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HDI PNP 2023-025

10 CFR 50.12
10 CFR 50.82(a)(2)

September 28, 2023

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

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

Subject: Request for Exemption from Certain Termination of License Requirements of
10 CFR 50.82

In accordance with the requirements of Title 10 of the Code of Federal Regulations (10 CFR) 50.12, *Specific exemptions*, Holtec Decommissioning International LLC (HDI), on behalf of Holtec Palisades LLC, hereby requests exemption from portions of 10 CFR 50.82, *Termination of license*, paragraph (a), subparagraph (2), 10 CFR 50.82(a)(2) for the Palisades Nuclear Plant (PNP). Upon docketing the 10 CFR 50.82(a)(1) certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel, regulation 10 CFR 50.82(a)(2) no longer authorizes operation of the PNP reactor or emplacement or retention of fuel into the PNP reactor vessel. This exemption request is necessary to support the resumption of power operations at PNP.

Specifically, HDI is requesting an exemption from the 10 CFR 50.82(a)(2) restriction that prohibits reactor power operations and retention of fuel in the reactor vessel, which is applicable to PNP due to docketing the 10 CFR 50.82(a)(1) certifications, by allowing for a one-time rescission of the docketed 10 CFR 50.82(a)(1) certifications. Once the docketed 10 CFR 50.82(a)(1) certifications are rescinded, 10 CFR 50.82(a)(2) will no longer apply and PNP will formally exit the decommissioning process and enter a second period of power operation within the original renewed facility operating license term which expires on March 24, 2031.

This requested exemption, in combination with U.S. Nuclear Regulatory Commission (NRC) approval of an order to transfer operational authority of PNP and amendments to the PNP Renewed Facility Operating License (RFOL), is necessary to reauthorize placement of fuel in the PNP reactor vessel and reauthorize power operations at PNP. Once approved, the exemption to 10 CFR 50.82(a)(2), will allow rescission of the 10 CFR 50.82(a)(1) certifications on the same date that the operating authority license transfer, and the requisite power operations license amendments will become effective. It is on this date that PNP will transition from a facility in decommissioning back to a power operations plant subject to inspection under the NRC Reactor Oversight Process.

Recently, the Governor of the State of Michigan declared that the continued operation of PNP is a top priority to shore up Michigan's clean energy supply and provide reliable lower energy costs for working families and small businesses (Reference 1). The State of Michigan legislature expressed their support of this effort, when on June 28, 2023, they approved the fiscal year 2024 budget which included 150 million dollars for the reopening of PNP (Reference 2). In support of this priority and to meet the future clean energy requirements of the State of Michigan, HDI has made the decision to pursue regulatory and financial actions to return PNP to operational status.

The PNP 10 CFR Part 50 license has not been terminated and remains valid even though, at the time of permanent cessation of power operation and permanent removal of fuel from the PNP reactor vessel, it was amended to reflect a facility in decommissioning. The transition of PNP from a power operations plant to a facility in decommissioning occurred on June 13, 2022, when the 10 CFR 50.82(a)(1) certifications were docketed (Reference 3). On June 15, 2023, other previously approved license amendments and exemptions that reduced regulatory requirements to facilitate decommissioning at PNP were implemented. To date HDI has not commenced any major decommissioning activities at PNP, as defined by 10 CFR 50.2, *Definitions*. In addition to this exemption request, HDI intends to submit license amendments that will reinstate regulatory requirements to support power operations in accordance with the facility licensing basis that were in effect prior to shutdown.

Letter Enclosure 1 provides the justification for the requested exemption. Letter Enclosure 2 provides an environmental new and significant review report that supports the exemption environmental assessment.

To coordinate implementing this requested exemption, after NRC approval of the supporting regulatory actions, HDI is proposing to submit a notification of transition to power operations letter to the NRC docketing that the exemption implementation conditions, operating authority transfer conditions, and the license amendments effectiveness conditions are met, and that the 10 CFR 50.82(1) certifications are rescinded. Upon docketing this transition notification letter PNP will transition from a facility in decommissioning back to a power operations plant.

HDI requests approval of the proposed exemption by December 31, 2024, that the proposed exemption be effective upon receipt, and that the actions permitted by the exemption (i.e., the rescission of the 10 CFR 50.82(a)(1) certifications) may not be implemented at PNP until the associated regulatory actions supporting the reauthorization of power operations at PNP have been approved and the conditions contained in the approvals have been satisfied as documented in the docketed transition notification letter.

This letter contains no new and no revised regulatory commitments.

Should you have any questions or require additional information, please contact Jim Miksa, Regulatory Assurance Engineer at (269) 764-2945.

Respectfully,

Jean A. Fleming

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Jean A. Fleming
Vice President, Licensing, Regulatory Affairs & PSA
Holtec International

Enclosures: 1) Request for Exemption from 10 CFR 50.82(a)(2)
2) Environmental New and Significant Review Proposed Resumption of Power Operations Palisades Nuclear Plant

References: 1) Office of the Governor, State of Michigan, Gretchen Whitmer letter to The Honorable Jennifer Granholm, Secretary, U.S. Department of Energy, *Utilizing the Civil Nuclear Credit to protect Michigan's clean energy assets, hundreds of good-paying jobs, and regional economic resilience*, dated April 20, 2022
2) The State of Michigan Executive Office of the Governor Communications Division, Press Release, *Gov. Whitmer Applauds Passage of "Make it in Michigan" Budget*, dated June 28, 2023
3) Entergy Nuclear Operations, Inc. letter to U.S. Nuclear Regulatory Commission, *Certifications of Permanent Cessation of Power Operations and Permanent Removal of Fuel from the Reactor Vessel*, dated June 13, 2022 (ADAMS Accession No. ML22164A067)

cc: NRC Region III Regional Administrator
NRC Decommissioning Inspector – Palisades Nuclear Plant
NRC NMSS Project Manager – Palisades Nuclear Plant
Designated Michigan State Official

Enclosure 1 to
HDI PNP 2023-025
Palisades Nuclear Plant
Request for Exemption from 10 CFR 50.82(a)(2)

Request for Exemption from 10 CFR 50.82(a)(2)

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1.0 PROPOSED EXEMPTION

In accordance with the requirements of Title 10 of the Code of Federal Regulations (10 CFR) 50.12, *Specific exemptions*, Holtec Decommissioning International LLC (HDI), on behalf of Holtec Palisades LLC, hereby requests exemption from portions of 10 CFR 50.82, *Termination of license*, paragraph (a), subparagraph (2), 10 CFR 50.82(a)(2), for the Palisades Nuclear Plant (PNP). Specifically, HDI is requesting an exemption from 10 CFR 50.82(a)(2) to allow for a one-time rescission of the PNP docketed 10 CFR 50.82(a)(1) certifications submitted on June 13, 2022 (Reference 1), to remove the restrictions that prohibits operation of the PNP reactor or emplacement or retention of fuel into the PNP reactor vessel. The proposed exemption would allow resumption of power operations at PNP after U.S. Nuclear Regulatory Commission (NRC) approval of operating authority transfer and the license amendments necessary to reinstate the PNP Renewed Facility Operating License (RFOL) power operations license basis (POLB). Once approved, this exemption, rescission of the 10 CFR 50.82(a)(1) certifications, transfer of the operating authority, and the associated amendments will be implemented at PNP on the same date.

To coordinate implementing this requested exemption, after NRC approval of the supporting regulatory actions, HDI is proposing to submit a notification of transition to power operations letter to the NRC docketing that the exemption implementation conditions, operating authority transfer conditions, and the license amendments effectiveness conditions are met, and that the 10 CFR 50.82(1) certifications are rescinded. Upon docketing this transition notification letter PNP will transition from a facility in decommissioning back to a power operations plant.

2.0 BACKGROUND

Prior to PNP transitioning from a power operations plant to a facility in decommissioning the Governor of the State of Michigan declared that the continued operation of PNP is a top priority to shore up Michigan's clean energy supply and provide reliable lower energy costs for working families and small businesses (Reference 2). Additionally, The State of Michigan legislature expressed their support of this effort, when on June 28, 2023, they approved the fiscal year 2024 budget which included 150 million dollars for the reopening of PNP (Reference 3). In part, due to the timing of this renewed support at the state and federal level, the transitioning of PNP to a decommissioned facility was unable to be avoided. However, shortly after PNP transitioned to a decommissioning facility, subsidiaries of Holtec International assumed ownership of PNP (Reference 4). Following acquisition of PNP by Holtec, in parallel with post-shutdown activities to place the plant into a safe and de-energized condition, HDI commenced project planning to return PNP to a power operations plant. A required part of this plan is a viable regulatory path to obtain NRC authorization to return PNP to power operations. This exemption request to rescind the docketed 10 CFR 50.82(a)(1) certifications will remove the restriction on placement of fuel into the PNP reactor vessel, and reauthorize power operations of the PNP reactor, and is needed alongside the requisite regulatory submittals that will reinstate the operational licensing basis to allow for the repowering of PNP. The unique sequence of actions leading up to this request are provided below.

On January 4, 2017, Entergy Nuclear Operations, Inc. (Entergy) submitted to the U.S. Nuclear Regulatory Commission (NRC) its plan to permanently cease power operations at

PNP on October 1, 2018 (Reference 5). This decision supported Entergy's strategic plan to exit the merchant power market and was predicated on Consumers Energy buyout of the contracted purchase power agreement (PPA) prior to expiration in 2022.

On October 19, 2017, Entergy submitted to the NRC a change to its permanent cessation of power operations plan that revised the permanent shutdown date to no later than May 31, 2022 (Reference 6). This revision was required due to the Michigan Public Service Commission refusal to approve the terms of the PPA buy out. May 31, 2022, coincided with the end of the contracted PPA term.

On December 13, 2021, the NRC approved the transfer of the operating license indirect ownership from Entergy subsidiaries to Holtec subsidiaries and the facility operating authority from Entergy Nuclear Operations, Inc. to Holtec Decommissioning International, LLC (HDI) (Reference 7). The license transfer was subject to PNP docketing the 10 CFR 50.82(a)(1) certifications and was scheduled to occur shortly after implementation of the PNP permanently defueled technical specifications (PDTS). Approval of HDI as operating authority was predicated on PNP having transitioned to a facility in decommissioning.

On April 19, 2022, the U.S. Department of Energy (DOE) issued guidance for the civil nuclear credit program (CNCP) with a deadline for submission of certification application and sealed bids by May 19, 2022 (Reference 8).

On April 20, 2022, a letter from the Governor of the State of Michigan to the Secretary of the DOE expressed support for use of the CNCP to support continued power operations at PNP. The Governor stated in the letter, *Keeping Palisades open is a top priority. Doing so will allow us to make Michigan more competitive for economic development projects bringing billions in investment, protect hundreds of good-paying jobs for Michigan workers, and shore up Michigan's clean energy supply and provide reliable lower energy costs for working families and small businesses* (Reference 2).

On June 13, 2022, Entergy submitted to the NRC the 10 CFR 50.82(a)(1) certifications of the permanent cessation of power operations at PNP and the permanent removal of fuel from the PNP reactor vessel (Reference 1). On this same date, the NRC informed Entergy that the reactor oversight process at PNP had been terminated and that the NRC decommissioning inspection program was now applicable to PNP (Reference 9). This is the date when PNP transitioned from a power operations plant to a facility in decommissioning.

During the period from January 4, 2017, to June 15, 2022, Entergy submitted numerous licensing actions (amendments and exemptions) to the NRC in readiness to implement the transition of PNP from a power operations plant to a facility in decommissioning. These actions were voluntary and consistent with other utilities that had previously permanently shut down and defueled.

On June 15, 2022, Entergy implemented the PDTS and supporting RFOL amendments and exemptions that modified the regulatory requirements to reflect a facility in decommissioning.

On June 28, 2022, Holtec acquired PNP from Entergy, and the NRC issued PNP RFOL amendments to reflect this change in ownership and name change, and the transfer of Entergy Nuclear Operations, Inc. operating authority, to Holtec Decommissioning International, LLC (Reference 10). Note, at the time of license transfer PNP was a facility in decommissioning and HDI was given operating authority by the NRC for the purpose of decommissioning the PNP site.

On June 30, 2022, the DOE revised the CNCP eligibility criteria and extended the application deadline to September 6, 2022 (Reference 11).

On August 22, 2022, Holtec International, (Holtec) having just obtained ownership of PNP on June 28, 2022, elected to apply for the CNCP, given the recent application deadline extension until September 6, 2022 (Reference 12). The decision for Holtec to apply for the CNCP was influenced in part by the strong support from the State of Michigan as stated in the above referenced April 20, 2022, letter.

On September 9, 2022, the Governor of the State of Michigan penned a second letter to the Secretary of the DOE supporting the Holtec application for the CNCP. In this letter the Governor wrote, *With your support, Holtec plans to repower and reopen the Palisades, a union plant in Southwest Michigan that employs 600 workers making an average of \$117,845, supports over 1,100 regional jobs, generates \$363 million in annual regional economic development, and produces more than 800 megawatts of reliable, clean power. Keeping Palisades open is critical for Michigan's competitiveness and future economic development opportunities* (Reference 13).

On November 17, 2022, a letter from the DOE to Holtec, notified Holtec that the DOE did not award CNCP for PNP. This decision was based on PNP not meeting the CNCP guidance for Award Period 1 (Reference 14).

On February 1, 2023, HDI submitted a letter to the NRC proposing a regulatory path to reauthorize power operations at PNP (Reference 15). While the letter recognized that current regulations do not prescribe a specific regulatory path to reinstating operational authority following docketing of the 50.82(a)(1) certifications, it did reference a denial of petition for rulemaking on the criteria to return retired nuclear power reactors to operations (Reference 16). The denial was based on, in part, that the existing regulatory framework provides adequate flexibility to accommodate reauthorization of operations.

On February 23, 2023, Holtec submitted a loan application to the DOE to support restoration of PNP. The decision for Holtec to apply for this alternate source of funding for the PNP restart project was again influenced by the continuing strong support from the state of Michigan (Reference 17).

On March 20, 2023, HDI met with the NRC, in a public meeting forum, to discuss with the NRC staff the proposed regulatory path to potentially request reauthorization of power operations at PNP. The purpose of the meeting was to provide an overview of the proposed regulatory path and to obtain feedback from the NRC staff on the reasonableness of the approach. The NRC provided no comments opposing the reasonableness of the approach (Reference 18).

On May 24, 2023, HDI met with the NRC, in a public meeting forum, to discuss the regulatory framework to potentially request reauthorization of power operations at PNP, with focus on the request for exemption to 10 CFR 50.82(a)(2). The purpose of the meeting was to provide an overview of the proposed regulatory framework, with emphasis on the requested exemption to 10 CFR 50.82(a)(2) and to obtain feedback from the NRC staff on the reasonableness of the approach. The NRC provided no comments opposing the reasonableness of the approach (Reference 19).

On June 28, 2023, The State of Michigan legislature expressed their support of this effort, when they approved the fiscal year 2024 budget which included 150 million dollars for the reopening of PNP (Reference 3).

On August 29, 2023, HDI conducted a pre-submittal meeting with the NRC, in a public meeting forum, to allow discussion on the important aspects associated with the exemption to 10 CFR 50.82(a)(2), and the planned exemption submittal date (Reference 20).

As shown above, the repowering of PNP is a top priority for the Governor of the State of Michigan to ensure a reliable lower cost clean energy source for the state. As well as the desire by Holtec to support this priority through pursuit of project funding and detailed regulatory framework planning. Finally, the above actions show the special circumstances that exist resulting in the need for this exemption request.

3.0 DETAILED DESCRIPTION

HDI is proposing a regulatory framework to transition PNP back to a power operations plant that includes similar licensing actions to those taken when PNP was transitioned from a power operations plant to a facility in decommissioning. Use of similar licensing actions will provide PNP licensing basis continuity from power operations, to decommissioning, and back to power operations.

