioactive waste does not significantly affect the environment. No changes were made to the Palisades EA as a result of these comments.

K.5.20.2 Waste Management-Radiological Response 2

Comments: (23-5-3) (23-8-14) (23-18-13)

Comment: Radioactive waste IS a significant impact on human health and the environment.

Uranium mining and milling on Indigenous Nations' lands is significant impact. Major impacts on Navajo/Dine and Pueblo communities has resulted from uranium mining; and on Ute Mountain Ute communities from uranium milling. But these are just a small number of examples of such impacts.

Such significant impacts are very possible at a restarted PNP, as well as at SMR new builds on the PNP site. **(23-5-3 [Kamps, Kevin])**

Comment: Continued operation of existing mines? What about new mines, including uranium mines previously proposed in Michigan's Upper Peninsula more than a decade ago? What about resumption of uranium mining and milling in the Elliot Lake/Serpent River (Ojibwe) first Nation region of Ontario, Canada. The environmental effects from such uranium mining and milling have harmed the Great Lakes since the 1940s, and would continue to do so if expanded into Michigan's UP, and/or resumed in Ontario. Just because there is an imaginary dotted line down the middle of the Great Lakes, does not mean that such activities would not harm Canadians downwind and downstream, and vice versa. In fact, binational impact environmental reviews are required, under the terms of the International Joint Committee and its organic treaty from 1909. Have NRC and DOE consulted with their Canadian counterparts under the terms of the IJC, re: PNP impacts on the Great Lakes, including from uranium mining and milling that could be undertaken to fuel PNP in the future? If not, why not? The same sort of questions need to be addressed regarding nuclear waste dumping that could result on either side of the Great Lakes, in Canada and/or the U.S., resulting from PNP restart. **(23-8-14 [Kamps, Kevin])**

Comment: 3.13 Uranium Fuel Cycle and Transportation

[U mining and milling impacts on Indigenous Nations are major and large; HLRW barges on Lake MI will be too; EJ impacts of dumps] are also major and large.]
(23-18-13 [Kamps, Kevin])

Response: *One commenter provided comments on the impacts from uranium fuel cycle. The actions of uranium recovery and milling are regulated by Agreement States and the NRC. Past impacts of these actions are not related to the current extraction of uranium from the environment. In addition, the impacts from the entirety of the fuel cycle for each light water reactor are bounded by the impacts identified in WASH-1248, Environmental Survey of Reprocessing and Waste Management Portion of the LWR Fuel Cycle. These are codified in*

10 CFR 51.51 Table S-3 (TN10253). The NRC staff are confident that the normalized impacts from the uranium fuel cycle will continue to remain lower than those stated in Table S-3 due to advances in the uranium recovery process including:

- Increasing use of in situ leach uranium mining has lower environmental impacts than traditional mining and milling methods.
- Current light-water reactors are using nuclear fuel more efficiently due to higher levels of fuel burnup resulting in less demand for mining and milling activities.
- Less reliance on coal-fired electrical generation plants to power all uranium fuel cycle facilities resulting in less gaseous effluent releases from electrical generation sources supporting mining and milling activities are likely to reduce the impacts from uranium recovery due to the reauthorization of power operations at Palisades.

The comments are related to past uranium mining and milling actions and are not related to the current environmental impacts of in situ uranium recovery, the principal source of uranium concentrate in the United States (DOE/EIA 2024-TN11944). These comments provided no new and significant information and therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.20.3 Waste Management-Radiological Response 3

Comments: (23-8-15) (23-12-10) (23-12-11)

Comment: And along the same lines, radioactive waste transport in the Great Lakes basin, including barges on the surface waters, as Holtec has proposed in its Palisades PSDAR dated December 2020, fully embracing a US DOE scheme first floated in Feb. 2002 under the Yucca Mountain dump planning. For this reason, we incorporate by reference, as if fully rewritten herein, the following document:

<https://www.nirs.org/wp-content/uploads/factsheets/mibargefactsheet92804.pdf>

Note in this document that cumulative effects of barge shipments of highly radioactive waste from other reactors, as in Wisconsin, needs to be accounted for. In fact, due to PNNL's research, on DOE's behalf, for barge shipping options from a growing list of Great Lakes shoreline reactors, all such cumulative impacts must be addressed in a EIS/PEIS.

In fact, all nuclear industry impacts on the Great Lakes should be included in such a cumulative effects analysis in an EIS/PEIS. For this reason, we incorporate by reference as if fully rewritten herein the following two maps, showing the extent of damage already inflicted on the Great Lakes, by nuclear industry facilities in the US and Canada:

<http://beyondnuclear.org/wp-content/uploads/2025/02/Great-Lakes-Nuclear-Hotspots-Map-final.jpg> (2013 map by IICPH and GLU);
<http://beyondnuclear.org/wp-content/uploads/2025/02/great-lakes-nuclear-hot-spots.bmp> (1990-1991 map by Irene Koch and David Martin).] (23-8-15 [Kamps, Kevin])

Comment: These depths are truly awe inspiring to contemplate. But they are also frightening, given Holtec's embrace - in its December 2020 PSDAR - of a DOE scheme, under the Yucca Mountain Project, to barge highly radioactive wastes on the surface waters of Lake Michigan. Do the routes - between PNP and the Port of Muskegon, not to mention from the Wisconsin

atomic reactors to the Port of Milwaukee - pass over such depths? Or what if, due to extreme weather, terrorist attack, or some other mishaps, such barge shipments veer off course, over such depths.

A Public Citizen fact sheet entitled "Everyone Knows That Accidents Happen: Nuclear Waste Transport Casks," includes information about NRC's design criteria meant to withstand underwater submersions.

One design criteria is that a cask that has undergone the puncture test (a free fall, from a height of just 40 inches, onto a 8 inch long spike) must withstand submersion under three feet of water. Of course, Lake Michigan reaches depths of three free, just offshore from PNP.

A second design criteria is that an undamaged cask must withstand submersion under 200meters (656 feet) of water for one hour.

But depths reported by DOE and NRC above include a maximum of 923 feet (281 meters), much deeper than the NRC design criteria.

These minimalistic NRC design criteria beg many questions.

As Public Citizen has pointed out, "A damaged cask submerged in water deeper than three feet could contaminate water supplies."