The regulatory framework for the reauthorization of power operations at PNP includes submitting a request for exemption from 10 CFR 50.82(a)(2) that states, *Upon docketing of the certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel, or when a final legally effective order to permanently cease operations has come into effect, the 10 CFR part 50 license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel*, for a one-time rescission of the PNP docketed 10 CFR 50.82(a)(1) certifications submitted on June 13, 2022 (Reference 1), to remove the restrictions that prohibits operation of the PNP reactor or emplacement or retention of fuel into the PNP reactor vessel. This restriction imposed by the voluntary docketing of the 10 CFR 50.82(a)(1) certifications was used as the basis for licensing actions that modified the facility licensing basis to facilitate the then-expected permanent shutdown and defueling. Implementation of the NRC approved licensing actions included revising the PNP licensing basis to accurately reflect the status and reduced risk of a facility in decommissioning. No major decommissioning activities, as defined in 10 CFR 50.2, *Definitions*, occurred at PNP to support this transition, and none have occurred since. This exemption along with operating authority transfer, and license amendment requests (LAR) for the PNP RFOL, Technical Specifications (TS), and Emergency Plan are required to reinstate the PNP POLB that was in effect just prior to the 10 CFR 50.82(a)(1) certifications. Once approved, this

exemption, and rescission of the 10 CFR 50.82(a)(1) certifications will occur on the same date that the operating authority license transfer, and the requisite license amendments will become effective. HDI is proposing to coordinate this transition by submitting a notification of transition to power operations letter to the NRC docketing that the exemption implementation conditions, operating authority transfer conditions, and the license amendments effectiveness conditions are met, and that the 10 CFR 50.82(1) certifications are rescinded. Upon docketing this notification letter PNP will transition from a facility in decommissioning back to a power operations plant. The date on which this notification letter is docketed will henceforth be referred to as the “transition date.”

This exemption request supports the regulatory framework for reauthorization of power operations at PNP through a series of licensing actions. Once granted, the requested one-time exemption from 10 CFR 50.82(a)(2) will allow HDI to rescind the docketed decommissioning certifications once the exemption implementation requirements are met. After the 10 CFR 50.82(a)(2) certifications rescission, implementation of the operating authority transfer and associated license amendments will allow fuel to be loaded into the PNP reactor vessel and to reauthorize operation of the PNP reactor. The specific supporting licensing actions that will be effective on the transition date, and which will reinstate the PNP POLB, are listed below.

- An application to transfer the decommissioning facility operating authority at PNP from HDI to an entity authorized to operate the PNP reactor.
- A LAR that reinstates the PNP RFOL operating TS by amending the PDTS technical sections to reflect a power operations plant.
- A LAR that reinstates the PNP RFOL operating TS administrative requirements by amending the PDTS administrative sections to reflect a power operations plant (Includes reinstating licensed operator requirements and removal of Certified Fuel Handlers).
- A LAR to amend the PNP RFOL for an Emergency Plan and Emergency Action Levels to support a power operations plant.

Industry standard exemptions and NRC Order relaxations that were granted to PNP based on a facility in decommissioning status that are no longer applicable to a power operations plant, will be rescinded coincident with implementation of this exemption on the transition date. The applicable exemptions and Orders are:

- Certified Fuel Handlers Severe Weather Authority (Reference 21)
- Record Keeping (Reference 22)
- Use of Decommissioning Funds for Spent Fuel Management (Reference 23)
- Emergency Plan Exemption that supported the permanently defueled emergency plan for post zirconium fire off-site Emergency Response Organization relaxation (Reference 24). Note: Reference 24 is the exemption request letter, since as of the submittal date of this letter the exemption has not been issued to PNP.

- Withdrawal of Interim Compensatory Measure B.1.a in EA-02-026, *Order for Interim Safeguards and Security Compensatory Measures* (Reference 25).

HDI plans to apply to the NRC for transfer of the PNP operating authority from HDI to a new entity. Ownership of the PNP license will remain with Holtec Palisades, LLC. This application is necessary because the order that transferred operating authority to HDI limits HDI to the performance of spent fuel management and decommissioning activities at PNP (Reference 4). Once approved by the NRC Commission, the transfer of PNP operating authority from HDI to the new entity and the associated amendments will be effective on the transition date.

In conjunction with the implementation of the foregoing licensing actions, the Updated Final Safety Analysis Report (UFSAR), now titled the Defueled Safety Analysis Report (DSAR), will be updated, via the 10 CFR 50.59, *Changes, tests and experiments*, process to reflect the docketed version that was in effective prior to the 10 CFR 50.82(a)(1) certifications, PNP UFSAR Revision 35 (Reference 26). Any DSAR retained changes to UFSAR Rev. 35 have been or will be evaluated via the 50.59 process against UFSAR Rev. 35 to determine if NRC approval is required prior to exiting the period of decommissioning. This will include reinstatement of accident analyses and the safety reclassification of systems, structures, and components (SSCs), required to support the PNP POLB. Changes made to the UFSAR after Rev. 35 will be evaluated for retention, to the extent appropriate for an operating plant. The DSAR revision back to the PNP POLB UFSAR will be accomplished under the 10 CFR 50.59 process and be implemented coincident with the associated license amendments.

NRC orders and industry initiatives that are applicable to PNP power operations will be reviewed to ensure compliance on the transition date.

Regulatory required programs and operational procedures will be reinstated to support power operations. Such as, the Quality Assurance Program, Inservice Inspection Program, and Emergency Operating Procedures.

PNP NRC commitments applicable to power operations that were closed based on the 10 CFR 50.82(a)(1) certifications will be evaluated for restoration on the transition date. PNP will evaluate regulatory commitments that were closed to reflect a facility in decommissioning and reinstate commitments applicable to power operations, as required. The guidance in NEI 99-04, *Guidelines for Managing NRC Commitment Changes*, will be used to complete the evaluations.

4.0 JUSTIFICATION FOR EXEMPTION

In accordance with 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of the regulations of Part 50 which are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security. 10 CFR 50.12 also states that the Commission will not consider granting an exemption unless special circumstances are present.

4.1 The Exemption is Authorized by Law

10 CFR 50.12 allows the NRC to grant exemptions from the requirements of 10 CFR Part 50. The requested exemption to 10 CFR 50.82(a)(2) to allow a one-time rescission of the docketed 10 CFR 50.82(a)(1) certifications during the decommissioning process after all requisite licensing actions are approved by the NRC to support returning a plant to power operations does not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations. In Reference 16, the Commission recognized that the existing regulatory framework supports resumption of power operations after docketing the 10 CFR 50.82(a)(1) certifications. Therefore, the exemption is authorized by law.

4.2 The exemption will not present an undue risk to public health and safety

HDI will need to satisfy regulatory requirements applicable to the preparation and submittal of a sufficient operating authority application and LARs to allow rescission of the docketed 10 CFR 50.82(a)(1) certifications and remove the restriction on placement of fuel into the PNP reactor vessel and operation of the PNP reactor. The requested exemption to 10 CFR 50.82(a)(2) to allow for a one-time rescission of the 10 CFR 50.82(a)(1) certifications after docketing supports restoration of the PNP POLB that complied with NRC regulations.

The application to transfer operating authority will support restoring the authorization to retain fuel in the PNP reactor vessel and to operate the PNP reactor by a qualified entity. NRC review and consent to this transfer as a condition to allow rescission of the 10 CFR 50.82(a)(1) certifications ensures the reinstated PNP POLB will comply with NRC regulations.

The LARs will reinstate the PNP POLB that was in effect prior to docketing the 10 CFR 50.82(a)(1) decommissioning certifications and complied with NRC regulations. Plant SSCs will be returned to an operable or functional status through system return to service plans ensuring support of the reinstated power operations license bases.

The PNP POLB that was in effect prior to docketing the 10 CFR 50.82(a)(1) decommissioning certifications complied with NRC regulations. Restoration of the PNP POLB through NRC review and approval of the application to transfer operating authority and LARs will also comply with NRC regulations. Additionally, NRC inspection activities during development and implementation of the return to service plans provide added assurance that SSCs will function as required by the reinstated POLB. The requested exemption, along with transfer of the operating authority and supporting LARs will reinstate the PNP operating license basis, which was in effect prior to docketing the 10 CFR 50.82(a)(1) decommissioning certifications, which complied with NRC regulations. Therefore, this exemption will not present an undue risk to public health and safety.

4.3 The exemption is consistent with the common defense and security

Modifying 10 CFR 50.82 to allow a one-time rescission of the decommissioning certifications does not alter the design, function, or operation of any structures or

plant equipment that is necessary to maintain the safe and secure status of the plant and will not adversely affect HDI's ability to physically secure the site or protect special nuclear material. PNP's safeguards and security programs will remain in full effect within regulatory requirements commensurate with the reinstated POLB. Therefore, the proposed exemption is consistent with the common defense and security.

5.0 Special Circumstances

10 CFR 50.12(a)(2) states that the Commission will not consider granting an exemption unless special circumstances are present and identifies in 10 CFR 50.12(a)(2)(i)-(vi) when special circumstances are present. Special circumstances are present and those applicable to this exemption are discussed below.

5.1 Application of the Regulation Does Not Serve the Underlying Purpose of the Rule

10 CFR 50.12(a)(2)(ii) states, "Application of the Regulation in the particular circumstances would not serve the underlying purpose of the rule."

10 CFR 50.82(a)(2) prohibits operation of the reactor or emplacement or retention of fuel in the reactor vessel upon docketing the decommissioning certifications. This certification docketing is intended to be a key means of communicating to the NRC and the public the licensee's plans for decommissioning the reactor as stated in, NRC-2015-0070, *Regulatory Improvements for Power Reactors Transitioning to Decommissioning, Regulatory Basis Document*. The certifications also identify the point in time when a reactor formally enters the decommissioning process.

Application of the rule as written would not allow HDI to place fuel into the PNP reactor vessel or operate the PNP reactor due to the docketed 10 CFR 50.82(a)(1) certifications. This prohibits HDI from exiting the decommissioning process through licensing actions that would reauthorize retention of fuel in the PNP reactor vessel and operation of the PNP reactor.

As stated above the purpose of the rule was for communication and formal entering into the decommissioning process, and not to prohibit rescission, by a licensee, of the docketed 10 CFR 50.82(a)(1) certifications to allow exiting the decommissioning process through licensing actions to reauthorize power operations. Therefore, applying the regulation as written to the licensing submittals required to allow reauthorization of power operations at PNP does not serve the underlying purpose of the rule. Accordingly, this special circumstance is present to justify the requested exemption.

5.2 Compliance Results in Undue Hardship

10 CFR 50.12(a)(2)(iii) states, *Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated.*

Entergy Nuclear Operations, Inc. docketed the 10 CFR 50.82(a)(1) certifications prior

to the transfer of PNP ownership from Entergy to Holtec subsidiaries. As mentioned above the decision for Holtec to pursue reauthorization of power operations at PNP was influenced by the strong support from the State of Michigan. This desire, by Holtec, to meet the clean energy and economic needs of Michigan coupled with obtaining ownership of PNP as a facility in decommissioning are special circumstances associated with this exemption. Details on the State of Michigan actions that influenced Holtec are listed below.

An April 20, 2022, letter from the Governor of the State of Michigan to the Secretary of the DOE expressed use of the CNCP to support continued power operations at PNP, the Governor wrote, *Keeping Palisades open is a top priority. Doing so will allow us to make Michigan more competitive for economic development projects bringing billions in investment, protect hundreds of good-paying jobs for Michigan workers, and shore up Michigan's clean energy supply and provide reliable lower energy costs for working families and small businesses.*

Further, a September 9, 2022, letter from the Governor to the Secretary of the DOE expressed support of the Holtec application for the CNCP, the Governor wrote, *With your support, Holtec plans to repower and reopen the Palisades, a union plant in Southwest Michigan that employs 600 workers making an average of \$117,845, supports over 1,100 regional jobs, generates \$363 million in annual regional economic development, and produces more than 800 megawatts of reliable, clean power. Keeping Palisades open is critical for Michigan's competitiveness and future economic development opportunities.*

If this exemption is not granted, then HDI will not be able to obtain NRC reauthorization of power operations at PNP due to the docketed 10 CFR 50.82(a)(1) certifications. This would result in an undue hardship, by preventing the return to the Michigan electrical grid of 800 megawatts of safe and reliable carbon-free electricity, and a dependable baseload generation vital to Michigan residents and businesses, thus unfairly hindering economic development in the state.

These circumstances clearly demonstrate an undue hardship significantly in excess of the circumstances and associated hardships that were anticipated when the regulation was adopted and as such, provide justification for the issuance of this exemption. Accordingly, this additional special circumstance is present to justify this exemption request.

5.3 Material Circumstances Present Not Considered when Regulation was Adopted

10 CFR 50.12(a)(2)(vi) states, *There is present any other material circumstance not considered when the regulation was adopted for which it would be in the public interest to grant an exemption.*

NRC-2015-0070, *Regulatory Improvements for Power Reactors Transitioning to Decommissioning, Decommissioning Regulatory Basis*, states *The NRC designed the current 10 CFR Part 50 regulations for reactor decommissioning for plants that were expected to be permanently shut down at the end of their operating license term.* The regulation was not written to address the unique PNP circumstance of returning to power operations after notifying the NRC by docketing decommissioning

certifications of permanent shut down during the current operating license term.

As described above, the decision to pursue reauthorization of power operations at PNP was influenced by the support from the Governor of the State of Michigan who has expressed that repowering Palisades is a key part to clean energy supply and providing reliable lower energy costs for working families and small businesses for the State of Michigan.

HDI has found that it is in the public interest to grant the exemption based on these new and material circumstances because it would provide the bases for HDI to submit an application to transfer operating authority and LARs to the NRC to allow the reauthorization of power operations at PNP. The governor's support for the reauthorization of power operations at PNP demonstrates the urgency and necessity to reauthorize power operations at PNP. In a letter from the Governor to the U.S. Secretary of Energy it stated, "... *I will do everything I can to keep this plant open, protect jobs, increase Michigan's competitiveness, lower costs, and expand clean energy production.* These material circumstances were not considered when the regulation was adopted and as such, in HDI's view, it is in the public interest to grant this exemption. Accordingly, this additional special circumstance is present to justify this exemption request.

6.0 PRECEDENT

No nuclear power plant licensee to date has requested reauthorization of power operation after docketing the 10 CFR 50.82(a)(1) certifications and before reaching the renewed facility license expiration date. There have been instances in which a licensee submitted to the NRC, and then subsequently withdrew, a certification of an intent to cease operations under 10 CFR 50.82(a)(1)(i). In those cases, the licensee had not submitted on the docket the certification of permanent cessation of operation and permanent removal of fuel from the reactor vessel.

While current regulations do not specify a particular mechanism for reauthorizing operation of a nuclear power plant after both certifications are submitted on the docket and before operating license expiration, there is no statute or regulation prohibiting such action. Additionally, the NRC has considered the possibility of returning a plant to power operations as mentioned in RG 1.184, *Decommissioning of Nuclear Power Reactors* (Reference 27), and SECY-20-110, *Denial of Petition for Rulemaking on Criteria to Return Retired Power Reactors to Operations* (Reference 16). Thus, the NRC may address such requests under the existing regulatory framework—including granting exemptions, where needed—on a case-by-case basis.

7.0 ENVIRONMENTAL ASSESSMENT

Pursuant to 10 CFR 51.22(c)(25), an exemption from NRC regulations is subject to a categorical exclusion from the preparation of an environmental assessment or an environmental impact statement if: (i) there is no significant hazards consideration; (ii) there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite; (iii) there is no significant increase in individual or

cumulative public or occupational radiation exposure; (iv) there is no significant construction impact; (v) there is no significant increase in the potential for or consequences from radiological accidents; and (vi)(I) the requirements from which an exemption is sought involve other requirements of an administrative, managerial, or organizational nature.

As demonstrated below, each of these provisions in 10 CFR 51.22(c)(25) is satisfied by this exemption request. In support of this conclusion an independent environmental review of potentially new and significant information, and environmental issues not addressed in the October 2006 *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 27, Regarding Palisades Nuclear Plant* was performed. The review concluded that the proposed exemption and supporting licensing actions environmental impacts are consistent with the findings in the PNP RFOL Supplemental Environmental Impact Statement (NUREG 1427, Supplement 27), and hence the NRC staff recommendation to the Commission is applicable to this activity. A copy of this independent review is provided in Enclosure 2 of this letter. Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the proposed exemption.

7.1 This exemption does not involve a significant hazards consideration.

As provided in 10 CFR 50.92, *Issuance of amendment*, an action involves a significant hazards consideration if it would: (1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) Involve a significant reduction in a margin of safety. As demonstrated below, none of these criteria apply to this exemption.

The proposed exemption would allow removal of the 10 CFR 50.82(a)(2) restrictions by allowing HDI a one-time rescission of the docketed 10 CFR 50.82(a)(1) decommissioning certifications for PNP which will support submittals to the NRC of an application to transfer operating authority, and LARs to reauthorize placement of fuel into the PNP reactor vessel and power operations at PNP in accordance with the operational licensing basis in effect prior to the 10 CFR 50.82(a)(1) certifications. It is proposed that the approved exemption will be conditioned by actions HDI is required to complete in order to reinstate the PNP power operations license basis (POLB) prior to implementation of the exemption. There are no physical changes to facility design proposed or required to support this exemption and no changes are proposed or required to the operation of the facility as part of this exemption.