Lake Michigan is the source of drinking water for 16 million people in four U.S. states. It is also a major headwaters for Great Lakes downstream - the source of drinking water for 40 million people in 8 U.S. states, 2 Canadian provinces, and a large number of Indigineous Nations.

Public Citizen also pointed out that "Casks can weigh as much as 125 tons and would be extremely difficult to rescue in one hour, especially in remote areas."

Actually, in the quarter-century since this Public Citizen fact sheet was published, cask weights have increased significantly. Back then, the largest transport casks could hold up to 24 Pressurized Water Reactor irradiated nuclear fuel assemblies. Holtec's current UMAX cask design can hold up to 37 PWR assemblies, around a 50% increase in size, weight, and radioactive source term contents.

Public Citizen also pointed out that "Water pressure over long periods of time could cause radiation to be released."

Public Citizen's fact sheet, at the following link, is incorporated by reference as if fully rewritten herein:

<http://beyondnuclear.org/wp-content/uploads/2025/02/Screen-Shot-2017-10-09-at-12.59.27-PM.pdf>

A related NIRS fact sheet, at the following link, is also incorporated by reference as if fully rewritten herein:

<https://www.nirs.org/wp-content/uploads/factsheets/mibargefactsheet92804.pdf>

It further describes the risks associated with a barge shipment of highly radioactive waste sinking in Lake Michigan.

In 2002, 453 barge shipments of high-level radioactive waste on Lake Michigan had been predicted by DOE, including 125 from PNP alone. But now DOE and NRC are poised to approve and enable restart of the closed for good PNP reactor. This will result in around 15 metric tons of additional irradiated nuclear fuel generation, annually, for a quarter-century into the future.

The two SMR-300s would generate yet more highly radioactive waste. Allison Macfarlane and Rod Ewing, President Obama's NRC and U.S. Nuclear Waste Technical Review Board chairs, respectively, published a study a couple years ago, calculating that, depending on the particular design, SMRs will generate 2 to 30 times more highly radioactive waste, per unit of electricity generated, as do the current generation of reactors.

Instead of 125 barge shipments from PNP alone, the number will be significantly higher, given all this newly proposed irradiated nuclear fuel generation at the site. (23-12-10 [Kamps, Kevin])

Comment: NRC has also approved a 60-year license at Point Beach, Wisconsin. Point Beach Units 1 and 2 have now applied for an 80-year license. This is 30 years more waste generation than DOE assumed in its 2002 Yucca Mountain FEIS. Thus, the number of barge shipments of highly radioactive waste originating at Point Beach will also be much larger.

Although Kewaunee shut for good in 2013, its new owner, EnergySolutions, instead of decommissioning it, has now proposed building and operating one or more SMRs there. So the number of barge shipments originating at Kewaunee will also be larger than DOE predicted in 2002.

DOE has contracted with PNNL to study additional barging options on the Great Lakes, besides those already mentioned above. This could include Big Rock Point in MI, Zion in IL, Cook in MI, and other reactors on other Great Lakes.

Why was none of this analyzed in this EA? Rather than NEPA's "hard look," DOE and NRC have done "hardly a look." This is why an EIS/PEIS is needed. (23-12-11 [Kamps, Kevin])

Response: *One commenter addressed the impacts of radioactive waste generation and transportation. The transportation of SNF requires certification of a transportation package and meet the requirements of 10 CFR 71.73, "Hypothetical Accident Conditions" (TN301). The package must undergo a series of tests including a free drop, crush, puncture, thermal, and immersion test. The package must survive this testing and remain in compliance with the Type B package requirements stated in 10 CFR 71.51, "Additional requirements for Type B packages." Several of the dry storage systems and related transport packages developed for SNF involve the placement of the SNF assemblies into an inner canister that is sealed by welding, which would be inserted into the transport package for shipment. As noted in NUREG-2125, this system of SNF packaging is robust enough that there would be no release of radioactive material even under accident conditions (NRC 2014-TN3231). As reported by DOE in 2016 (ORNL 2016-TN11946), at least 25,400 shipments of SNF have been made worldwide, but likely more than 44,400. It is likely that significantly more cask shipments have been made for all forms of SNF considered. The shipments within and into the US account for approximately 10 to 17 percent of this total. Review of the data sources shows that all of these shipments were undertaken without any injury or loss of life caused by the radioactive nature of the material transported. In general, there have been few transportation accidents worldwide in the history of transporting SNF, and none have had significant radiological consequences.*

Table G-1 of the EA, the construction and operation of SMRs for Palisades have been considered as a reasonably foreseeable action and have been included when determining the cumulative environmental effects for each resource area in Section 3 of the EA. In addition, prior to construction and operation of any proposed new SMR at a site, the applicant would be required to submit an application for a separate license which would require the staff to perform an environmental review related to the construction and operation of the SMR.

The comments and their associated references provide no new and significant information and therefore, no changes were made to the Palisades EA as a result of these comments.

K.5.20.4 Waste Management-Radiological Response 4

Comments: (10-17) (23-5-12) (23-17-16) (23-18-6) (23-18-10)

Comment: The cost and risks attendant to decades more of high-level and low-level nuclear waste.

The long-term tax and economic effects of adding to what is, in effect, a high level nuclear waste dump in Michigan for an indefinite, and potentially centuries-long, duration must be addressed.

Part of the equation will be the additional costs and complexities of ultimate decommissioning and remediation of the site.

Whether waste will remain at the site in perpetuity or ultimately be transported to another site in Michigan or elsewhere, all the additional spent fuel will still need to be stored and protected at Palisades for decades to come.

The US began a search for potential geologic repository sites in 1970. More than half-a-century later, we have none and the Nuclear Waste Policy Act (NWPA), passed in 1982, puts the liability for permanent sequestration of high-level nuclear waste on the American taxpayer.

Yucca Mountain was defunded in 2010 and there is no current realistic expectation that the project will be resuscitated.

Consolidated interim storage facilities (CISFs) proposed by Holtec International in New Mexico and Waste Control Specialists in Texas have faced judicial scrutiny and fierce opposition. The governors of both Texas and New Mexico have opposed these facilities, in large part because of the safety and security concerns. These "interim" nuclear waste storage facilities have also been staunchly opposed by Native American Tribes and Indigenous groups, farmers, ranchers, and the oil and gas industry.

Regardless of the fate of CISFs, as determined by the judicial branch, the conditions which make CISFs and a large nuclear waste transportation regime which would span decades highly risky will continue.

The decades of additional high-level nuclear waste which would be generated by the relicensing of Palisades will only add to the problem of nuclear waste and raise all attendant costs.

Should an EIS postulate the removal of spent fuel from the Palisades site, waste transportation costs must be included in the accounting, with acknowledgement that the level of spent fuel

transportation risk is unique to the energy sector, substantial in sum, and will likely be borne by the public. (See e.g., Von Hippel 2016)

The calculus of costs should include security, first responder and emergency planning, equipping, training, and staging costs. (10-17 [Lee, Michel])

Comment: Where does the mixed waste - toxic and radioactive waste mixed together - go to then? Why is this information not provided? (23-5-12 [Kamps, Kevin])

Comment: Mixed waste, regulated under Resource Conservation and Recovery Act of 1976, as amended (Resource Conservation and Recovery Act of 1976-TN1281) and Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.-TN663), include both radioactive and hazardous waste (EPA2019-TN6956). According to Holtec's N&S Report (Holtec 2023-TN10538), **Palisades has generated minimal mixed waste from 2018 to 2023. [Emphasis added.]**

[Really? How's that? Of course, with permanent shutdown on May 20, 2022, and little to no decommissioning work from June 28, 2022 (when Holtec took over, till now), it makes sense that minimal mixed waste would be generated. But what about all the way back to 1971? And what about all the way out to 2051 at the restarted zombie reactor, as well as the SMR new builds, from 2030 to 2070, 2090, or 2110? This EA is supposed to concern itself with cumulative effects, not parroting Holtec propaganda.]

Where did past PNP mixed wastes get dumped? Where will future PNP mixed wastes get dumped? In its Dec. 2020 PSDAR, Holtec indicated that all so-called "low-level radioactive wastes" would get dumped at WCS in TX, which happens to be very near, or even directly above, the Ogallala Aquifer. The Ogallala is vital to eight states, for drinking and irrigation water.

Holtec's PNP LLRW dumping plans threaten that. WCS is also located in a Latino majority area of Andrews County, west Texas, literally immediately adjacent to the New Mexico border. New Mexico is majority minority, Latino and Indigenous. So Holtec's LLRW dumping plans are an EJ violation on their face. But so too are Holtec's highly radioactive waste dumping plans. Holtec wants to open the world's single largest high-level radioactive waste dump, in southeastern NM. Interim Storage Partners wants to open another large-scale HLRW dump, 40 miles east, at WCS. So the HLRW dumping plans are also EJ violations.

As Dr. Marvin Resnikoff wrote in his 1980s book Living Without Landfills, all the LLRW dumps ever opened in the US have leaked radioactivity into the greater environment, over time.] (23-17-16 [Kamps, Kevin])

Comment: Holtec recently did a chelating agent flush of either the primary loop, the RPV, or other radioactively contaminated areas. Which SSCs were flushed with chelating agent? Where was this mixed waste dumped? What are/were the impacts of this process on-site, and dumping off-site, including transport risks/impacts in between the two? (23-18-6 [Kamps, Kevin])

Comment: See our questions about the chelating flush Holtec already performed, per above. Why were no details on that provided in the EA? Specifics, including comprehensive impact analyses, looking backwards (the past chelating flush, already carried out) and forwards (future chelating flushes, in the future) in time should be performed. (23-18-10 [Kamps, Kevin])

Response: As discussed in EA Section 3.12.1, there has been minimal generation of mixed waste at Palisades from 2018 to 2023. During environmental reviews, the NRC staff's policy is to review the previous 5 years of environmental data reported by the licensee. These reports are required annually and available online (NRC 2024-TN10750). Mixed wastes will be collected and stored onsite until prepared and transferred for disposal. Mixed wastes generated at Palisades have been and will be disposed at a licensed facility consistent with NRC regulations (10 CFR Part 61-TN252, "Licensing Requirements for Land Disposal of Radioactive Waste") and EPA regulations for disposal of hazardous waste (40 CFR Part 260 through 40 CFR Part 270 [TN6617]). The environmental impacts of the uranium fuel cycle are addressed in Section 3.13 of the EA. Costs relating to the uranium fuel cycle and long-term disposal are not an environmental impact to be addressed in the uranium fuel cycle resource area. The NRC staff determined in the Palisades EA that there are no significant environmental impacts. Therefore, a cost-benefit analysis that may be included in an EIS was not prepared for the Palisades EA. These comments provide no new and significant information, and therefore, no changes were made to the Palisades EA as a result of these comments.

K.6 Major Topics of Concern—General Non-Technical and Outside Scope

- Comments were received outside the scope of the EA or were non-technical in nature.
- Topics raised included a variety of concerns about:
- General Support-Licensing Action (Section K.6.1)
- General Opposition-Licensing Action (Section K.6.2)
- General Editorial (Section K.6.3)
- General Environmental Concerns (Section K.6.4)
- NEPA Process and Licensing Action (Section K.6.5)
- Aging Management (Section K.6.6)
- Environmental Justice (Section K.6.7)
- Emergency Preparedness (Section K.6.8)
- Energy Costs (Section K.6.9)
- Miscellaneous (Section K.6.10)
- Safety (Section K.6.11)
- Security and Terrorism (Section K.6.12)

K.6.1 General Comments in Support of the Licensing Action

Comments: (1-1) (2-1) (4-1) (6-1) (6-6) (13-1) (13-4) (14-1) (21-1) (22-1)

Summary: Commenters expressed general support for Palisades and/or nuclear power. Reasons for support include Palisades being vital to America's energy needs and that nuclear energy is an advanced and environmentally friendly energy option and is reliable and heavily regulated.

Response: The NRC acknowledges these comments. As the comments are supportive and are general in nature, no changes were made to the Palisades EA as a result of these comments.