The one-time rescission of the 10 CFR 50.82(a)(1) certifications does not require physical design changes to SSCs. The rescission will remove the 10 CFR 50.82(a)(2) restrictions to allow reinstatement of the POLB and exiting the decommissioning process. The design basis function and operation of SSCs will be restored through system return to service plans to ensure compliance with the reinstated POLB previously evaluated accidents. Therefore, the proposed exemption does not involve a significant increase in the probability or consequences of an accident previously evaluated because it does not involve a change to the design configuration or operation of the facility.

The one-time rescission of the 10 CFR 50.82(a)(1) certifications does not require physical design changes to facility SSCs. The rescission will remove the 10 CFR 50.82(a)(2) restrictions to allow reinstatement of the POLB that was in effective prior to entering the decommissioning process. There are no design configuration or operational changes proposed or required to support the POLB and no new accidents than those previously evaluated in the POLB. The proposed exemption does not involve physical changes to the facility or in the procedures governing operation of the plant that were in effect prior to 10 CFR 50.82(a)(1) certifications. Therefore, the exemption does not create the possibility of a new or different kind of accident.

Margin of safety is associated with confidence in the ability of the fission product barriers (i.e., fuel cladding, reactor coolant system pressure boundary, and containment structure) to limit the radiological dose to the public and control room operators in the event of an accident. The one-time rescission of the 10 CFR 50.82(a)(1) certifications does not require physical design changes to SSCs or changes in facility operational requirements. The rescission will remove the 10 CFR 50.82(a)(2) restrictions to allow reinstatement of the POLB that was in effective prior to entering the decommissioning process. The proposed exemption has no impact on the margin of safety and robustness provided in the design and construction of the facility because it is not modifying plant design, physical configuration or operational requirements that were in effect prior to 10 CFR 50.82(a)(1) certifications. In addition, the proposed exemption will not relax any of the criteria used to establish operational safety limits, nor will the proposed exemption relax safety system settings or limiting conditions of operation as defined in the reinstated POLB Technical Specifications. Therefore, the proposed exemption does not involve a significant reduction in a margin of safety.

7.2 This exemption does not involve a significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

The one-time rescission of the 10 CFR 50.82(a)(1) certifications does not require physical design changes to facility SSCs. The rescission will remove the 10 CFR 50.82(a)(2) restrictions to allow reinstatement of the POLB that was in effective prior to entering the decommissioning process. There are no design configuration or operational changes proposed or required to support the reinstatement of the POLB that would change the type or amount of any effluents previously considered in the provisional, full-term, or renewed facility operating license environmental impact statements that considered power operations impacts through March 24, 2031. There are no expected changes in the types, characteristics, or quantities of effluents discharged to the environment associated with the proposed exemption. The exemption will not cause any materials or chemicals to be introduced into the plant that could affect the characteristics or types of effluents released offsite. Resumed power operations will be conducted under existing environmental permits. In addition, the method of operation of waste processing systems will not be affected by the exemption. The proposed exemption will not result in changes to the design basis requirements of SSCs that function to limit or monitor the release of effluents. All the SSCs associated with limiting the release of effluents will continue to be able to perform the necessary functions.

7.3 This exemption does not involve a significant increase in individual or cumulative public or occupational radiation exposure.

The one-time rescission of the 10 CFR 50.82(a)(1) certifications does not require physical design changes to facility SSCs. The rescission will remove the 10 CFR 50.82(a)(2) restrictions to allow reinstatement of the POLB that was in effective prior to entering the decommissioning process. There are no design configuration or operational changes proposed or required to support reinstatement of the POLB that would change the cumulative public or occupational radiation exposure than previously considered in the provisional, full-term, or renewed facility operating license environmental impact statements that considered power operations impacts through March 24, 2031. Therefore, the exemption does not involve any physical change to the facility or in the procedures governing operation of the plant. Therefore, the exemption does not involve a significant increase in individual or cumulative public or occupational radiation exposure.

7.4 This exemption does not involve a significant construction impact.

The one-time rescission of the 10 CFR 50.82(a)(1) certifications does not require physical design changes to facility SSCs. The rescission will remove the 10 CFR 50.82(a)(2) restrictions to allow reinstatement of the POLB that was in effective prior to entering the decommissioning process. There are no major construction activities proposed or required to support reinstatement of the POLB. Therefore, the exemption does not involve any physical change to the facility or the manner in which the plant will be constructed. Therefore, the exemption does not involve a significant construction impact.

7.5 This exemption does not involve a significant increase in the potential for or consequences from radiological accidents.

The one-time rescission of the 10 CFR 50.82(a)(1) certifications does not require physical design changes to facility SSCs. The rescission will remove the 10 CFR 50.82(a)(2) restrictions to allow reinstatement of the POLB that was in effective prior to entering the decommissioning process. There are no design configuration or operational changes proposed or required to support reinstatement of the POLB that would change the previously considered consequences from radiological accidents that were previously considered in the provisional, full-term, or renewed facility operating license environmental impact statements that considered power operations impacts through March 24, 2031. The proposed exemption does not involve a significant increase in the potential or consequences from radiological accidents previously evaluated because it does not involve a change to the design configuration or operation of the facility.

The proposed exemption does not involve physical changes to the facility or in the procedures governing operation of the plant. Therefore, the exemption does not create the possibility of a new or different kind of radiological accident.

7.6 The requirements from which this exemption is sought involve 10 CFR 51.22(c)(25)(vi)(I) (Other requirements of an administrative, managerial, or organizational nature).

The underlying purpose of the 10 CFR 50.82(a)(1) docketing of decommissioning certifications is to communicate to the NRC and the public the licensee's plans for decommissioning the reactor, and formal entry into the decommissioning process. Entergy voluntarily submitted the 10 CFR 50.82(a)(1) certifications to support early shutdown of the facility for business/economic reasons prior to the expiration of the PNP RFOL term and not as a result of any safety or operational deficiencies at the facility. This exemption seeks to allow a one-time rescission of the docketed decommissioning certifications to communicate to the NRC and the public the licensee's plans for exiting the reactor decommissioning process, and formal entering into a second period of power operations at PNP for the balance of the RFOL term which was authorized through March 24, 2031. The requested exemption if granted, would allow rescission of the decommissioning certifications, which in conjunction with approval of the transfer of the operating authority under 10 CFR 50.80 and LARs under 10 CFR 50.90, *Application of amendment of license, Construction Permit, or early site permit*, to reinstate the previous PNP POLB, would allow reauthorization of placement of fuel into the PNP reactor and reauthorization of power operations at PNP.

8.0 CONCLUSION

Pursuant to the provisions of 10 CFR 50.12, HDI is requesting an exemption, from 10 CFR 50.82(a)(1) to allow a one-time rescission of the docketed decommissioning certifications. Based on the considerations discussed above, HDI proposes that the requested exemption is authorized by law, will not present an undue risk to the public health and safety, is consistent with the common defense and security, and special circumstances are present as set forth in 10 CFR 50.12.

9.0 REFERENCES

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2. Office of the Governor, State of Michigan, Gretchen Whitmer letter to The Honorable Jennifer Granholm, Secretary, U.S. Department of Energy, *Utilizing the Civil Nuclear Credit to protect Michigan's clean energy assets, hundreds of good-paying jobs, and regional economic resilience*, dated April 20, 2022
3. The State of Michigan Executive Office of the Governor Communications Division, Press Release, *Gov. Whitmer Applauds Passage of "Make it in Michigan" Budget*, dated June 28, 2023

4. U.S. Nuclear Regulatory Commission letter to Holtec Decommissioning International, LLC, *Palisades Nuclear Plant and Big Rock Point Plant – Issuance of Amendment Nos. 129 and 273 RE: Order Approving Transfer of Licenses and Conforming Administrative License Amendments* (EPIDS L-2022-LLM-0002 and L-2020-LLM-0003), Dated June 28, 2022 (ADAMS Accession No. ML22173A173)
5. Entergy Nuclear Operations, Inc. letter to U.S. Nuclear Regulatory Commission, PNP 2017-001, *Certification of Permanent Cessation of Power Operations*, dated January 4, 2017 (ADAMS Accession Number ML17004A062)
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7. U.S. Nuclear Regulatory Commission letter to Entergy Nuclear Operations, Inc., *Palisades Nuclear Plant and Big Rock Point Plant – Order Approving Transfer of Licenses and Draft Conforming Administrative License Amendments (EPID L-2020-LLM-0003)*, Dated December 13, 2021 (ADAMS Accession No. ML21292A145)
8. U.S. Nuclear Regulatory Commission Federal Register (FR) Notice, *Notice of Availability of Guidance for the First Award Period of the Civil Nuclear Credit Program, Federal Register Department of Energy (DOE)*, 87 FR 24291, dated April 25, 2022
9. U.S. Nuclear Regulatory Commission letter to Entergy Nuclear Operations, Inc., *Termination of Reactor Oversight Process for Palisades Nuclear Plant and Commencement of Decommissioning Inspection Program*, Dated June 13, 2022 (ADAMS Accession No. ML22164A432)
10. Entergy Nuclear Operations, Inc. letter to U.S. Nuclear Regulatory Commission, *Notification of Expected Date of Transfer of Ownership of Nuclear Plants to Holtec Palisades, LLC; and Notification of Receipt of all Required Regulatory Approvals*, dated June 24, 2022 (ADAMS Accession No. ML22175A106)
11. U.S. Department of Energy Guidance for the Civil Nuclear Credit Program, Revision 1, dated June 30, 2022
12. Holtec International, Application to the Department of Energy (DOE) Civil Nuclear Credit (CNC) Program, dated August 22, 2022.
13. Office of the Governor, State of Michigan, Gretchen Whitmer letter to The Honorable Jennifer Granholm, Secretary, U.S. Department of Energy, *State support of Holtec International's application to the Civil Nuclear Credit Program to save Palisades; protect a critical clean energy asset, hundreds of good-paying jobs, and regional economic resilience*, dated September 9, 2022
14. Department of Energy Letter to Holtec International, *Certification Decision, Civil Nuclear Credit (CNC) Program, Award Period 1 – CLN 230224*, dated November 17, 2022

15. Holtec Decommissioning International, LLC letter to U.S. Nuclear Regulatory Commission, *Regulatory Path to Reauthorize Power Operations at the Palisades Nuclear Plant*, dated February 1, 2023 (ADAMS Accession No. ML23032A399)
16. Nuclear Regulatory Commission, *SECY-20-0110: Enclosure 1 – Federal Register Notice – Denial of Petition for Rulemaking on Criteria to Return Retired Nuclear Power Reactors to Operations (PRM 50 117; NRC-2019-0063)*, dated December 7, 2020 (ADAMS Accession No. ML20205L307)
17. Holtec International, Loan Application to the U.S. Department of Energy (DOE) Loan Programs Office, dated February 23, 2023.
18. Holtec Decommissioning Public Meeting with the U.S. Nuclear Regulatory Commission, *Summary of March 20, 2023, Meeting with Holtec Decommissioning International, LLC Regarding Regulatory Path for Potentially Requesting Reauthorization of Power Operations at Palisades Nuclear Plant*, dated April 20, 2023 (ADAMS Accession Package No. ML23107A125)
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20. Holtec Decommissioning Pre-submittal Meeting with the U.S. Nuclear Regulatory Commission, *Public Meeting 08/29/23 – Palisades Nuclear Plant – Return to Power Operations – Exemption to CFR 50.82(a)(2)*, dated August 29, 2023 (ADAMS Accession Package No. ML23235A180)
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23. U.S. Nuclear Regulatory Commission letter to Holtec Decommissioning International, LLC, *Palisades Nuclear Plant – Request for Exemption from 10 CFR 50.82(a)(8)(i)(A) and 10 CFR 50.75(h)(1)(iv) for Holtec Decommissioning International, LLC (EPID L-2020-LLE-0240)*,” dated December 13, 2021 (ADAMS Accession Package No. ML21286A581)
24. Holtec Decommissioning International, LLC letter to U.S. Nuclear Regulatory Commission, *Request for Exemptions from Certain Emergency Planning Requirements of 10 CFR 50.47(b); 10 CFR 50.47(c)(2); and 10 CFR Part 50, Appendix, E*, dated July 11, 2022 (ADAMS Accession No. ML22192A134)

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26. Entergy Nuclear Operations, Inc. letter to U.S. Nuclear Regulatory Commission, *Final Safety Analysis Report Update – Revision 35,* dated April 14, 2021, (ADAMS Accession No. ML21125A285)
27. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.184, *Decommissioning of Nuclear Power Reactors,* Revision 1, dated October 4, 2013, (ADAMS Accession No. ML13144A840)

Enclosure 2 to
HDI PNP 2023-025

Environmental New and Significant Review Proposed Resumption of Power Operations Palisades Nuclear Plant

September 22, 2023

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Abbreviations, Acronyms, and Symbols

§	Section
μCi/mL	microcuries per milliliter
ACS	American Community Survey
ADAMS	Agencywide Documents Access and Management System
AEC	Atomic Energy Commission
AFW	auxiliary feedwater
ALARA	as low as reasonably achievable
AQCR	air quality control region
AREOR	annual radiological environmental operating report
ARERR	annual radiological effluent release report
BHP	brake horsepower
BMP	best management practice
CAA	Clean Air Act
CFR	Code of Federal Regulations
Ci	Curie
Ci/L	Curies per liter
CO	carbon monoxide
CWA	Clean Water Act
CWS	circulating water system
DO	dissolved oxygen
DSAR	decommissioning safety analysis report
EGLE	Michigan Department of Environmental, Great Lakes, and Energy
EFH	essential fish habitat
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
ER	environmental report
ESA	Endangered Species Act
FSAR	final safety analysis report
GEIS	Generic Environmental Impact Statement
GPI	Groundwater Protection Initiative
gpm	gallons per minute
HAPC	habitat areas of particular concern
HDI	Holtec Decommissioning International LLC

IPaC	Information for Planning and Consultation
ISFSI	independent spent fuel storage installation
kV	kilovolt
LLMW	low-level mixed waste
LLRW	low-level radioactive waste
LLW	low-level waste
LR	license renewal
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
MDA	minimum detectable activity
MDCT	mechanical draft cooling tower
MET	meteorological
MMBtu/hr	million British thermal units per hour
MSHPO	Michigan State Historic Preservation Office
MW	monitoring well
MWd/MTU	megawatt days per metric ton uranium
MWt	megawatts thermal
N&S	new and significant
N/A	not available/not applicable
NAAQS	national ambient air quality standards
NEI	Nuclear Energy Institute
NESC	National Electrical Safety Code
NH ₃	Ammonia
NMC	Nuclear Management Company LLC
NOAA	National Oceanic and Atmospheric Administration
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NREPA	(Michigan) Natural Resources and Environmental Protection Act
NRHP	National Register of Historic Places
NUREG	NRC technical report designation
ODCM	offsite dose calculation manual
OSHA	Occupational Safety and Health Administration
pCi/L	picoCuries per liter
pCi/m ³	picoCuries per cubic meter

PM ₁₀	particulate matter less than 10 micrometers in diameter
PM _{2.5}	particulate matter less than 2.5 micrometers in diameter
PNP	Palisades Nuclear Plant
PSDAR	Post Shutdown Decommissioning Activities Report
RCRA	Resource Conservation and Recovery Act
rem	roentgen equivalent man
REMP	radiological environmental monitoring program
RFI	request for information
RFOL	renewed facility operating license
ROW	right-of-way
SEIS	Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 27, Regarding Palisades Nuclear Plant
SHPO	state historic preservation officer
SO ₂	sulfur dioxide
SPCC	spill prevention, control, and countermeasures
SPCC-PIPP	spill prevention, control, and countermeasures and pollution incident prevention plan
SWPPP	stormwater pollution prevention plan
SWS	service water system
TEDE	total effective dose equivalent
TNMOC	total non-methane organic compounds
TOC	total organic carbon
USCB	U.S. Census Bureau
USDOI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound

1.0 PURPOSE

Holtec Decommissioning International LLC (Holtec) has prepared an environmental review of the proposed resumption of power operations at Palisades Nuclear Plant (PNP) specifically to (1) provide updated status of the plant's permits, licenses, and authorizations, (2) provide updated information on the Palisades Nuclear Plant's (PNP) site and environs, (3) provide a review of potentially new and significant information since the Nuclear Regulatory Commission's (NRC) findings in its October 2006 *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 27, Regarding Palisades Nuclear Plant* [herein called SEIS] to determine if the SEIS findings remain bounding, and (4) provide an assessment of Category 1 and 2 environmental issues not addressed in Supplement 27. (NMC 2005; NRC 2006)

Methodology

For the purpose of determining if the SEIS findings are bounding for resumed power operations, the review was guided by the NRC's *Staff Process for Determining if a Supplement to an Environmental Impact Statement is Required in Accordance with 10 Code of Federal Regulations (CFR) 51.92(a) or 51.72(a)* (NRC 2014), as well as the approach for seeking new information and assessing its potential to result in SMALL, MODERATE, or LARGE impacts. Based on the definitions of SMALL, MODERATE, and LARGE impacts provided by the NRC in 10 CFR 51, Appendix B, Table B-1, Footnote 3, and presented below, Holtec considered that any new information regarding environmental issues with MODERATE or LARGE impacts would be significant.

- a) SMALL Impact – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the NRC has concluded that those impacts that do not exceed permissible levels in the NRC's regulations are considered SMALL.
- b) MODERATE Impact – Environmental effects are sufficient to alter noticeably, but not to destabilize, any important attributes of the resource.
- c) LARGE Impact – Environmental effects are clearly noticeable and are sufficient to destabilize any important attributes of the resource.

The new and significant information review included the following steps:

- Review of the 1996 GEIS issues and the 2013 GEIS issues to determine which issues were applicable to PNP resumed operations. Applicable and non-applicable issues were established by reviewing the GEIS discussions and identification and review of past or potential modifications to PNP.
- Identification and assessment of any changes in emissions, releases, discharge points, land use, noise levels, etc., from the operating conditions prior to ceasing operations as compared to the operating conditions proposed for resumed operations.

- Identification of current environmental conditions and setting of the plant and its surrounding area applying an investigative process for purposely seeking new information related to the environmental issues through the following:
 - Review of current protected species listing and recorded observations;
 - Review of recorded cultural sites and historic places in the surrounding area;
 - Interviews with PNP plant staff and corporate environmental staff;
 - Review of permits and reference materials related to environmental issues at the plant;
 - Review of recent environmental monitoring reports by PNP, particularly data or reports from the past 5 years;
 - Review of PNP environmental programs and procedures related to the PNP site and operations; and
 - Review of recent correspondence and permitting documentation.

Comparison of the new information with conditions and findings of the 2006 SEIS for each of the applicable environmental issues takes into account the scope and context of the specific environmental issue's treatment in the 2013 GEIS. For example, the scope of transmission lines considered applicable to license renewal (LR) was revised in the 2013 GEIS, so the new and significant information review considered only the portion of transmission lines on the PNP site, which was in keeping with the 2013 GEIS in-scope transmission lines.

The SEIS findings for all environmental issues applicable to PNP were small. To determine if the SEIS finding remained bounding to the proposed resumed operations at PNP, the new information gathered for 2023 environmental conditions and the proposed resumption for power operations were assessed for their potential to raise the impact severity higher than small. Impact severity levels are defined in 10 CFR Part 51, Appendix B, 18 Table B-1, Footnote 3.

To provide an assessment of the LR environmental issues added by NRC in the 2013 GEIS, the environmental review assessed baseline conditions (i.e., the current environment setting and conditions, PNP's environmental permit requirements and limits, and plant procedures and programs) against the potential to impact the environmental resource. The potential for impact was graded as SMALL, MODERATE, or LARGE as defined in 10 CFR Part 51, Appendix B, Table B-1, Footnote 3.

This report documents the results of the above reviews, as well as provides references for the information upon which the relevant analyses were based.

1.1 Description of the Proposed Action

Holtec is requesting an exemption from portions of 10 CFR 50.82(a), *Termination of license*, for PNP. The exemption would allow resumption of power operations at PNP after NRC approval of operating authority transfer and license amendments necessary to reinstate the PNP renewed

facility operating license (RFOL) power operations licensing basis. Once approved, PNP would transition from a facility in decommissioning back to an operating power plant for the remainder of the operating term granted in the renewed operating license issued in 2006 (i.e., until March 24, 2031).

1.2 Licensing History

On June 2, 1966, Consumers Power filed a construction permit and operating license application with the Atomic Energy Commission (AEC) for PNP, Docket No. 50-255, with a design core power (full power) of 2,650 megawatts thermal (MWt) to operate at 2,200 MWt, with electrical output of 700 megawatts electric. The permit to construct a pressurized-water reactor was issued on March 14, 1967, pursuant to Section 104(b) of the Atomic Energy Act. An operating license application, along with the final safety analysis report (FSAR), was filed with the AEC on November 1, 1968, as Amendment 9 to the original application. Following submission of the November 1, 1968, version of the FSAR, 23 additional amendments (10 through 32) were filed. An interim provisional license (IDPR-20) was issued on March 24, 1971, for a period of 18 months allowing for operation up to 1 MWt. Amendments were issued for an increase in generating power on November 10, 1971, and March 10, 1972, for 20 percent and 60 percent, respectively. Issuance of an additional amendment on September 1, 1972, allowed for continued operation at 60 percent. On October 16, 1972, PNP received authorization to operate at 100 percent, limited to 60 percent power. Operations of 100 percent power, limited to 85 percent power, were authorized on March 23, 1973. (Entergy 2021a)

The provisional operating license was extended beyond the expiration date, in accordance with 10 CFR 2.109, due to a delay in issuing the full-term operating license. On June 17, 1977, the NRC issued Amendment 28 for the full-term operating license application, with nine subsequent revisions. The AEC was replaced by the NRC in January 1975 as the governing agency for safe use of radioactive materials. On November 1, 1977, PNP was authorized to operate at 2,530 MWt power. The full-term operating license (DPR-20) was issued on February 21, 1991, with an expiration of March 14, 2007. However, the NRC issued Amendment 192 on December 14, 2000, to extend the expiration to March 24, 2011. Not until June 23, 2004, did PNP receive authorization to operate at steady state power levels up to 2,565.4 MWt in Amendment 216. (Entergy 2021a)

The RFOL was issued by NRC on January 17, 2007, with an expiration date of March 24, 2031. It was transferred to Entergy Nuclear Operations Inc. on April 11, 2007. (Entergy 2021a)

Entergy Nuclear Operations Inc. (Entergy) certified to the NRC on October 19, 2017, its intent to permanently cease power operations by May 31, 2022 (Entergy 2017). On June 10, 2022, the fuel was removed from the reactor vessel and stored in the spent fuel pool. On June 13, 2022, Entergy certified to the NRC that power operations at PNP ceased on May 20, 2022 (Entergy 2022a). On June 15, 2022, Entergy implemented the permanently defueled technical specifications and supporting documents that modified the regulatory requirements to reflect a facility in decommissioning. In accordance with 10 CFR 50.82(a), upon docketing these certifications the 10 CFR 50 license no longer authorized operation of the reactor.

On June 28, 2022, Holtec acquired PNP from Entergy, and the NRC issued PNP RFOL amendments to reflect this change in ownership and name change and the transfer of operating authority to Holtec (NRC 2022a). (Note: At the time of license transfer, PNP was a facility in decommissioning and Holtec was given operating authority by the NRC for the purpose of decommissioning the PNP site.)

On March 13, 2023, Holtec submitted a letter to the NRC proposing a regulatory path to reauthorize power operations at PNP. While the letter recognized that current regulations do not prescribe a specific regulatory path to reinstating operational authority following docketing of the 50.82(a) certifications, it did reference a denial of petition for rulemaking on the criteria to return retired nuclear power reactors to operations. The denial was based on, in part, that the existing regulatory framework provides adequate flexibility to accommodate reauthorization of operations. (HDI 2023a)

1.3 Site Permits

Table 1.3-1 provides a summary of the authorizations currently held for PNP. Authorizations in this context include any permits, licenses, approvals, or other entitlements that would continue to be in place, as appropriate, for power operations. PNP has established control measures in place to ensure compliance with the authorizations listed in Table 1.3-1, including monitoring, reporting, and operating within specified limits. PNP environmental compliance staff are primarily responsible for monitoring and ensuring that the site complies with its environmental permits and applicable regulations. Monitoring and sampling results associated with environmental programs are submitted to the appropriate agencies as specified in the permits and/or governing regulations.

Table 1.3-1 Environmental Authorizations for Current PNP Operations (Sheet 1 of 5)

Agency	Authority	Requirement	Number	Expiration Date	Authorized Activity
NRC	Atomic Energy Act [10 CFR Part 50]	License to operate	DPR-20	3/24/2031	Operation of PNP
State of Michigan	Clean Water Act (CWA) Section 401 [33 USC 1341]	Certification of water quality standards	Not available	Not applicable	Discharge into waters of the U.S. under the Michigan National Pollutant Discharge Elimination System (NPDES) permit ^(a)
U.S. Department of Transportation	[49 USC 5180 (49 CFR Part 107, Subpart G)]	Registration	051 122600031EG	6/30/2025	Hazardous material shipments
Tennessee Department of Environment and Conservation	Tennessee Department of Environment and Conservation Rule 0400-20-10-.32	License to ship radioactive material	T-MI-003-L23	12/31/2023	Shipment of radioactive material to a licensed disposal/processing facility in Tennessee

Table 1.3-1 Environmental Authorizations for Current PNP Operations (Sheet 2 of 5)

Agency	Authority	Requirement	Number	Expiration Date	Authorized Activity
Michigan Department of Environmental, Great Lakes, and Energy (EGLE)	Federal Resource Conservation and Recovery Act [42 USC 6901] and Michigan Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended	Hazardous waste generator license	MID098644685	Not applicable	Authorizes facility to operate as a hazardous waste generator
EGLE	Federal CWA, Section 402 (33 USC 1251 et seq.), Michigan Act 451, Public Acts of 1994 (as amended), parts 31 and 41; Michigan Executive Orders 1991-31, 1995-4, and 1995-18	NPDES permit	MI0001457	10/1/2018, administratively extended. Renewed permit pending; draft permit issued with 10/1/2028 expiration date.	Discharges of stormwater, wastewater, and treated water to waters of the State

Table 1.3-1 Environmental Authorizations for Current PNP Operations (Sheet 3 of 5)

Agency	Authority	Requirement	Number	Expiration Date	Authorized Activity
EGLE	R 323.1050 of the Part 4 Rules promulgated pursuant to Part 31 of the NREPA	Stormwater Management Industrial Site Certification	I-18257	7/1/2026	Required to ensure proper management of industrial sites' stormwater runoff and the stormwater inspection program
EGLE	Air Pollution Control of the NREPA, 1994 PA 451 Section 5506(3) of Part 55, and Michigan Air Pollution Control Rule 210(1) and Clean Air Act (CAA)	Renewable operating permit (air quality)	MI-ROP-B2934-2019	2/4/2024 Renewal submitted and confirmation received 8/15/2023. Application deemed complete.	Operate air emission sources (evaporator heating boiler, plant heating boiler, office heating boiler, emergency generators, emergency diesel engine auxiliary feedwater (AFW) system, emergency fire pumps, emergency air compressor, and cold cleaners)

Table 1.3-1 Environmental Authorizations for Current PNP Operations (Sheet 4 of 5)

Agency	Authority	Requirement	Number	Expiration Date	Authorized Activity
EGL	Part 31 of Michigan Act 451 (as amended)	Waste treatment plant operator certification	W 7992 W 8468 W 8469 W 8470 W 8471	7/1/2025 7/1/2028 7/1/2028 7/1/2028 7/1/2028	Operate industrial or commercial waste treatment facility
EGL	NREPA 1994 PA 451, as amended; Part 325, Great Lakes Submerged Lands; and Part 353, Sand Dunes Protection and Management	Dredging permit	WRP020704 v1.0	4/16/2025	Maintenance dredging of sand along security fences, other security infrastructure, and stormwater outfall structures
Texas Low-Level Radioactive Waste (LLRW) Disposal Compact Commission	Texas Admin. Code Title 31, Natural Resources and Conservation, Part 21	Agreement	TLLRWDCC #2-0397-00 / #2-0398-00	8/31/2024	Agreement for the importation of nonparty LLRW

Table 1.3-1 Environmental Authorizations for Current PNP Operations (Sheet 5 of 5)

Agency	Authority	Requirement	Number	Expiration Date	Authorized Activity
Bureau of Fire Service	Michigan Fire Prevention Code, 1941 PA 207	Aboveground tank registration	Facility ID: 91084220	Registration and annual fee	Registration of three diesel ASTs
Michigan Department of Natural Resources-Fisheries Division	NREPA 1994 PA 451, Part 487, as amended, Section 324.48735	Scientific collector's permit	FSCP0310202391005	12/31/2023	Survey, handle, take, catch, kill, and/or possess fish species not listed in Michigan as special concern, threatened, or endangered

a. As stated in the final addendum to the PNP final environment statement, PNP received an NPDES permit from the State of Michigan Department of Natural Resources (NRC 1978). This permit fulfills the requirements for water quality certification as provided in Section 401 of the Federal Water Pollution Control Act Amendments of 1972.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

Holtec is seeking authorization to resume power operations at PNP through March 24, 2031, the end of the current license term. Thus, Holtec would receive new fuel bundles, load fuel into the reactor, and commence power operations. There are no expected changes to environmental interfaces or volumes compared to plant operations prior to the June 2022 shutdown. The proposed resumption of power operations does not include any refurbishment activities. Holtec does plan to upgrade or replace some equipment and facilities to support and maintain power operations. However, these upgrades do not involve ground disturbance beyond the already developed and disturbed area, nor do they involve new sources of environmental emissions.

2.1.1 General Plant Information

As discussed in Section 1.2, following PNP ceasing power operations after decades of commercial operations, nuclear fuel was permanently removed from the reactor and placed in the spent fuel pool. Subsequently, the Governor of the State of Michigan requested that PNP be returned to commercial operation to shore up Michigan's clean energy supply and provide reliable lower energy costs for working families and small businesses (Whitmer 2022). To date, Holtec has not commenced any major decommissioning activities at PNP.

As discussed in Regulatory Guide 4.2, Supplement 1, Revision 1, general plant information includes, but is not limited to, reactor and containment systems, cooling and auxiliary water systems, radioactive and nonradioactive waste management, and power transmission systems. Principal structures at PNP include a reactor containment building, auxiliary building, intake structure, turbine building, radwaste buildings, cooling towers, and service buildings (HDI 2023c). Figure 2-3 of the SEIS remains valid for PNP. Section 1.5 of the FSAR describes major plant modifications since 1971. Since the SEIS was written in 2006, changes to major systems between 2006 and 2023 include the replacement of the cooling towers in 2012 and 2017 and the replacement of some spent fuel racks in the spent fuel pool in 2013. Cooling Tower A replacement in 2012 resulted in a change in the number of cells from 18 cells to 16 cells. Cooling Tower B replacement in 2017 did not change the number of cells. In 2018, non-safety-related, high-head, diesel-driven AFW pump P-8D and associated piping and valves were installed to provide an AFW supply to the steam generators that would be free of fire damage in scenarios that impact the operation of the supply from the safety-related AFW pumps. In addition, a cross-connect between the demineralized water storage tank T-939 and the condensate storage tank T-2 was installed to ensure that sufficient water inventory is available to supply the AFW system for 24 hours without operator action outside the control room. (Entergy 2021a) The changes since the SEIS was written were replacements or upgrades of existing equipment, not functional changes to plant operations and are discussed in the following paragraphs.

PNP also implemented mitigation measures in response to NRC Order EA-12-049 for Beyond-Design-Basis External Events, which addressed natural disasters such as that seen at

Fukushima. PNP added a security emergency diesel generator, which is included in the air permit (Table 3.7-1), and two new storage buildings. FLEX Storage Building A is located inside the protected area north of the North Radwaste and Construction Building and FLEX Storage Building B is north of the plant entrance road near the switchyard. (Entergy 2015)

Because there have been no functional changes to the plant, the reactor operates as described in the SEIS. Once fuel is loaded into the plant, procedures, schedules, and operations are expected to resume to pre-shutdown condition. The maximum enrichment for fresh fuel would remain at 4.6 percent maximum planar average.

Since the SEIS was written, the definition of in-scope transmission lines has changed in NRC guidance (NRC 2013b). As such, the SEIS includes additional transmission lines that are no longer considered part of the scope of a LR. In June 2022, the connection between the Palisades main transformer and the Palisades Substation was removed. The connection is planned to be restored prior to resuming operations at PNP.

The latest information on the meteorological system can be found in the 2023 decommissioning safety analysis report (DSAR). According to the DSAR, onsite meteorological parameters are monitored at the 10-meter and the 60-meter levels and are digitally recorded.

Currently, PNP is not in power operation and there are no scheduled refueling cycles. There are no planned modifications to PNP operational processes post-restart that would increase the amount of radioactive waste routinely generated at the plant. Once fuel is loaded into the plant, PNP radioactive waste processes would not result in increases in waste beyond the previous levels.