K.6.2 General Comments in Opposition to the Licensing Action

Comments: (5-4) (8-7) (9-1) (10-2) (10-4) (10-22) (11-1) (12-1) (16-1) (17-21) (19-1) (23-1-6) (23-1-16) (23-2-8) (23-4-13) (23-5-21) (23-7-11) (23-8-4) (23-10-3) (23-10-4) (23-10-13) (23-10-17) (23-11-6) (23-11-17) (23-12-13) (23-13-3) (23-13-13) (23-13-14) (23-13-16) (23-14-3) (23-14-8) (23-15-11) (23-16-11) (23-17-4) (23-17-14) (23-18-1) (23-18-5) (23-19-3) (23-19-11) (23-19-15) (23-19-17) (23-20-1) (23-20-5) (23-20-16) (23-21-6) (23-21-12) (23-21-16) (23-21-17) (23-21-18) (23-22-3) (23-22-6) (23-22-16) (23-22-18) (23-25-6) (23-26-3) (23-27-10) (23-28-7) (23-29-9) (23-29-17)

Summary: Commenters expressed opposition to the reauthorization of operations at Palisades, nuclear power, and/or NRC's licensing process. Reasons for opposition include safety concerns and the age of Palisades, nuclear risks, actions not being proposed under this reauthorization action, preference for renewable energy, negative impacts on human health and the environment, and Holtec management.

Response: The NRC acknowledges these comments. The comments are general in nature and do not raise any issues within the scope of this environmental review. The NRC's looked at potential environmental effects of the proposed Federal actions on all resource areas in Chapter 3 of the EA and determined that they were not significant. No changes were made to the Palisades EA as a result of these comments.

K.6.3 General Editorial Comments

Comments: (20-1) (20-5) (20-6) (23-3-1) (23-3-2) (23-3-3) (23-3-7) (23-11-3) (23-12-4) (23-14-5) (23-16-14) (23-18-4) (23-18-15) (23-19-1) (23-19-4) (23-21-2) (23-22-17) (23-23-2) (23-23-3) (23-23-12) (23-23-16) (23-25-8) (23-25-9) (23-25-10) (23-25-11) (23-25-12) (23-25-14) (23-25-15) (23-25-16) (23-26-1) (23-26-5) (23-26-7) (23-27-11) (23-27-15) (23-27-16) (23-27-17) (23-28-5) (23-28-8) (23-29-4)

Summary: Commenters provided recommended changes on editorial content within the Palisades EA.

Response: The NRC staff reviewed recommended changes and checked recommendations for accuracy. Those formatting requests determined to be applicable were incorporated into the EA. Acronyms have been revised for consistency, as needed, misspellings have been addressed, and corrections made to RAI numbers.

One commenter requested additional and revised information be added to Table G-1 of the EA. The direction and/or mileage from the facility were added or revised, as needed, and editorial changes completed. Distances between 0 and 5 mi from Palisades were noted as being <5 miles. Sand mining sites were already included in the table and include the Rosy Mound Site, Van Horn Site, and Nadeau Pit. No additional sand mining sites were added to Table G-1. The South Haven Regional Airport was added. The Enbridge Oil pipeline was not included in Table G-1 as it is beyond 50 mi (80 km) from Palisades, as specified in EA Section 3.1.4.

K.6.4 Comments Concerning General Environmental Concerns

Comments: (8-5) (10-6) (10-20) (23-3-12) (23-3-15) (23-5-9) (23-6-18) (23-7-2) (23-10-12) (23-11-16) (23-12-15) (23-12-17) (23-13-7) (23-22-4)

Summary: The NRC received comments expressing concern regarding the reauthorization of Palisades operations and the potential threats to Lake Michigan and its surrounding ecosystems. Commenters mention the sensitive nature of the region, the fragility of Lake Michigan's aquatic environment and sand dunes, and the biological diversity they support. The commenters stress that the EA fails to consider these risks and calls for a more comprehensive EIS that fully addresses cumulative effects and modern environmental standards.

Criticism is specifically targeted at ongoing and planned activities including the use of herbicides and pesticides and the potential SMR project on site. The comments contend that the FONSI reflects a disregard for major environmental risks, including the possibility of catastrophic radioactive releases and the ongoing contributions to ecological harm. The EA is perceived as minimizing the severity of environmental impacts and failing to account for the accelerated pace of global and local extinction (or extirpation) events, urging regulators to reconsider and prioritize ecological preservation and safety.

Response: These comments express general concerns regarding the reauthorization of power operations at Palisades and the potential threats to Lake Michigan and its surrounding ecosystems. The NRC considered the topics identified in these comments and in Chapter 3 of the EA. Responses to public comments on the draft EA with more specificity to resource area are addressed in Section K.5 of this report. These comments are general in nature and do not provide significant new information; therefore, no changes were made to the Palisades EA as a result of these comments.

K.6.5 Comments Concerning Process - Licensing Action

K.6.5.1 Process – Licensing Action Response 1

Comments: (3-1) (7-1) (7-4) (7-11) (10-5) (10-9) (17-8) (23-1-1) (23-1-5) (23-1-7) (23-2-12) (23-4-8) (23-12-19) (23-15-15) (23-16-9) (23-20-15) (23-22-2)

Summary: The NRC received comments from six commenters concerning the decision to complete an EA instead of an environmental impact statement (EIS). These comments highlighted the need for a robust review, appreciation for completing public scoping and comment periods not required for an EA, the perceived complexity of the proposed Federal actions and of the EA itself, and the first of its kind nature of reauthorization of a nuclear reactor. They also questioned the break from the traditional approach of the NRC to complete a full EIS for new reactors and license renewals, whether an EA meets NEPA requirements, whether the location next to Lake Michigan should require an EIS given the large area Lake Michigan covers, the length of the EA including the appendixes, and whether the EA adequately addresses potential radiation exposure, environmental impacts, alternatives, and cumulative effects. One commenter felt the NRC's separation of the potential SMR project at the same site amounted to illegal segmentation under NEPA law and commenters felt the NRC should have done a Programmatic Environmental Impact Statement.

Response: The NRC staff reviewed and considered the comments concerning the decision to complete an EA instead of an EIS. The NRC performed a detailed assessment to determine the most appropriate level of NEPA review for evaluating the proposed Federal actions, as described in Section 1.1 of the Palisades EA. NRC actions explicitly requiring preparation of an EIS are specified in 10 CFR 51.20(b)(1) to (b)(13) (TN10253). As explained in Section 1.3.1 of the EA, the proposed Federal actions are not specifically covered by the criteria for an EIS as delineated in 10 CFR 51.20 without knowing the significance of potential impacts from the

proposed Federal actions. Pursuant to NEPA § 102(2)(C), a “detailed statement” (i.e., an EIS) must be prepared for “major Federal actions significantly affecting the quality of the human environment” (42 U.S.C. 4321 et seq.; TN661). An EA is a decisional document prepared to evaluate whether a proposed action constitutes a “major federal action” with the potential to significantly affect quality of the human environment. If the NRC staff determine that significant environmental impacts may result from the proposed action, the NRC staff would prepare an EIS. As discussed in Section 1.3 of the EA, the NRC licensing decision is based on applicable regulatory criteria and the associated adjudicatory process. These comments provide no new and significant information, and therefore, no changes were made to the Palisades EA as a result of these comments.

K.6.5.2 Process – Licensing Action Response 2

Comments: (17-9) (23-2-11) (23-20-3) (23-21-14) (23-21-15) (23-23-10)

Summary: The NRC received comments from two commenters expressing dissatisfaction with the NRC’s approach to public input on the on the EA and decision-making processes related to the reauthorization of power operations at Palisades. Commenters feel that past public input, including input on the 2006 SEIS (NRC 2006-TN7346) for the Palisades license renewal, has been largely ignored by the NRC despite the comments being substantial and detailed and would like the comments from 2006 reviewed under this NEPA review. One also felt that the NRC did not meaningfully engage with the public during the scoping period and ignored calls to consider safety issues relating to Palisades’ age, needed repairs and upgrades, and lack of proper upkeep. Another commenter felt there should be Federal funding provided for public participation.

Response: The NRC’s current review processes are designed to address and incorporate stakeholder contributions within the existing framework outlined in 10 CFR 51 (TN10253). The NRC encourages and values public input. The Palisades EA is an example of NRC’s strong commitment to public input through its inclusion of both a scoping period and draft comment period, not required for an EA, exceeding the public participation requirements for EAs.

Comments submitted during scoping were used to inform impact analyses to draft the EA while comments on the draft EA were considered to determine if new or significant information was missed or needs to be reconsidered and should be incorporated into the final EA. NRC’s inclusion of EA Appendix H, Discussion of Cancer Risks at and Around Palisades Nuclear Plant, is an example of NRC’s careful consideration of scoping comments. Every comment submitted during the comment period is reviewed and considered by NRC staff. Responses to the comments are included in this document and revisions in the final EA are made, as applicable. All correspondence is publicly available and may be accessed through the NRC’s ADAMS website at <http://adams.nrc.gov/wba/>.

Regarding funding for public participation, the current structure for the Palisades EA aligns with NEPA (TN661) and the NRC’s implementing regulations and practices under 10 CFR 51 and currently provides no current mechanism for public funding. The comments related to public participation, along with the provided reference materials, do not provide new and significant information that is within the scope of the NRC’s environmental review; therefore, no changes were made to the Palisades’ EA as a result of these comments.

K.6.5.3 Process – Licensing Action Response 3

Comments: (10-21) (17-1) (17-5) (17-7) (23-3-4) (23-3-5) (23-3-8) (23-4-5)

Summary: *The NRC received comments from three commenters about regulatory concerns regarding the framework for reauthorization of nuclear power operations. Commenters questioned Holtec's requests for an exemption, transfer, and license amendment requests (LARs) that are necessary for the resumption of power operations. They also questioned the NRC citing regulations as an evidentiary basis. Commenters expressed apprehension over the NRC's consideration of these requests without a defined regulatory framework for an unprecedented action, emphasizing the lack of a rulemaking process to address the unique challenges posed by restarting a decommissioned nuclear plant. The commenters also urge the NRC to act on an existing petition to initiate a comprehensive rulemaking process to establish clear procedures for reviewing and evaluating the impacts of reauthorizing power operations at a decommissioned plant that addresses baseline safety and environmental concerns before taking further actions related to Palisades. There was one comment stating NRC must use up-to-date knowledge and not rely on outdated reports, studies, and regulations.*

Response: *The NRC regulatory framework is designed to address the complexities associated with nuclear power plant licensing actions and operations necessary for this process. The existing NRC regulatory processes, including processes for license amendments, exemptions, and transfer requests, may be used to reauthorize power operations at Palisades because HDI still holds an operating license. As stated in 86 FR 24362 (TN11947) and reiterated in CLI-25-03 (NRC 2025-TN11948), "the NRC may consider requests from licensees to resume operations under the existing regulatory framework." CLI-25-03 also states that "no statute or regulation prohibits reauthorizing operation after the section 50.82(a)(1) certificates have been issued."*

The Palisades license is still an RFOL, even during decommissioning, because the license "continues in effect" after permanent cessation of operation until the license is terminated. While the docketing of the 10 CFR 50.82(a)(1) (TN249) certifications means that reactor operation is no longer authorized, that is a change in license authority, not a change to the form of the license. Moreover, several other NRC regulations and the license itself all indicate that the Palisades license is an RFOL.

Further, all relevant safety and environmental concerns that would be evaluated under a new or renewed license have been considered under the current EA process for Palisades. For the NRC staff, evaluation of the exemption, transfer, and license amendment requests occurs simultaneously for safety and environmental reviews through the Office of Nuclear Reactor Regulation and the Office of Nuclear Material Safety and Safeguards, respectively. In parallel with this environmental review, the NRC staff in the Office of Nuclear Reactor Regulation are conducting a detailed safety evaluation of the exemption, transfer, and license amendment requests. The comments do not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the EA as a result of these comments.

K.6.5.4 Process – Licensing Action Response 4

Comments: (17-3) (17-10) (23-4-15) (23-6-2) (23-6-13) (23-7-5) (23-7-9) (23-8-1) (23-9-17) (23-11-1) (23-11-14) (23-11-15) (23-12-6) (23-14-13) (23-22-15)

Summary: *The NRC received comments from two commenters concerning the NEPA process and the NRC's implementation of NEPA regulations. The comments express concern over the NRC and DOE's handling of the NEPA process, arguing that the EA process falls short in its*

analysis and fails to account for the cumulative effects of potential future projects on the site. The commenters criticize separating the reauthorization of power operations at Palisades and the potential SMR project at the same location. The comments also contend that the NRC's use of the 2006 SEIS and the License Renewal Generic Environmental Impact Statement (LR GEIS) violates NEPA requirements for ongoing and rigorous evaluations of new circumstances. Commenters also feel that a site-specific EIS or a Programmatic EIS is necessary for a thorough review and urges the NRC and DOE to take a "hard look" at public health impacts and environmental risks as mandated by NEPA. There were also two comments stating that the NRC does not adequately consider the health, safety, and security of area residents. One of these commenters questioned why the U.S. EPA was not included as a cooperating agency in the Palisades environmental review.