PNP's liquid, gaseous, and solid radioactive waste management systems have not undergone major changes since the SEIS was issued. During the past 5 years, all releases were well below regulatory limits and the limits defined in the offsite dose calculation manual (ODCM). The annual radioactive effluent release reports (ARERRs) for 2018 through 2022 information on effluents was compared to the values presented in the SEIS and liquid and gaseous effluents are presented in Table 2.1-1. All results were below regulatory limits; however, the maximum liquid effluents for the past 5 years were higher than the values presented in the SEIS. Gaseous effluents for the past 5 years have been lower than the gaseous effluents reported in the SEIS. (Entergy 2019; Entergy 2020; Entergy 2021b; Entergy 2022b; HDI 2023b)

The volume of solid waste disposed of for the past 5 years is presented in Table 3.10-1 and has been higher than the maximum annual amount presented in the SEIS of 3,630 cubic feet. However, the total activity of the solid waste was much lower, ranging from approximately 6,748 Curie (Ci) in 2018 to less than 1 Ci in 2022, as compared to the maximum annual activity of 8,554 Ci presented in the SEIS (Entergy 2019; Entergy 2020; Entergy 2021b; Entergy 2022b; HDI 2023b)

Minimal mixed waste has been generated for the past 5 years. Currently, the only expected generation of mixed waste would be from potential primary coolant system chemical

decontamination activities. Once fuel is loaded into the plant, mixed waste generation is expected to resume and be minimal. Mixed waste would be managed in accordance with PNP waste management procedures and disposed of off site at a licensed, permitted facility.

The nonradioactive wastes at PNP are similar to the information in the SEIS, with one notable exception. Fluorescent bulbs and ballast have continued to be replaced by LED lighting, resulting in the reduction of discarded fluorescent bulbs and ballast as listed in the SEIS. Once fuel is loaded into the plant, prior waste management programs and procedures are expected to be used.

Table 2.1-1 Liquid and Gaseous Releases 2018–2022

Value	SEIS Value (2000–2004 Annual Average)	SEIS Value (Max Annual 2000–2004)	2018	2019	2020	2021	2022
Total liquid releases of fission and activation products	1.18 × 10 ⁻³ Ci	2.12 × 10 ⁻³ Ci	1.52E-02 Ci	6.73E-03 Ci	1.21 E-02 Ci	2.27E-04 Ci	2.20E-02 Ci
Total Liquid releases of tritium	202 Ci (2.02E+02)	342 Ci (3.42E+02)	9.02E+02 Ci	1.97E+02 Ci	8.21E+02 Ci	4.88E+02 Ci	5.54E+02 Ci
Average diluted concentration fission and activation products	8.78 E-15 Ci/L	Not presented in the SEIS	1.13E-10 μCi/mL	4.27E-11 μCi/mL	8.53E-11 μCi/mL	1.44E-12 μCi/mL	2.44E-10 μCi/mL
Average diluted concentration of tritium	1.58 E-9 Ci/L	Not presented in the SEIS	6.73E-06 μCi/mL	1.25E-06 μCi/mL	5.79E-06 μCi/mL	3.08E-06 μCi/mL	6.15E-06 μCi/mL
Total gaseous releases of fission and activation products (Ci)	28.9 Ci (2.89E+01)	65 Ci	2.82E+01 Ci	7.50E+00 Ci	6.54E+00 Ci	4.05E+00 Ci	8.11E+00 Ci
Total gaseous releases of tritium (Ci)	37.7 (3.77E+01) Ci	99.2 Ci	1.53E+01 Ci	1.30E+01 Ci	1.40E+01 Ci	1.09E+01 Ci	7.48E+00 Ci

(Entergy 2019; Entergy 2020; Entergy 2021b; Entergy 2022b; HDI 2023b)

2.2 No-Action Alternative

The no-action alternative is that PNP would not receive authorization to resume power operations, and the plant would continue decommissioning in accordance with NRC regulations. PNP's Post Shutdown Decommissioning Activities Report (PSDAR) provides the environmental impact assessment for this no-action alternative (HDI 2020).

3.0 AFFECTED ENVIRONMENT

3.1 Land Use

PNP is situated on approximately 432 acres on the eastern shores of Lake Michigan in Van Buren County, Michigan. Descriptions and discussions in the SEIS, including the boundaries (site and exclusion area) and overall characteristics remain valid. The addition of two FLEX buildings is mentioned in Section 2.1.1. In addition, since the SEIS there have been two structures within the protected area that were removed in 2023 due to poor structural conditions. The structures were on concrete pad areas, which remain in place. There are plans for construction of staff support facilities (e.g., a new training facility, parking garage, visitor center, and day-care facility). Also, the east independent spent fuel storage installation (ISFSI) is being expanded. These projects would be taking place within the existing developed areas on PNP. There have been no changes to onsite land uses, and there are no plans by Holtec to change land uses within the site boundary. There are no plans for refurbishment. A review of aerial imagery between 2006 through 2021 showed no major changes to onsite land uses have occurred at the PNP site.

The area surrounding PNP is primarily rural and characterized by agriculture and heavily wooded, rugged sand dunes along the lakeshore (NRC 2006). Since the SEIS, the general character of the surrounding area has remained largely the same. The Covert Generating Station, located east of the PNP site, remains the only major industrial facility in the immediate vicinity. Numerous recreational areas remain within 50 miles of the PNP site, with the closest being Van Buren State Park located adjacent to the northern boundary of the PNP site. A review of aerial imagery between 2006 and 2021 showed no major changes have occurred to offsite land uses near the PNP site.

3.2 Water Resources

Water supplies in Van Buren and Berrien Counties come from surface water and groundwater sources, although surface water (especially Lake Michigan) is the main source. (NRC 2006)

Water for the PNP service water system (SWS) and circulating water system (CWS) is withdrawn from Lake Michigan. The South Haven Municipal Water Authority provides PNP with municipal water for potable, sanitary, emergency shower, eyewash station, landscaping, and other uses.

3.2.1 Groundwater

3.2.1.1 Groundwater Use

Regional geology in Van Buren County consists of 300–400 feet of glacial and post-glacial deposits overlying sedimentary bedrock consisting of Mississippian-age Coldwater Shale or Limestone (NMC 2005). Groundwater occurs in the shallow dune sand in the glacial drift aquifer, which provides water for domestic supply wells, but is not sufficient for larger non-domestic water supply volumes. The glacial drift aquifer is isolated from the underlying regional

bedrock water-bearing zones by a significant thickness of glacial silts and clays. The bedrock aquifer is not typically used for potable water because of its low permeability and the presence of brackish groundwater. The groundwater flow in both unconsolidated deposits and bedrock units in the region is generally toward the lake.

Three onsite groundwater wells were used for grounds maintenance located on the east side of PNP near Blue Star Highway. Their combined pumping rate was 24 gallons per minute (gpm) (NRC 2006). These wells were capped in 2019, and landscaping systems were tied to the South Haven Municipal Water Authority municipal water supply. There are no groundwater withdrawals at PNP. There are no major sources of groundwater withdrawal that might reverse the direction of groundwater flow and cause groundwater to flow from the PNP facility area toward any existing domestic wells. (HDI 2023c)

3.2.1.2 Groundwater Quality

The site conceptual model for tritium is that a release to groundwater would flow within the dune sand unit westward to Lake Michigan. Groundwater moving within the dune sand is separated from the regional bedrock aquifer zones by the underlying low-permeability silty clay unit; therefore, tritium would remain in the shallow dune sand. Further, groundwater flow in the dune sand would flow westward to Lake Michigan without being significantly affected by building foundations or other man-made subsurface structures. There are no nearby public groundwater supply wells, and the nearest domestic wells are located a half-mile east and south of the protected area, which could not be impacted by onsite groundwater based on the westward groundwater flow direction.

The dune sand is highly permeable, with hydraulic conductivities ranging from 0.0003 centimeters per second in deeper wells with higher silt content to 0.04 centimeters per second in wells set in loose, medium-grained sand. Using a plant-specific hydraulic gradient of 0.008 feet per foot and an assumed porosity of 30 percent, shallow groundwater velocities are estimated at 640 to 990 feet per year in the dune sand unit and 7 to 77 feet per year in the deeper thin silty sand unit between the dune sand and lower silty clay layers. Building foundations of the main plant structures extend into the saturated dune sand. The foundations of the deepest and largest structures, including the containment and turbine buildings, extend to approximately 22 feet below ground surface, which is 568 feet mean sea level. Although these structures act as a hydraulic barrier to shallow groundwater flow, they do not significantly restrict the groundwater flow toward Lake Michigan. A potentiometric surface map prepared using water-level elevation data collected on June 13, 2017, is also depicted in Figure 3.2-1.

Groundwater is routinely sampled on site in support of the Groundwater Protection Initiative (GPI), an industry-wide voluntary effort to enhance nuclear power plant operators' management of groundwater protection, implemented by the Nuclear Energy Institute (NEI) in May 2006. In August 2007, NEI published updated guidance on implementing the GPI as NEI 07-07 (NEI 2007). This initiative was developed to ensure timely and effective management of situations involving inadvertent releases of licensed material to groundwater. This guidance was further updated in February 2019 (NEI 2019). Holtec continues to implement the PNP GPI in

accordance with NEI 07-07 with the goal of prompt identification and corrections of leaks from plant systems (HDI 2023b).

Onsite hydrogeologic investigations at PNP began in 2007, and the PNP GPI program began in 2008. The current groundwater monitoring network includes 23 monitoring wells (MWs) and 16 temporary wells. (HDI 2023b) These wells were completed within the dune sand unit. Four wells were installed east and upgradient of the plant area MWI-14, MW-15, MW-16, and MW-20. Two wells were installed south of the plant area near the southern cooling tower bank (MW-18 and MW-19). Three shallow/deep well pairs (MW-1/1A, MW-3/3A, and MW-9/9A) were installed in the plant area. The remaining monitoring wells and temporary monitoring wells were installed in and around the main plant area. Monitoring wells were installed with 2-inch-diameter polyvinyl chloride and 10-foot screens, and temporary wells were installed with 1-inch-diameter polyvinyl chloride and 5-foot screens. Monitoring well and temporary locations are depicted in Figure 3.2-1. Samples are collected quarterly and analyzed for gamma activity and tritium.

Since 2009, the only target radionuclide detected above its minimum detectable activity (MDA) was tritium. In 2009, tritium was detected at fluctuating levels in onsite MW-3, located north of tanks T-90 and T-91. Eighteen temporary monitoring wells were installed in 2009 to identify the source of tritium, with locations based on the existing underground pipe run that extends from the auxiliary building addition to tanks T-90 and T-91, and other site-specific factors. Tritium concentrations were below the U.S. Environmental Protection Agency (EPA) drinking water maximum contaminant level (MCL) of 20,000 picoCuries per liter (pCi/L). Between 2013 and 2018, tritium was detected in two monitoring wells, MW-2 and MW-11, and in six temporary monitoring wells at concentrations that fluctuated over time but remained below its MCL. Underground piping leaks were identified and repaired; tritium concentrations subsequently decreased, remaining below the EPA MCL.

In 2019 through 2022, GPI monitoring was conducted in the 23 monitoring wells and 16 of the 18 temporary monitoring wells. In 2019, tritium was detected above its MCL in well MW-11 at 46,268 pCi/L. The monitoring wells and temporary wells in which tritium was detected above the MDA in 2019 are located within an area approximately 200 feet wide (north to south) and 120 feet long (east to west). Tritium was detected in 2020 above its MCL in three monitoring wells (MW-2, MW-3, and MW-11) and several temporary monitoring wells with a maximum detection of 63,153 pCi/L in TW-10. As reported in the ARERRs for 2019 and 2020, these wells were impacted by previously discharged radiological effluents. Processed liquid radiological waste, which contains tritium, is discharged to the mixing basin in accordance with the PNP ODCM. Due to high lake levels and, therefore, high mixing basin levels, some of the effluent migrated to a storm drain that normally discharges into the mixing basin. The storm drain had frequently been full of standing effluent water. The storm drain runs adjacent to MW-11 and near other monitoring and temporary wells. The extent of impact measured approximately 270 feet wide by 90 feet long. These tritium detections were determined to be the result of recapture of previously accounted-for effluents. In accordance with NRC RIS-2008, "Return/Re-use of Previously Discharged Radioactive Effluents," the tritium effluent via groundwater is not required to be reported because it was previously reported under the batch release process and does not introduce a new significant dose pathway. (Entergy 2020; Entergy 2021b)

Between October 2019 and January 2020, an increasing trend in tritium concentrations was observed in five temporary monitoring wells and two permanent groundwater monitoring wells. No gamma isotopes were detected, however. The heating boiler rooms' sump and the underground piping that discharges to it were determined to be a potential source of tritium impacts to groundwater; therefore, cured-in-place liners were installed in the underground piping in 2020, and a chemical coating and seal were applied to the sump cavity. During installation of the underground pipe liner, it was difficult to install the line through two of the elbows; therefore, the elbows were excavated and replaced in 2021.

In 2021 and 2022, tritium concentrations generally decreased. In 2021, tritium was detected above its MCL in six temporary wells with a maximum concentration of 49,197 pCi/L in TW-3. In 2022, tritium was detected above its MCL in two wells with a maximum detection of 32,254 pCi/L in MW-2. Wells in which tritium was detected above the MDA in 2022 are within an area of approximately 280 feet wide by 40 feet long. (Entergy 2022b; HDI 2023b) Data collected in 2023 showed that tritium was not detected above MDAs in the monitoring wells.

An event was recorded in May 2022 related to high tritium detections in the 1C switchgear sump located within the protected area. Typical tritium detections are <15,000 pCi/L; however, tritium was detected in the sump at a maximum concentration of 645,255 pCi/L. No plant-related gamma isotopes were detected. An investigation into the source of tritium into the sump was conducted and determined to be from either the tank T-91 recirculation line or the transfer line between tanks T-87 and T-91. The tanks and associated underground piping were flushed with domestic water, and tank T-91 was removed from recirculation after it was flushed and drained. Tritium detections in the sump steadily decreased to typical levels (<15,000 pCi/L). Remediation and repairs are planned as part of the resumption of power operations efforts. Holtec plans to cap the underground piping, install aboveground piping, and reroute radwaste through the aboveground pipes.

Tritium has not been detected in the three deeper monitoring wells, indicating that any tritium impacts are limited to the upper 10 to 15 feet of the dune sand aquifer (Entergy 2019; Entergy 2020; Entergy 2021b; Entergy 2022b; HDI 2023b).

3.2.2 Surface Water

Sand dunes surround the PNP site on the north, east, and south sides. The west side of the site is the Lake Michigan shoreline. All surface water and percolating runoff drains directly to the lake. (HDI 2023c)

3.2.2.1 Surface Water Use

In the PNP area, the two closest surface water supply intakes are the Covert Generating Station, located approximately 1 mile north of PNP (withdrawing approximately 8 million gallons per day), and the South Haven Municipal Water Authority, located 5 miles north of PNP (withdrawing approximately 1.64 million gallons per day).

PNP uses a closed-loop cooling tower system for cooling water, with the intake structure located approximately 3,300 feet offshore in Lake Michigan (HDI 2023c). There are two banks of mechanical draft cooling towers (MDCTs) located south of the power block. During normal operations, approximately 98,000 gpm is pumped from the lake, 86,000 gpm is returned, and 12,000 gpm is lost to evaporation from the cooling towers. (HDI 2023c) The cooling towers were replaced in 2012 and 2017 (HDI 2023c).

3.2.2.2 Surface Water Quality

Discharges from PNP to Lake Michigan are authorized under NPDES Permit No. MI0001457, issued by the EGLE in 2014, which is under administrative extension. EGLE issued a draft NPDES permit on June 23, 2023, to take effect on November 1, 2023, and expire on October 1, 2028. The draft permit would accommodate resumption of power operations. Approved biocides are used in the SWS and CWS to control biofouling in accordance with provisions of the draft NPDES permit. Compliance with NPDES permit limits for discharge of these biocides and associated residuals is confirmed by monitoring. PNP discharges to Lake Michigan through one external outfall, Outfall 001, and monitoring requirements and permit limits are listed for three permitted monitoring points associated with this external outfall. (HDI 2020)

Sanitary wastewater is treated and disposed of by infiltration at the septic drain fields; solids are periodically removed from the holding tanks and disposed of at a licensed wastewater treatment facility by a commercial vendor. (NRC 2006) There are no sanitary system discharges, as sanitary wastewater is collected into and treated by the PNP septic system. (HDI 2020)

Holtec maintains the PNP stormwater pollution prevention plan (SWPPP) to manage stormwater runoff to Lake Michigan in accordance with NPDES permit requirements. The PNP SWPPP includes best management practices (BMPs) to prevent pollutants from entering stormwater, to direct the flow of stormwater, or to treat stormwater. Structural controls were installed at two stormwater outfalls since the SEIS was prepared. At stormwater Outfall SW-4, an alarm, a structural curb, and an emergency backup pump are designed to prevent a potential accidental overflow from the PNP septic system from reaching the nearby storm drain. An oil/water separator is in use to prevent potential releases from the turbine building from impacting stormwater Outfall SW-6. (NRC 2006)

Water discharged on the ground surface at the PNP site would percolate downward at a slow rate and mix with groundwater moving toward Lake Michigan. (HDI 2023c) Inadvertent releases of oil, salt, and polluting materials are managed in accordance with the PNP spill prevention, control, and countermeasures and pollution incident prevention plan (SPCC-PIPP). In addition, there are several internal procedures related to storage, handling, cleanup, and disposal of chemicals at PNP.



Legend

-  Monitoring Well
-  Temporary Well
-  Groundwater Contour (ft. MSL)
-  Groundwater Flow Direction

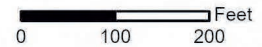


Figure 3.2-1 Onsite Groundwater Monitoring Wells and Potentiometric Surface Map

3.3 Ecological Resources

3.3.1 Aquatic Ecology

PNP is located on the southeastern shoreline of Lake Michigan, which is the source and receiving body for the plant's cooling system. Descriptions and discussions in the SEIS regarding aquatic resources remain valid. No additional plant-specific aquatic studies have been conducted since the SEIS. State and federally protected aquatic species are discussed in further detail under Section 3.3.3, Special Status Species and Habitats.

3.3.2 Terrestrial Ecology

The PNP site is located in the glacial plain of Lake Michigan, characterized by sand dunes up to 200 feet high in a band along the lakeshore, lacustrine deposits, and generally flat to gently rolling, fine textured end and ground moraine eastward (NMC 2005). The entire PNP site is protected under the Coastal Zone Management Act and Michigan's Coastal Zone Management Program (EGLE 2023a). Descriptions and discussions in the SEIS regarding terrestrial resources remain valid. No additional plant-specific terrestrial studies have been conducted since the SEIS. State and federally protected terrestrial species are discussed in further detail under the Special Status Species and Habitats section.

3.3.3 Special Status Species and Habitats

3.3.3.1 Federally Listed Species

Currently, a total of 10 species known to occur within a 6-mile vicinity of the PNP site are federally protected under the Endangered Species Act (ESA): Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), whooping crane (*Grus americana*), eastern massasauga rattlesnake (*Sistrurus catenatus*), Mitchell's Satyr butterfly (*Neonympha mitchelli mitchellii*), monarch butterfly (*Danaus plexippus*), and pitcher's thistle (*Cirsium pitcher*). There is no proposed or designated critical habitat present in the vicinity of the PNP site. (USFWS 2023a)

Of the 10 species, five were listed under the ESA after the SEIS was prepared: northern long-eared bat (endangered), tricolored bat (proposed endangered), red knot (endangered), whooping crane (experimental population; nonessential), and monarch butterfly (candidate). The eastern massasauga rattlesnake, which was a federal candidate for listing under the ESA, has been listed as threatened since the SEIS. In addition, two species evaluated in the SEIS are no longer identified to occur in the vicinity of the PNP site: Karner blue butterfly (*Lycaeides melissa Samuelis*) and American burying beetle (*Nicrophorus americanus*). (USFWS 2023a)

A summary of federally listed species and their status is provided in Table 3.3-1.

3.3.3.1.1 Northern Long-Eared Bat (*Myotis Septentrionalis*)

The northern long-eared bat (*Myotis septentrionalis*) was listed as endangered under the ESA in 2015. This species of bat is medium-sized, about 3 to 3.7 inches in length, but with a wingspan of 9 to 10 inches. Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various-sized caves or mines with constant temperatures, high humidity, and no air currents. Within hibernacula, surveyors find them hibernating most often in small crevices or cracks, often with only the nose and ears visible. During the summer and portions of the fall and spring, northern long-eared bats may be found roosting singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags, or dead trees. Males and non-reproductive females may also roost in cooler places, such as caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. The species has also been found, although less commonly, roosting in structures, such as barns and sheds. Northern long-eared bats use forested areas not only for roosting, but also for foraging and commuting between summer and winter habitat. (USFWS 2023b)

According to the U.S. Fish and Wildlife Service (USFWS), the current known range of the northern long-eared bat overlaps with the 6-mile vicinity of the PNP site (USFWS 2023b). Suitable roosting and maternity habitat for the northern long-eared bat is potentially present near the PNP site. However, no occurrences of northern long-eared bat have been documented at the PNP site.

3.3.3.1.2 Tricolored Bat (*Perimyotis Subflavus*)

The tricolored bat was listed as proposed endangered in 2023. This species of bat is one of the smallest bats native to North America. The once-common species is wide ranging across the eastern and central United States and portions of southern Canada, Mexico, and Central America. During the spring, summer and fall (collectively referred to as the non-hibernating seasons), tricolored bats primarily roost among live and dead leaf clusters of live or recently dead deciduous hardwood trees. In the southern and northern portions of the range, tricolored bats will also roost in Spanish moss (*Tillandsia usneoides*) and *Usnea trichodea* lichen, respectively. In addition, tricolored bats have been observed roosting during summer among pine needles, eastern red cedar (*Juniperus virginiana*), within artificial roosts like barns, beneath porch roofs, bridges, concrete bunkers, and, rarely, within caves. Female tricolored bats exhibit high site fidelity, returning year after year to the same summer roosting locations. Female tricolored bats form maternity colonies and switch roost trees regularly. Males roost singly. During the winter, tricolored bats hibernate (reducing their metabolic rate, body temperature, and heart rate) in caves and mines; although, in the southern United States, where caves are sparse, tricolored bats often hibernate in road-associated culverts, as well as sometimes in tree cavities and abandoned water wells. Tricolored bats exhibit high site fidelity, with many individuals returning year after year to the same hibernaculum. (USFWS 2023c)

According to USFWS, the current known range of the tricolored bat overlaps with the 6-mile vicinity of the PNP site (USFWS 2023c). Suitable roosting and maternity habitat for the

tricolored bat is potentially present near the PNP site. However, no occurrences of the species have been documented at the PNP site.

3.3.3.1.3 *Red Knot (Calidris Canutus Rufa)*

The red knot was listed as threatened under the ESA in 2015. The red knot is a stocky, medium-sized shorebird with a relatively short bill and legs. Coastal habitats used by *rufa* red knots in migration and wintering areas are similar in character: generally coastal marine and estuarine habitats with large areas of exposed intertidal sediments. Migration and wintering habitats include both high-energy, ocean- or bay-front areas, as well as tidal flats in more sheltered bays and lagoons. Preferred wintering and migration habitats are muddy or sandy coastal areas—specifically bays and estuaries, tidal flats, and unimproved tidal inlets. Tracking and resighting data show that the *rufa* red knot nonbreeding range includes nearly the entire Atlantic and Caribbean coasts of South America and the Caribbean islands; Chiloé Island on the south-central Pacific coast of Chile; the Pacific coast of Panama; the North American Gulf and Atlantic coasts from Tamaulipas, Mexico, through Quebec, Canada; the interior of South America; and the interior of the United States and Canada west at least as far as the Great Plains. Some portions of this vast nonbreeding range support both wintering and migrating birds, while other areas are used only during winter or migration (but not both). (USFWS 2023d)

According to the USFWS, the current known range of the red knot overlaps with the 6-mile vicinity of the PNP site (USFWS 2023e). The coastal areas of Lake Michigan at the PNP site and adjacent areas present suitable habitat for the species. While there is potential for the species to occur at the site, no occurrences have been documented.

3.3.3.1.4 *Whooping Crane (Grus Americana)*

The population of whooping crane that occurs in the vicinity of the PNP site is listed as an experimental population, which is a nonessential population not necessary for the continued existence of the species (USFWS 2023f). However, for the purposes of consultation, nonessential experimental populations are treated as threatened species on national wildlife refuge and national park land, and as a proposed species on private land, but federal agencies must not jeopardize their existence (USFWS 2023g). As such, whooping cranes are treated as proposed threatened at the PNP site.

Whooping cranes are tall, white birds with long necks and long legs. They have stout, straight bills. Their bodies are slender and widen to a plump bustle by the tail. When in flight, the wings of a whooping crane are broad, and the neck is fully extended. Their wingspans are more than 7 feet. This species is monomorphic; both sexes stand about 5 feet in height when standing erect. The whooping crane breeds, migrates, winters, and forages in a variety of habitats, including coastal marshes and estuaries, inland marshes, lakes, open ponds, shallow bays, salt marsh and sand or tidal flats, upland swales, wet meadows and rivers, pastures, and agricultural fields. (USFWS 2023f)

The historical range of the whooping crane from north to south included Canada and the United States to Mexico, and its east to west range included the Rocky Mountains to the East Coast.

Four geographically distinct populations exist in the wild: (1) Aransas Wood Buffalo Population, which is the only natural, self-sustaining population in existence and migrates between Aransas National Wildlife Refuge on the Texas Coast and Wood Buffalo National Park in Alberta, Canada; (2) Central Florida, an experimental, nonmigratory population that was reintroduced from 1993 to 2005; (3) Eastern Migratory Population, an experimental population that was reintroduced from 2001 to 2010 and migrates between Wisconsin and Florida; and (4) White Lake, Louisiana, a nonmigratory flock introduced in 2011. The natural population nests in Wood Buffalo National Park and adjacent areas in Canada and winters in coastal marshes in Texas at Aransas County. The 5-year review of 2011 notes that none of the reintroduced populations are self-sustaining. (USFWS 2023f)

3.3.3.1.5 *Eastern Massasauga Rattlesnake (Sistrurus catenatus)*

Eastern Massasaugas are thick-bodied, with a triangular-shaped head and vertical pupils. The most distinguishing feature of Eastern Massasauga rattlesnakes is a keratinized rattle at the end of the tail, which is used to ward off potential threats. These snakes are most often gray or light brown, but can be black, with large light-edged chocolate brown to black blotches on the back and smaller blotches on the sides. Their cryptic coloration allows them to rely on camouflage to avoid predators and capture prey. These snakes eat small rodents, such as mice and voles, but will sometimes eat frogs and other snakes. This species is venomous, but because of the snake's elusive and shy behavior, people are rarely bitten by them. Eastern massasaugas use shallow wetlands and surrounding upland areas to forage, breed, shelter, and hibernate. (USFWS 2023h)

According to the USFWS, the current known range of the Easter Massasauga overlaps with the 6-mile vicinity of the PNP site (USFWS 2023h). Suitable habitat for the species is likely present in riparian areas of the PNP site and adjacent areas.

3.3.3.1.6 *Monarch Butterfly (Danaus Plexippus)*

The monarch butterfly is a candidate species under the ESA. Adult monarch butterflies are large and conspicuous, with bright orange wings surrounded by a black border and covered with black veins. The black border has a double row of white spots, present on the upper side of the wings. Adult monarchs feed on the nectar of many flowers during breeding and migration, but they can only lay eggs on milkweed plants. For overwintering monarchs, habitat with a specific microclimate is needed for protection from the elements, as well as moderate temperatures to avoid freezing. Monarch butterflies require healthy and abundant milkweed plants for laying eggs on and as a food source for larvae or caterpillars. By consuming milkweed plants, monarchs obtain toxins, called cardenolides, that provide a defense against predators. Additionally, flower nectar is needed for adults throughout the breeding season, migration, and overwintering. Monarchs are native to North and South America but have since spread to many other locations where milkweed and suitable temperatures exist. (USFWS 2023i)

According to the USFWS, the current known range of the monarch butterfly extends across the contiguous United States and overlaps with the 6-mile vicinity of the PNP site. (USFWS 2023i)

Suitable habitat for the monarch butterfly is potentially present in undeveloped portions of the PNP site that are not maintained by mowing.

3.3.3.2 Bald Eagles, Golden Eagles, and Migratory Birds

In addition to species protected under federal and state endangered species acts, there are numerous bird species protected under the Migratory Bird Treaty Act (MBTA) that may visit PNP. The MBTA, enacted in 1918 (16 U.S.C. 703-712), prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the USFWS. (USFWS 2023j)

The PNP site is located in the Mississippi Flyway, one of four administrative flyways established in North America to facilitate management of migratory birds and their habitats (USFWS 2023k). Numerous species of migratory birds likely use the project corridor during the spring and fall migrations, as summer residents, and as winter visitors.

According to the USFWS, the following 17 birds of conservation concern have the potential to occur within the 6-mile vicinity of the PNP site: bald eagle (*Haliaeetus leucocephalus*), black tern (*Chlidonias niger*), black-billed cuckoo (*Coccyzus erythrophthalmus*), bobolink (*Dolichonyx oryzivorus*), Canada warbler (*Cardellina canadensis*), cerulean warbler (*Dendroica cerulea*), chimney swift (*Chaetura pelagica*), eastern whip-poor-will (*Antrostomus vociferus*), golden eagle (*Aquila chrysaetos*), golden-winged warbler (*Vermivora chrysoptera*), lesser yellowlegs (*Tringa flavipes*), marbled godwit (*Limosa fedoa*), red-headed woodpecker (*Melanerpes erythrocephalus*), ruddy turnstone (*Arenaria interpres morinella*), rusty blackbird (*Euphagus carolinus*), short-billed dowitcher (*Limnodromus griseus*), and wood thrush (*Hylocichla mustelina*). Of these, the golden eagle, lesser yellowlegs, ruddy turnstone, rusty blackbird, and short-billed dowitcher breed elsewhere. (USFWS 2023a)

In addition to the MBTA, bald and golden eagles are protected under the Bald and Golden Eagle Protection Act. According to the USFWS, there are bald and/or golden eagles in the vicinity of the PNP site. (USFWS 2023a)

3.3.3.3 Essential Fish Habitat

Essential fish habitat (EFH) is defined under the Magnuson-Stevens Fishery Conservation and Management Act and refers to waters and substrate necessary for fish to spawn, breed, feed or grow to maturity. The National Oceanic and Atmospheric Administration (NOAA) is responsible for identifying and describing EFH for sharks, tuna, and other highly migratory species that cross regional boundaries. NOAA only provides EFH for federally managed fish and invertebrates. According to NOAA, no EFH is located within the vicinity of PNP, nor were any EFH areas protected from fishing. As habitat areas of particular concern (HAPC) are derived from EFH, there were also no HAPCs located within the 6-mile vicinity of PNP. (NOAA 2023)

3.3.3.4 State-Listed Species

A total of 213 species identified as threatened, endangered, or of special concern occur in Van Buren and Berrien Counties (MSU 2023). Table 3.3-2 provides the list of state-listed species.

Table 3.3-1 Species Listed Under the Endangered Species Act within a 6-Mile Vicinity of the PNP Site

Species	2006 Federal Status	2023 Federal Status
Indiana bat (<i>Myotis sodalis</i>)	E ^(a)	E
Northern long-eared bat (<i>Myotis septentrionalis</i>)	Not listed	E
Tricolored bat (<i>Perimyotis subflavus</i>)	Not listed	PE ^(b)
Piping plover (<i>Charadrius melodus</i>)	E	E
Red knot (<i>Calidris canutus rufa</i>)	Not listed	T ^(c)
Whooping crane (<i>Grus americana</i>)	Not listed	EXPN ^(d)
Eastern massasauga (<i>Sistrurus catenatus</i>)	C ^(e)	T
Mitchell's Satyr butterfly (<i>Neonympha mitchelli mitchellii</i>)	E	E
Karner blue butterfly (<i>Lycaeides melissa samuelis</i>)	E	E (Not recorded to occur in the vicinity)
Monarch butterfly (<i>Danaus plexippus</i>)	Not listed	C
American burying beetle (<i>Nicrophorus americanus</i>)	E	T (Not recorded to occur in the vicinity)
Pitcher's thistle (<i>Cirsium pitcher</i>)	T	T

- a. Endangered.
- b. Proposed endangered.
- c. Threatened.
- d. Experimental.
- e. Candidate.