Response: The NRC complies with the requirements of the NEPA (42 U.S.C. Part 4336a et seq.; TN661). The NRC's regulations, procedures, and guidance documents evaluate environmental impacts within this framework. An EA is prepared to evaluate and document whether a proposed action constitutes a "major federal action" that has the potential to significantly affect the environment. If NRC staff determine that significant environmental impacts may result from the proposed Federal actions, the NRC staff would prepare an EIS. The use of prior environmental documents, including the SEIS and LR GEIS, falls within NRC's guideline documents for integrating previous findings with new assessments, which align with legal mandates and best available data while enabling the NRC to make progress on the proposed Federal actions. Section 1.3 of the EA describes the NRC's approach in this regard. To ensure the EA stands alone and provides sufficient analysis for the decision-maker to arrive at a conclusion, the NRC adheres to the incorporation by reference approach. One of the three principles of incorporation by reference includes assurance that new information is evaluated and the relevance to the proposed action is discussed.

The NRC staff strives to conduct its regulatory responsibilities in an open and transparent manner, consistent with the NRC Approach to Open Government (<https://www.nrc.gov/public-involve/open.html>) and the NRC regulations under 10 CFR Part 51 (TN10253). This includes consideration of multiple potential impacts on the public and surrounding communities including but not limited to visual resources, land use, air quality, surface and groundwater resources, socioeconomics, and human health. Cooperating agencies are included in an environmental review at the request of the agency. As the U.S. EPA did not request cooperation status, they are not a cooperating agency in the Palisades environmental review, but did provide comments during the public comment period on the draft. These comments and the reference materials do not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the EA as a result of these comments.

K.6.6 Comments Concerning Outside Scope - Aging Management

Comments: (5-2) (7-3) (8-2) (10-1) (10-10) (10-14) (17-11) (23-6-9) (23-9-13) (23-17-6) (23-20-8)

Summary: Several commenters expressed concern about aging components and older technologies that would be used at Palisades or the ability to effectively manage aging during the reauthorization of power operations. Several commenters specifically cited reactor pressure vessel embrittlement as a concern, as well as lapsed maintenance during decommissioning and potential damage to components due to improper storage.

Response: The NRC staff is conducting both an environmental review and a safety review related to the request for reauthorization of Palisades. The staff's safety review is conducted in accordance with 10 CFR Part 50 (TN249), and the results of the staff's evaluation are documented in a safety evaluation report issued separately from the environmental review. Operational safety issues related to the management of aging structures, systems, and components are outside of the scope of the environmental review conducted under 10 CFR Part 51 (TN10253). In accordance with 10 CFR Part 50, the results of the NRC staff's review of the licensee's aging management programs and documents will be documented in the safety evaluation report, which will be publicly available. These comments provide no new and significant information, and therefore, no changes have been made to the EA as a result of these comments.

K.6.7 Comments Concerning Outside Scope - Environmental Justice

Comments: (10-19) (23-1-8) (23-1-9) (23-1-10) (23-3-14) (23-6-11) (23-15-6) (23-15-12) (23-15-13) (23-15-14) (23-15-16) (23-16-1) (23-16-3) (23-16-5) (23-16-7) (23-16-10) (23-16-12) (23-16-15) (23-22-7) (23-24-10)

Summary: Two commenters expressed concern about the environmental and health impacts to environmental justice communities in and around the area of Palisades.

Response: Executive Order 14173, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity," issued January 21, 2025 (90 FR 8633-TN11607), revoked Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," issued February 11, 1994 (59 FR 7629-TN1450), among other things. Staff Requirements Memorandum (SRM)-COMSECY-25-0007, "Withdrawing the Environmental Justice Policy Statement and Environmental Justice Strategy," issued April 10, 2025, approved publication of a notice in the Federal Register (90 FR 17887-TN11684), which explained that, in response to the policies in Executive Order 12898, the NRC had made voluntary commitments on environmental justice in its Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (Environmental Justice Policy Statement) and Environmental Justice Strategy (69 FR 52040-TN1009). Accordingly, with the revocation of Executive Order 12898, the NRC also withdrew its Environmental Justice Policy Statement and Environmental Justice Strategy.

K.6.8 Comments Concerning Outside Scope - Emergency Preparedness

Comments: (23-3-9) (23-17-13)

Summary: One commenter expressed concerns about emergency preparedness plans at Palisades. The concerns included the lapse of Palisades' emergency evacuation and other emergency preparedness plans during the decommissioning phase as nuclear risks remained on site.

Response: Emergency preparedness is subject to NRC oversight at Palisades; however, this issue is outside the scope of the NRC staff's environmental review of the reauthorization of power operation at Palisades. Therefore, no changes were made to the EA. Emergency preparedness is required at all nuclear power plants and requires specified levels of protection from each licensee regardless of plant design, construction, or license date. Requirements related to emergency planning are set out in the NRC's regulations at 10 CFR 50.47 and

Appendix E to 10 CFR Part 50 (TN249). The NRC has regulations in place to ensure that emergency preparedness and security plans are updated throughout the life of all plants.

K.6.9 Comments Concerning Outside Scope - Energy Costs

Comment: (10-13)

Summary: *One commenter expressed concerns related to the cost of the resumption of power operations at Palisades and that the financial risks of a nuclear accident are paid for by the public.*

Response: *The NRC acknowledges the comment related to the economic costs associated with a nuclear power plant accident. The consideration of economic costs associated with a hypothetical nuclear accident is outside the scope of this proposed Federal actions. However, costs associated with nuclear incidents are governed by the Price-Anderson Nuclear Industries Indemnity Act (42 U.S.C. 2210 et seq.; TN6486). In accordance with the Price-Anderson Nuclear Industries Indemnity Act, the NRC requires that all nuclear power reactors have and maintain financial protection, or insurance, to cover the liability claims of members of the public for personal injury and property damage caused by a commercial nuclear power plant accident. No changes were made in the EA as a result of these comments or their associated reference material.*

K.6.10 Comments Concerning Outside Scope - Miscellaneous

K.6.10.1 Outside Scope – Miscellaneous Response 1

Comments: (5-1) (5-3) (5-5) (7-2) (8-3) (17-12) (23-2-1) (23-3-6) (23-3-17) (23-5-7) (23-6-14) (23-6-16) (23-10-7) (23-10-9) (23-12-12) (23-14-10) (23-14-12) (23-14-14) (23-17-15) (23-18-3) (23-18-18) (23-19-6) (23-19-7) (23-20-6) (23-21-1) (23-21-3) (23-21-9) (23-23-7) (23-23-8) (23-23-9) (23-25-2) (23-25-3)

Summary: *Several commenters expressed concern over Holtec's inexperience in operating a nuclear power plant and use of public funds to support the reauthorization of power operations at Palisades. Commenters stated that Holtec has a history of disreputable business practices and NRC should not trust or assist Holtec with the operation of Palisades in the protection of human health and the environment. Reasons for distrust include using Nuclear Decommissioning Trust Funds for preparation for reauthorization activities at Palisades and suspected dishonesty about their plan to decommission Palisades.*

Response: *The purpose of the EA is to identify and evaluate if the environmental impacts that could result from the preparation for and the resumption of power operations at Palisades have the potential to significantly affect the environment. The business practices of the applicant are not within this scope. Site-specific concerns and safety violations at other sites are dispositioned in site-specific reviews, through the NRC's enforcement process, or through the NRC's allegation process. Beyond determining compliance with the NRC's regulatory standards, the NRC does not exercise regulatory authority over the business decisions of private companies or organizations such as Holtec or their interactions with other agencies or businesses. The NRC is an independent agency and conducts its activities in an open and transparent manner. These comments or the reference materials do not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the EA as a result of these comments.*

K.6.10.2 Outside Scope – Miscellaneous Response 2

Comments: (7-10) (23-2-5) (23-4-11) (23-18-7) (23-19-12) (23-20-7) (23-22-5) (23-22-8) (23-26-4) (23-26-6) (23-27-9)

Summary: *One commenter questioned what the environmental impact is for using coal and natural gas from the power grid to operate the pumps, valves, and other equipment at a nuclear power plant. Another commenter (1) expressed concerns about the relationship between nuclear industry and government agencies, (2) stated that Federal incentives may not occur under our current administration and may affect the incentives for Palisades, (3) questioned the difference between United States and international radiation limits, and (4) commented on the location for Palisades being selected because the location was a former sand quarry.*

Response: *The purpose of the EA is to identify and evaluate if the environmental impacts that could result from the preparation for and the resumption of power operations at Palisades have the potential to significantly affect the environment. These comments and referenced materials are generic in nature and do not provide new and significant information that are within the scope of the NRC's environmental review; therefore, no changes were made to the EA as a result of these comments.*

K.6.10.3 Outside Scope – Miscellaneous Response 3

Comments: (23-1-11) (23-5-13) (23-9-15) (23-12-7) (23-13-12) (23-14-17) (23-15-7) (23-15-8) (23-16-2) (23-16-4) (23-16-13) (23-17-11) (23-18-14) (23-20-9) (23-21-11) (23-22-13) (23-22-14)

Summary: *One commenter stated that the NRC and/or DOE have ignored, understated, or concealed environmental issues within the vicinity of Palisades and throughout the United States and provided examples. Some provided comments include references to Environmental Justice. See Section K.6.7 for additional information.*

Response: *The purpose of the EA is to identify and evaluate if the environmental impacts that could result from the preparation for and the resumption of power operations at Palisades have the potential to significantly affect the environment. Addressing NRC past actions or decisions are not within the scope of the EA. The NRC is an independent agency and conducts its activities in an open and transparent manner. These comments and referenced materials do not provide new and significant information that are within the scope of the NRC's environmental review; therefore, no changes were made to the EA as a result of these comments.*

K.6.10.4 Outside Scope – Miscellaneous Response 4

Comments: (10-3) (23-6-4) (23-9-2) (23-10-14) (23-10-16) (23-10-18) (23-15-1) (23-17-10) (23-21-4) (23-21-5) (23-22-1) (23-22-11) (23-23-1) (23-23-11) (23-25-13) (23-26-10) (23-29-12) (23-29-15) (23-29-16)

Summary: *One commenter provided comments related to State oversight of Palisades, potential future actions at Palisades, and Palisades' surrounding community. Opposition was expressed regarding any future SMRs at Palisades, the extension or renewal of Palisades' NPDES and dredging permits, EGLE certifications or waivers, the Energy Policy Act, the Atomic Energy Act, nuclear loan guarantee program, and the Inflation Reduction Act. This commenter expressed concern that not enough was being done by Fish and Wildlife, Michigan EGLE, State*

of Michigan, or the Michigan Department of Health and Human Services related to protection of human health and the environment. Specific concerns include why the Coastal Zone Management Act does not require State participation, that Lake Michigan near Palisades should qualify under the National Marine Sanctuaries Act, and that there are no Federal regulations on electromagnetic fields. This commenter also questioned whether there are plans to frack at or near Palisades and what the environmental and safety impacts would be from fracking. This commenter provided commentary regarding socioeconomics and environmental justice in the region, including (1) the reduced number of American Indians near Palisades is due to past eviction and genocide, but they are not vanishing, (2) the brownfield redevelopment projects in Kalamazoo will result in living and gardening on toxic sites, and (3) commentary regarding boardwalks that were incorporated on nature trails at Jean Klock Park due to radioactivity.

Response: The purpose of the EA is to identify and evaluate if the environmental impacts that could result from the preparation for and the resumption of power operations at Palisades have the potential to significantly affect the environment. The NRC does not have a role in decision-making of other regulatory or State agencies and is not within the scope of the EA. These comments and referenced materials do not provide new and significant information that is within the scope of the NRC's environmental review; therefore, no changes were made to the EA as a result of these comments.