Table 3.3-2 State-Listed Species Occurring in Van Buren and Berrien Counties, Michigan (Sheet 1 of 10)

Species Name	Common Name	Federal Status	State Status
Invertebrates			
<i>Bombus pensylvanicus</i>	American bumble bee		E ^(a)
<i>Neonympha mitchellii mitchellii</i>	Mitchell's satyr	LE ^(b)	E
<i>Bombus auricomus</i>	Black and gold bumble bee		SC ^(c)
<i>Bombus borealis</i>	Northern amber bumble bee		SC
<i>Bombus terricola</i>	Yellow banded bumble bee		SC
<i>Dorydiella kansana</i>	Leafhopper		SC
<i>Faxonius immunis</i>	Calico crayfish		SC
<i>Fontigens nickliniana</i>	Watercress snail		SC
<i>Lepyronia angulifera</i>	Angular spittlebug		SC
<i>Lepyronia gibbosa</i>	Great Plains spittlebug		SC
<i>Oecanthus laricis</i>	Tamarack tree cricket		SC
<i>Papaipema beeriana</i>	Blazing star borer		SC
<i>Pomatiopsis cincinnatiensis</i>	Brown walker		SC
<i>Bombus affinis</i>	Rusty-patched bumble bee	LE	E
<i>Calephelis muticum</i>	Swamp metalmark		E
<i>Cincinnatiatia cincinnatiensis</i>	Campeloma spire snail		SC
<i>Copablepharon michiganensis</i>	Michigan dune dart		SC
<i>Euxoa aurulenta</i>	Dune cutworm		SC
<i>Melanoplus walshii</i>	Walsh's short-winged grasshopper		SC
<i>Papaipema cerina</i>	Golden borer		SC
<i>Papaipema maritima</i>	Maritime sunflower borer		SC

Table 3.3-2 State-Listed Species Occurring in Van Buren and Berrien Counties, Michigan (Sheet 2 of 10)

Species Name	Common Name	Federal Status	State Status
<i>Paroxya hoosieri</i>	Hoosier locust		SC
<i>Photedes inops</i>	Spartina moth		SC
<i>Resapamea stipata</i>	Four-lined borer moth		SC
<i>Valvata perdepressa</i>	Purplecap valvata		SC
<i>Mesodon elevatus</i>	Proud globe		T ^(d)
<i>Pallifera fosteri</i>	Foster mantleslug		T
<i>Papaipema sciata</i>	Culvers root borer		T
<i>Papaipema silphii</i>	Silphium borer moth		T
Mussels			
<i>Epioblasma triquetra</i>	Snuffbox	LE	E
<i>Obliquaria reflexa</i>	Threehorn wartyback		E
<i>Alasmidonta marginata</i>	Elktoe		SC
<i>Cambarunio iris</i>	Rainbow		SC
<i>Lasmigona compressa</i>	Creek heelsplitter		SC
<i>Lasmigona costata</i>	Flutedshell		SC
<i>Pleurobema sintoxia</i>	Round pigtoe		SC
<i>Truncilla truncata</i>	Deertoe		SC
<i>Venustaconcha ellipsiformis</i>	Ellipse		SC
<i>Alasmidonta viridis</i>	Slippershell		T
<i>Lampsilis fasciola</i>	Wavyrayed lampmussel		T
<i>Potamilus alatus</i>	Pink heelsplitter		SC
<i>Ptychobranchnus fasciolaris</i>	Kidney shell		SC
<i>Utterbackia imbecillis</i>	Paper pondshell		SC
<i>Cyclonaias tuberculata</i>	Purple wartyback		T
<i>Ligumia recta</i>	Black sandshell		T

Table 3.3-2 State-Listed Species Occurring in Van Buren and Berrien Counties, Michigan (Sheet 3 of 10)

Species Name	Common Name	Federal Status	State Status
Fish			
<i>Coregonus zenithicus</i>	Shortjaw cisco		E
<i>Notropis anogenus</i>	Pugnose shiner		E
<i>Fundulus dispar</i>	Starhead topminnow		SC
<i>Lepisosteus oculatus</i>	Spotted gar		SC
<i>Necturus maculosus</i>	Mudpuppy		SC
<i>Moxostoma duquesnei</i>	Black redhorse		SC
<i>Acipenser fulvescens</i>	Lake sturgeon		T
<i>Moxostoma carinatum</i>	River redhorse		T
Amphibians			
<i>Lithobates palustris</i>	Pickerel frog		SC
<i>Acris blanchardi</i>	Blanchard's cricket frog		T
<i>Ambystoma opacum</i>	Marbled salamander		E
Reptiles			
<i>Clonophis kirtlandii</i>	Kirtland's snake		E
<i>Emydoidea blandingii</i>	Blanding's turtle		SC
<i>Opheodrys vernalis</i>	Smooth green snake		SC
<i>Pantherophis spiloides</i>	Gray rat snake		SC
<i>Clemmys guttata</i>	Spotted turtle		T
<i>Sistrurus catenatus</i>	Eastern massasauga	LT ^(e)	T
<i>Terrapene carolina carolina</i>	Eastern box turtle		T
Birds			
<i>Centronyx henslowii</i>	Henslow's sparrow		E
<i>Rallus elegans</i>	King rail		E
<i>Siren intermedia nettingi</i>	Western lesser siren		E

Table 3.3-2 State-Listed Species Occurring in Van Buren and Berrien Counties, Michigan (Sheet 4 of 10)

Species Name	Common Name	Federal Status	State Status
<i>Ammodramus savannarum</i>	Grasshopper sparrow		SC
<i>Buteo lineatus</i>	Red-shouldered hawk		SC
<i>Melanerpes erythrocephalus</i>	Red-headed woodpecker		SC
<i>Pandion haliaetus</i>	Osprey		SC
<i>Protonotaria citrea</i>	Prothonotary warbler		SC
<i>Setophaga citrina</i>	Hooded warbler		SC
<i>Setophaga discolor</i>	Prairie warbler		SC
<i>Spiza americana</i>	Dickcissel		SC
<i>Coregonus artedi</i>	Lake herring or Cisco		T
<i>Parkesia motacilla</i>	Louisiana waterthrush		T
<i>Setophaga cerulea</i>	Cerulean warbler		T
<i>Charadrius melodus</i>	Piping plover	LE	E
<i>Cistothorus palustris</i>	Marsh wren		SC
<i>Haliaeetus leucocephalus</i>	Bald eagle		SC
<i>Ixobrychus exilis</i>	Least bittern		T
Mammals			
<i>Microtus ochrogaster</i>	Prairie vole		E
<i>Myotis sodalis</i>	Indiana bat	LE	E
<i>Microtus pinetorum</i>	Woodland vole		SC
<i>Myotis lucifugus</i>	Little brown bat		T
<i>Myotis septentrionalis</i>	Northern long-eared bat	LE	T
<i>Perimyotis subflavus</i>	Eastern pipistrelle		T

Table 3.3-2 State-Listed Species Occurring in Van Buren and Berrien Counties, Michigan (Sheet 5 of 10)

Species Name	Common Name	Federal Status	State Status
Plants			
<i>Aristida tuberculosa</i>	Beach three-awned grass		E
<i>Besseya bullii</i>	Kitten-tails		E
<i>Carex platyphylla</i>	Broad-leaved sedge		E
<i>Coreopsis palmata</i>	Prairie coreopsis		E
<i>Eryngium yuccifolium</i>	Rattlesnake-master or button snakeroot		E
<i>Ludwigia sphaerocarpa</i>	Globe-fruited seedbox		E
<i>Lygodium palmatum</i>	Climbing fern		E
<i>Platanthera ciliaris</i>	Orange- or yellow-fringed orchid		E
<i>Populus heterophylla</i>	Swamp or black cottonwood		E
<i>Scleria pauciflora</i>	Few-flowered nut rush		E
<i>Stellaria crassifolia</i>	Fleshy stitchwort		E
<i>Valerianella chenopodiifolia</i>	Goosefoot corn salad		E
<i>Agrimonia rostellata</i>	Beaked agrimony		SC
<i>Ammannia robusta</i>	Sessile tooth-cup		SC
<i>Amorpha canescens</i>	Leadplant		SC
<i>Arnoglossum plantagineum</i>	Prairie Indian-plantain		SC
<i>Berula erecta</i>	Cut-leaved water parsnip		SC
<i>Betula populifolia</i>	Gray birch		SC
<i>Brickellia eupatorioides</i>	False boneset		SC
<i>Cirsium hillii</i>	Hill's thistle		SC
<i>Corispermum pallasii</i>	Pallas' bugseed		SC
<i>Eleocharis equisetoides</i>	Horsetail spike rush		SC
<i>Hypericum gentianoides</i>	Gentian-leaved St. John's-wort		SC

Table 3.3-2 State-Listed Species Occurring in Van Buren and Berrien Counties, Michigan (Sheet 6 of 10)

Species Name	Common Name	Federal Status	State Status
<i>Lipocarpha micrantha</i>	Dwarf-bulrush		SC
<i>Lycopodiella subappressa</i>	Northern appressed clubmoss		SC
<i>Polygala cruciata</i>	Cross-leaved milkwort		SC
<i>Pycnanthemum verticillatum</i>	Whorled mountain mint		SC
<i>Rhexia virginica</i>	Meadow beauty		SC
<i>Rhynchospora macrostachya</i>	Tall beakrush		SC
<i>Rhynchospora scirpoides</i>	Bald-rush		SC
<i>Sporobolus heterolepis</i>	Prairie dropseed		SC
<i>Strophostyles helvula</i>	Trailing wild bean		SC
<i>Triplasis purpurea</i>	Sand grass		SC
<i>Adlumia fungosa</i>	Climbing fumitory		T
<i>Asclepias purpurascens</i>	Purple milkweed		T
<i>Baptisia lactea</i>	White or prairie false indigo		T
<i>Bartonia paniculata</i>	Panicled screwstem		T
<i>Carex lupuliformis</i>	False hop sedge		T
<i>Carex seorsa</i>	Sedge		T
<i>Cirsium pitcheri</i>	Pitcher's thistle	LT	T
<i>Cypripedium candidum</i>	White lady slipper		T
<i>Dichanthelium leibergii</i>	Leiberg's panic grass		T
<i>Dryopteris celsa</i>	Small log fern		T
<i>Endodeca serpentaria</i>	Virginia snakeroot		T
<i>Filipendula rubra</i>	Queen-of-the-prairie		T
<i>Fuirena pumila</i>	Umbrella-grass		T
<i>Galearis spectabilis</i>	Showy orchis		T

Table 3.3-2 State-Listed Species Occurring in Van Buren and Berrien Counties, Michigan (Sheet 7 of 10)

Species Name	Common Name	Federal Status	State Status
<i>Hieracium paniculatum</i>	Panicled hawkweed		T
<i>Hydrastis canadensis</i>	Goldenseal		T
<i>Isotria verticillata</i>	Whorled pogonia		T
<i>Juncus scirpoides</i>	Scirpus-like rush		T
<i>Justicia americana</i>	Water willow		T
<i>Linum virginianum</i>	Virginia flax		T
<i>Panax quinquefolius</i>	Ginseng		T
<i>Panicum verrucosum</i>	Warty panic grass		T
<i>Persicaria careyi</i>	Carey's smartweed		T
<i>Polemonium reptans</i>	Jacob's ladder		T
<i>Potamogeton bicupulatus</i>	Waterthread pondweed		T
<i>Rhexia mariana</i>	Maryland meadow beauty		T
<i>Sabatia angularis</i>	Rosepink		T
<i>Scleria reticularis</i>	Netted nut rush		T
<i>Scutellaria ovata</i>	Forest skullcap		T
<i>Silphium integrifolium</i>	Rosinweed		T
<i>Symphotrichum sericeum</i>	Western silvery aster		T
<i>Trichostema dichotomum</i>	Bastard pennyroyal		T
<i>Trillium sessile</i>	Toadshade		T
<i>Triphora trianthophora</i>	Nodding pogonia or three birds orchid		T
<i>Valeriana edulis var. ciliata</i>	Edible valerian		T
<i>Carex crus-corvi</i>	Raven's-foot sedge		E
<i>Dichantherium polyanthes</i>	Round-seed panic-grass		E
<i>Primula meadia</i>	Shooting star		E
<i>Silphium laciniatum</i>	Compass plant		E

Table 3.3-2 State-Listed Species Occurring in Van Buren and Berrien Counties, Michigan (Sheet 8 of 10)

Species Name	Common Name	Federal Status	State Status
<i>Tachopteryx thoreyi</i>	Grey petaltail		E
<i>Tipularia discolor</i>	Cranefly orchid		E
<i>Toxolasma parvum</i>	Lilliput		E
<i>Utricularia inflata</i>	Floating bladderwort		E
<i>Aristida longespica</i>	Three-awned grass		SC
<i>Astragalus canadensis</i>	Canadian milk vetch		SC
<i>Carex amphibola</i>	Narrow-leaved sedge		SC
<i>Carex trichocarpa</i>	Hairy-fruited sedge		SC
<i>Conioselinum chinense</i>	Hemlock-parsley		SC
<i>Corispermum americanum</i>	American bugseed		SC
<i>Cuscuta campestris</i>	Field dodder		SC
<i>Cuscuta glomerata</i>	Rope dodder		SC
<i>Eleocharis engelmannii</i>	Engelmann's spike rush		SC
<i>Helianthus hirsutus</i>	Whiskered sunflower		SC
<i>Hybanthus concolor</i>	Green violet		SC
<i>Jeffersonia diphylla</i>	Twinleaf		SC
<i>Juncus anthelatus</i>	Large path rush		SC
<i>Juncus dichotomus</i>	Forked rush		SC
<i>Nelumbo lutea</i>	American lotus		SC
<i>Scutellaria elliptica</i>	Hairy skullcap		SC
<i>Thaspium chapmanii</i>	Meadow-parsnip		SC
<i>Trillium recurvatum</i>	Prairie trillium		SC
<i>Vitis vulpina</i>	Frost grape		SC
<i>Asplenium rhizophyllum</i>	Walking fern		T
<i>Boechera missouriensis</i>	Missouri rock-cress		T

Table 3.3-2 State-Listed Species Occurring in Van Buren and Berrien Counties, Michigan (Sheet 9 of 10)

Species Name	Common Name	Federal Status	State Status
<i>Camassia scilloides</i>	Wild hyacinth		T
<i>Carex albolutescens</i>	Sedge		T
<i>Carex oligocarpa</i>	Eastern few-fruited sedge		T
<i>Collinsia verna</i>	Blue-eyed Mary		T
<i>Corydalis flavula</i>	Yellow fumewort		T
<i>Draba reptans</i>	Creeping whitlow grass		T
<i>Euphorbia commutata</i>	Tinted spurge		T
<i>Eutrochium fistulosum</i>	Hollow-stemmed Joe-pye weed		T
<i>Fraxinus profunda</i>	Pumpkin ash		T
<i>Gentianella quinquefolia</i>	Stiff gentian		T
<i>Gratiola virginiana</i>	Annual hedge hyssop		T
<i>Helianthus mollis</i>	Downy sunflower		T
<i>Ipomoea pandurata</i>	Wild potato vine or man-of-the-earth		T
<i>Juncus brachycarpus</i>	Short-fruited rush		T
<i>Lechea pulchella</i>	Leggett's pinweed		T
<i>Mertensia virginica</i>	Virginia bluebells		T
<i>Mimulus alatus</i>	Winged monkey flower		T
<i>Morus rubra</i>	Red mulberry		T
<i>Phlox maculata</i>	Wild sweet William		T
<i>Potamogeton pulcher</i>	Spotted pondweed		T
<i>Pycnanthemum muticum</i>	Mountain mint		T
<i>Pycnanthemum pilosum</i>	Hairy mountain mint		T
<i>Sagittaria brevirostra</i>	Short-beaked arrowhead		T
<i>Silene stellata</i>	Starry campion		T

**Table 3.3-2 State-Listed Species Occurring in Van Buren and Berrien Counties,
Michigan (Sheet 10 of 10)**

Species Name	Common Name	Federal Status	State Status
<i>Silphium perfoliatum</i>	Cup plant		T
<i>Smallanthus uvedalia</i>	Yellow-flowered leafcup		T
<i>Utricularia subulata</i>	Bladderwort		T
<i>Zizania aquatica</i>	Wild rice		T

(MSU 2023)

- a. Endangered.
- b. Listed endangered.
- c. Special concern.
- d. Threatened.
- e. Listed threatened.

3.4 Socioeconomics

This section describes three primary socioeconomic factors: PNP staffing levels, local tax payments, and operating expenditures, because changes in these three factors result in socioeconomic changes. The NRC also based its impact findings in the 2006 Palisades SEIS on these socioeconomic factors. This section demonstrates the change in these factors as a result of decommissioning and the anticipated changes that would result with resumption of power operations.

Prior to decommissioning, the PNP workforce consisted of roughly 550 permanent workers. The permanent decommissioning workforce is 218 workers. While the initial activity of restarting the plant will likely require a significant number of temporary workers, it is expected that the permanent workforce after PNP's return to power operations would consist of approximately 525 workers. It is expected that the demographics of the future workforce would remain substantially similar to the decommissioning workforce.