K.6.11 Comments Concerning Outside Scope - Safety

Comments: (5-6) (6-4) (8-4) (8-6) (10-7) (10-11) (10-12) (10-15) (15-1) (17-2) (17-6) (17-13) (17-14) (23-1-3) (23-1-4) (23-1-14) (23-4-7) (23-5-6) (23-5-20) (23-6-1) (23-6-3) (23-6-5) (23-6-6) (23-7-16) (23-8-12) (23-10-11) (23-14-2) (23-14-4) (23-15-3) (23-15-4) (23-16-8) (23-18-17) (23-18-19) (23-18-20) (23-19-2) (23-19-10) (23-19-14) (23-21-8) (23-23-14) (23-24-3) (23-24-4) (23-24-5) (23-24-11) (23-24-12) (23-25-17)

Summary: Commenters expressed concern about Palisades operational safety issues, material aging management programs, and/or safety impacts of external events and natural hazards. Specific concerns include (1) climate change and resulting extreme weather and lake level rise; (2) reactor core meltdown resulting in impacts to human health and the environment; (3) structural integrity of stored irradiated fuel and throughout site; (4) equipment, structures, and component degradation, skipped maintenance, and ability to withstand earthquakes; and the (5) proximity of hydrazine storage and the turbine building.

Response: The NRC staff is conducting both an environmental review and a safety review related to the request for reauthorization of Palisades. The staff's safety review is conducted in accordance with 10 CFR Part 50 (TN249), and the results of the staff's evaluation are documented in a safety evaluation report issued separately from the environmental review. In addition, the NRC addresses potential hazards to safe operation of a nuclear power plant, including external hazards, through its ongoing oversight of operating licenses.

The NRC staff's environmental review of the licensing actions for Palisades takes into consideration external hazards, such as extreme weather impact, in two ways. First, the risks from external events (hazards) were considered as part of the staff's review of postulated accidents and the SAMA analysis performed for the initial license renewal of Palisades. For the potential reauthorization of Palisades, the NRC staff considered any new and significant information that is identified as relevant to SAMAs. As stated in Section 3.14 of the Palisades EA, the NRC staff's review concluded that there is no new and significant information regarding

any potentially cost-beneficial SAMA that would substantially reduce the risks of a severe accident at Palisades.

On an ongoing basis, ensuring the continued safe operation of an operating nuclear power plant is a separate and distinct process from the NRC staff's environmental review. With regard to future operational impacts, the NRC provides continuous oversight for the safe operation of nuclear power plants through its ongoing reactor oversight process to verify that they are being operated and maintained in accordance with NRC regulations. This oversight includes having full-time NRC inspectors located at the plant and periodic safety inspections conducted by NRC inspectors based in an NRC Regional Office. The inspections look at a licensee's compliance with NRC's regulations, which includes plant safety (routine and accident scenarios), radiation protection of plant workers and members of the public, radioactive effluent releases, radiological environmental monitoring, emergency preparedness, radioactive waste storage and transportation, quality assurance, and training. Should the NRC discover an unsafe condition, or that a licensee is not complying with its licensing basis, the NRC has full authority to take whatever action is necessary to protect public health and safety.

Comments related to the impacts of plant operation on the surrounding environment, such as potential environmental releases, are within the scope of the environmental review (e.g., surface water hydrology and climate change) and are evaluated in Chapter 3 of the EA. These comments provide no new and significant information, and therefore, no changes were made to the EA based on these comments.

K.6.12 Comments Concerning Outside Scope - Security and Terrorism

Comments: (10-8)

Summary: *One commenter expressed concern about security issues including cyberattacks, attacks on the regional electric grid, and sabotage.*

Response: *Security-related issues are addressed as a current operating issue. As a result of the terrorist attacks of September 11, 2001, the NRC conducted a comprehensive review of the agency's security program and made further enhancements to security at a wide range of NRC-regulated facilities. These enhancements included significant reinforcement of the defense capabilities for nuclear facilities, better control of sensitive information, enhancements in emergency preparedness to further strengthen the agency's nuclear facility security program, and implementation of mitigating strategies to deal with postulated events.*

The NRC routinely assesses threats and other information provided by a variety of Federal agencies and sources. The NRC also ensures that licensees meet appropriate security-level requirements. The NRC will continue to focus on prevention of terrorist acts for all nuclear facilities and will not focus on site-specific evaluations of speculative environmental impacts resulting from terrorist acts. While these are legitimate matters of concern, the staff will continue to address them through the ongoing regulatory process as a current and generic regulatory issue that affects all nuclear facilities and many of the activities conducted at nuclear facilities. With regard to malevolent acts or sabotage, it is the NRC's position that malevolent acts or sabotage are speculative and beyond the scope of the NRC's license renewal environmental review. The NRC believes that the consequences of events initiated by malevolent acts or sabotage would be comparable to or bounded by the severe accidents considered in the EA. This comment provides no new and significant information, and therefore, no changes were made to the EA based on this comment.

K.7 U.S. Environmental Protection Agency Correspondence

Response: *The NRC acknowledges the comments provided by the EPA. The EPA comments focused on recommendations and observations regarding water resources, sediment testing and placement, wildlife (ecological) resources, aspects of construction, demolition, environmental best practices, the community benefits plan, mitigation commitments, and editorial considerations. While a portion of these comments are outside of the NRC's scope for this environmental analysis (e.g., aspects of recycling of demolition materials), several in-scope comments and recommendations were incorporated into the final EA. This includes modified text within EA Section 3.7 noting that Michigan EGLE requires a thermal plume study within one year of restart of operations. Additionally, records of consultation with the FWS were added to EA Appendix J. Table 3-1 was also modified to clarify the purpose of the new south radioactive waste storage building.*

K.8 References

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10 CFR Part 51. *Code of Federal Regulations*, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." TN10253.

10 CFR Part 61. *Code of Federal Regulations*, Title 10, *Energy*, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." TN252.

10 CFR Part 71. *Code of Federal Regulations*, Title 10, *Energy*, Part 71, "Packaging and Transportation of Radioactive Material." TN301.

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36 CFR Part 800. *Code of Federal Regulations*, Title 36, *Parks, Forests, and Public Property*, Part 800, "Protection of Historic Properties." TN513.

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