Yearly taxes paid by PNP to Van Buren County (with a small portion to the City of Benton Harbor) prior to decommissioning were roughly \$10 million. After the decommissioning announcement in 2016, Entergy worked with local tax officials to minimize the interim impact of the tax base loss and negotiated a glide path for tax assessment reductions up through plant shutdown in 2022. As the plant resumes normal power operations, yearly tax payments are expected to fluctuate between \$1.6 million in 2023 to \$15.6 million in 2025 due to plant modifications and improvements that are expected to create changes in the plant's valuation. These payments are anticipated to level out to roughly pre-decommissioning levels in 2027.

Operating expenditures for nuclear plants are largely based off plant staffing levels and yearly tax payments. Because both the PNP workforce and its anticipated yearly tax payments are expected to level out to pre-decommissioning numbers, as discussed above, operating expenditures would be expected to level out as well.

A review of publicly available websites and documents did not reveal any current or upcoming projects in the vicinity of PNP that would be expected to significantly impact the local economy. While PNP itself expects to undergo various projects in the process of returning to normal power operations, these projects would be short-term.

3.5 Environmental Justice

The scope of review in the 2006 Palisades SEIS includes identification of impacts on minority and low-income populations, and whether these impacts are likely to be disproportionately high and adverse. In the 2006 SEIS, the NRC staff reviewed minority and low-income populations using block groups as the area of geographical distribution included in the examination. Additionally, the 2006 SEIS evaluated whether minority and low-income populations could be disproportionately affected by environmental impact pathways associated with LR for PNP.

The NRC staff found no unusual resource dependencies or practices, such as subsistence agriculture, hunting, or fishing, through which the populations could be disproportionately highly and adversely affected. In addition, the NRC staff did not identify any location-dependent disproportionately high and adverse impacts affecting these minority and low-income populations, including impacts on the seasonal migrant farm labor force, many of whom could be minority. The NRC staff concluded that offsite impacts from PNP on minority and low-income populations would be SMALL, and no special mitigation actions are warranted.

This section uses U.S. Census Bureau (USCB) data obtained from the 2020 redistricting and American Community Survey (ACS) to determine minority and low-income characteristics for portions of Michigan and Indiana. The information is compared to information found in the SEIS to assess new and potentially significant changes for environmental justice.

3.5.1 County Populations

County population estimates were obtained using the 2000, 2010, and 2020 ACS and redistricting census data for Michigan and Indiana. There are 12 counties within a 50-mile radius of the plant (NRC 2006). According to the 2000 census, the permanent population of the 12 counties was approximately 2,124,370 people. There was an increase of 85,581 people residing within these counties between the years 2000 to 2010, followed by a larger increase of 123,625 people between 2010–2020. Overall, there was a 9.9 percent increase of residents within these counties between the years 2000–2020. (USCB 2020a; USCB 2020b)

The census data show that the two largest counties in the State of Michigan within a 50-mile radius of PNP are Kent County, Michigan (2020 population 574,335), and Kalamazoo County, Michigan (2020 population 238,603). Both counties experienced a continuous increase in population from 2000 to 2020. Over the 20-year period, the number of people residing in Kent County increased by 14.6 percent. The number of people residing in Kalamazoo County increased by 9.7 percent. Similarly, the two largest counties in Indiana within a 50-mile radius of the plant are St. Joseph County, Indiana (2020 population 272,912), and Elkhart County, Indiana (2020 population 207,047). Overall, the number of St. Joseph County residents increased by 2.8 percent from 2000 to 2020 and the number of Elkhart County residents increased by 13.3 percent over the 20-year period. (USCB 2020a; USCB 2020b)

3.5.2 Minority and Low-Income Populations

NRC guidance calls for use of the most recent USCB decennial census data. Holtec used 2020 redistricting census data to determine the percentage of the total populations in the two states that belong to each minority group.

3.5.2.1 Minority Populations

NRC procedural guidance defines a minority population as Black or African-American, American Indian or Alaska Native, Asian, Native Hawaiian/other Pacific Islander, some other race, two or more races, the aggregate of all minority races, Hispanic or Latino ethnicity, and the aggregate

of all minority races and Hispanic ethnicity (NRC 2020). A minority category of “Aggregate of All Races” is created when the populations of all the 2020 USCB minority categories are summed.

Because Hispanic is not considered a race by the USCB, Hispanics are already represented in the census-defined race categories. However, because Hispanics can be represented in any race category, some white Hispanics not otherwise considered minorities become classified as a minority when categorized in the “Aggregate and Hispanic” category.

The census data show that the largest minority census category of all races from 2000 to 2020 was the Black or African-American census category. The County of Kent housed the majority of Black or African American residents over the 20-year period in the region. Additionally, Kent County had the highest population of all minority groups when compared to all 12 counties. The aggregate of all minority races and Hispanic ethnicity in Kent County, Michigan, increased by 42,368 residents from 2000 to 2010 and 73,734 residents from 2010 to 2020. Overall, there was an 84.7 percent increase in the aggregate of all minority races and Hispanic ethnicity in Kent County from 2000 to 2020. The aggregate of all minority races and Hispanic ethnicity in Kent County was 137,097 people in the year 2000, which increased to 253,199 people by 2020. (USCB 2020c)

PNP is located in Van Buren County, Michigan, which had the sixth lowest population of combined minority groups from 2000 to 2020. The largest group of minority populations in Van Buren County were Black or African-American people. The number of aggregate of all minority races and Hispanic ethnicity people residing in Van Buren County increased by 3,041 people from 2000 to 2010 and 5,321 people from 2010 to 2020. There was an overall increase in the aggregate of all minority races and Hispanic ethnicity population of 56.3 percent in the county over the 20-year period of 2000–2020. The aggregate of all minority races and Hispanic ethnicity in Van Buren County was 14,846 people in the year 2000, which increased to 23,208 people by the year 2020. (USCB 2020c)

3.5.2.2 Low-Income Populations

NRC guidance defines low income by using USCB statistical poverty thresholds (NRC 2013). The geographic distribution of low-income populations in the counties within 50 miles of the site were examined using county data. Poverty status for households and individuals within each state were obtained from the USCB Decennial Summary File 3 for the year 2000 and ACS 5-year estimates were used for the years 2010 and 2020.

Geographically, 26.5 percent of all low-income households in the counties located within the region in the year 2000 were in Kent County. It was followed by St. Joseph County, Indiana, which consisted of 14.7 percent of low-income households. Contrarily, Barry County, Michigan, had the lowest number of low-income households of the counties in the region, with 1.8 percent. PNP is located in Van Buren County and contained 4.6 percent of the low-income households of the counties in the region in the year 2000. The distribution of low-income households from 2000 to 2010 decreased for Barry County by -0.12 percent and Van Buren County by -0.8 percent. However, the census data show that the distribution of low-income households in Kent County increased by 0.5 percent. St. Joseph County, Indiana, experienced the most significant

decrease in low-income household distribution from 2000 to 2010, with a reduction of -2.6 percent. The data show that during the overall 20-year period of 2000–2020 the county of Kent had the most significant decrease in low-income household distribution by -11.3 percent in that timeframe. (USCB 2020d; USCB 2020e)

Similar to low-income households, in the year 2000 the greatest number of low-income individuals in the counties in the region were located in Kent County, with 49,832 individuals accounting for 26.2 percent of all low-income individuals in the regional counties. Kalamazoo County, Michigan, had the second largest percentage of low-income individuals of the counties in the region, with 14.4 percent. Barry County, Michigan, had the lowest percentage of low-income individuals of the counties in a 50-mile radius of the site in the year 2000. There was a 0.8 percent distribution increase of low-income individuals from 2000 to 2010 for Kent County and a 0.1 percent distribution increase of low-income individuals located in Barry County during the 10-year period. In 2020, Kent County experienced a -0.1 percent decrease in low-income distribution for individuals but still consisted of 26.1 percent of low-income individuals of the counties in the region. Additionally, the distribution of low-income individuals that resided in Van Buren County decreased by -0.3 percent from 2000 to 2020. (USCB 2020d; USCB 2020e)

3.5.3 Subsistence Populations and Migrant Workers

3.5.3.1 Subsistence Populations

Subsistence refers to the use of natural resources as food for consumption and for ceremonial and traditional cultural purposes, usually by low-income or minority populations. Specific examples of subsistence use include gathering plants for direct consumption (rather than produced for sale from farming operations), for use as medicine, or use in ritual practices. Fishing or hunting activities associated with direct consumption or use in ceremonies, rather than for sport, are other examples.

Determining the presence of subsistence use can be difficult, as data at the county or block group level are aggregated and not usually structured to identify such uses on or near the site. Frequently, the best means of investigating the presence of subsistence use is through dialogue with the local population who are most likely to know of such activity. This may include county officials, community leaders, and landowners in the vicinity who would have knowledge of subsistence activity. The area surrounding PNP is rural, with no known subsistence-based activity.

As discussed in the SEIS, 47 percent of land in Van Buren County is allocated to agriculture, 5 percent is dedicated to “other,” 4 percent is dedicated to industrial and commercial, and 44 percent is allotted for residential (NRC 2006). PNP staff were interviewed to identify whether there are any subpopulations near PNP (Van Buren County) that engage in a subsistence-like lifestyle. This would include groups in which hunting, gathering, fishing, and gardening constitute a substantially larger fraction of the subpopulation’s food sources than those of the general population. No known subsistence-based activity was identified in the PNP vicinity.

Each year a radiological environmental monitoring program (REMP) land use census is conducted to assess the contribution of radionuclides to the environment resulting from PNP operation. The census is conducted by traveling all roads within a 5-mile radius of the plant site and recording and mapping the locations of the nearest resident, available milk animal, and vegetable garden. The results for each sample type are discussed in the publicly available annual radiological environmental operating reports (AREORs) and compared to historical data to determine if there are any observable trends. No values have exceeded the limits set by the NRC. As such, the REMP has not identified any significant effects to the environment; therefore, no potential impact pathways were identified (Entergy 2022c; HDI 2023d).

3.5.3.2 Migrant Workers

Migrant labor, or a migrant worker, is defined by the U.S. Department of Agriculture as “a farm worker whose employment required travel that prevented the migrant worker from returning to his/her permanent place of residence the same day.” In 2017, Van Buren County reported that 346 out of 953 total farms employed farm labor. An estimated total of 6,446 farm laborers were hired, of which 5,400 workers were estimated to work fewer than 150 days per year. (USDA 2017)

3.6 Historic and Cultural Resources

Cultural resources include prehistoric- and historic-era archaeological sites and objects, architectural properties and districts, and traditional cultural properties, which are defined as significant objects or places important to any community, including Native American tribes, a local ethnic group, or the people of the nation as a whole for maintaining their culture. (USDOI 1998) Of particular concern are those cultural resources that may be considered eligible for listing on the National Register of Historic Places (NRHP). Any cultural resources listed on or eligible for the NRHP are considered historic properties under the National Historic Preservation Act of 1966 [Public Law 89-675].

Prior to taking any action to implement an undertaking, Section 106 of the National Historic Preservation Act requires the NRC as a federal agency to do the following:

- Take into account the effects of an undertaking (including issuance of a license) on historic properties, including any district, site, building, structure, or object included in or eligible for inclusion in the NRHP.
- Afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertaking.

As stated in the SEIS, there are no known cultural resources within the 432-acre PNP property. At the time of the SEIS there were five NRHP properties within Van Buren County, with the closest properties located approximately 6 miles to the north of PNP in South Haven. The SEIS stated that the operation of PNP through the LR term will not have an adverse effect on any historic or cultural property in the region and, therefore, a survey of the project area was not necessary. Their conclusion was based upon the small extent of potential land-disturbing activities, the absence of known historic properties in the vicinity of PNP, and the existence of

adequate environmental controls to ensure protection of cultural resources. Nuclear Management Company LLC (NMC) and Consumers Energy consultation with the Michigan State Historic Preservation Officer (SHPO) occurred from 2005 and 2006, giving the Michigan SHPO the opportunity to comment on the conclusions of the SEIS. In response to the consultations and after review of the SEIS, the Michigan SHPO stated that no historic properties would be affected in the project area by LR. As discussed below, an updated review revealed no new and significant cultural resources since the SEIS.

An in-person file search and records review was conducted at the Michigan State Historic Preservation Office (MSHPO) in Lansing, Michigan, on September 11, 12, and 13, 2023. The records review revealed that there are no sites recorded on the PNP site. There have been 16 cultural surveys, 31 archaeological sites, 3 cemeteries, and 15 aboveground cultural resources recorded within 6 miles of the PNP site (Tables 3.6-1, 3.6-2, and 3.6-3). None of the archaeological sites are listed on or have been determined eligible for the NRHP. One is listed not eligible, two have been determined ineligible, one site is listed undetermined, and 28 sites listed are unevaluated for the NRHP (Table 3.6-2). There is one underwater resource, 20UM144, listed in the MSHPO records. The Michigan Shipwreck Web App does not list any shipwrecks within 6 miles of PNP, although the Southwest Michigan Preserve is depicted along the southwest shore of Lake Michigan from southern Ottawa County on the north, past Allegan and Van Buren Counties, to Berrien County on the south. (MSWA 2023) Of the 15 aboveground cultural resources recorded within 6 miles of the PNP site, two are listed on the NRHP, nine are determined eligible, three properties are undetermined, one resource is listed not eligible (Table 3.6-3). The closest aboveground cultural resource, P758, is 3.37 miles from PNP. Due to topography and vegetation, the PNP site would not be viewable from the resource.

Table 3.6-1 Previous Cultural Resources Surveys and Salvage Work within 6 Miles of PNP (Sheet 1 of 2)

MSHPO Survey ID	Survey Company or Organization and Author	Report Date	Description	Findings within 6 Miles of PNP
Not applicable	Amos R. Green	1957	The Archaeological Survey of the Muskegon Pipeline	Sites 20VA3, 20VA5, 20VA7, 20VA8, 20VA0, and 20VA10
Not applicable	Donald J. Wier, Stephan Demeter, and Curtis E. Larson	1980	Cultural Resource Management Study of Eight Candidate Power Plant Sites.	No sites within Van Buren County
ER-262	NA	NA	No digital records available.	Unknown
ER-273	Robert G. Kingsley	1978	Archaeological Survey of the Proposed Development Areas at the South Haven Municipal Airport, South Haven, Michigan.	No sites
ER-4662	Donna C. Roper, R-2362	1981	Cultural Resources Survey of Two Natural Gas Pipeline Loops. R-2362 Commonwealth Associates, Inc.	20VA47
ER-6120	Donald J. Weir, J.R. Kern, and D.R. Hayes	1983	Archaeological and Historical investigation of the M-43 Improvement Project, I196 to the West Village Limits of Bangor, Van County Michigan. R-2577 Commonwealth Associates, Inc.	20VA56
ER-217	Richard E Flanders	1985	Archaeological Survey; Sanitary Treatment Facility, Covert Township, Van Buren County, Michigan.	No sites
ER-87549	William M. Cremin	1988	An Archaeological Survey of the Covert Township Wastewater Treatment Facility, Van Buren County, Michigan. 83. Western Michigan University, Department of Anthropology.	20VA60
ER-930129	William Cremin and Arthur DeJardins	1994	Phase I Archaeological Assessment of the Taube Road Site (West Parcel), NE ¼ and NW ¼ of Section 1, Hagar Township T13S R18W, Berrien County Michigan (ER-930129). 106 Western Michigan University.	20BE446

Table 3.6-1 Previous Cultural Resources Surveys and Salvage Work within 6 Miles of PNP (Sheet 2 of 2)

MSHPO Survey ID	Survey Company or Organization and Author	Report Date	Description	Findings within 6 Miles of PNP
ER96-503	James A. Robertson and Kent C. Taylor	1995	Phase I Archaeological Survey of the Proposed South Haven Transmission Line, South Haven Township, Van Buren County Michigan. R-0224. Commonwealth Cultural Resources Group, Inc.	No sites within 6-miles of PNP
ER-98-661	Mark Branstner	2000	Cultural Resources Inventory Survey; City of South Haven / Covert Generating Co. Project, Van Vuren State Park, South Haven Township, Van Buren County Michigan. 2000-002. Great Lakes Research, Inc.	No sites
ER00-7.07.070342	Larry N. Stillwell	2007	An Archaeological Field Reconnaissance of a Proposed Cellular Phone Tower (Project #070342) near Lake Michigan Beach, Van Buren County, Michigan. 07FR143Mi. Archaeological Consultants of Ossian.	No sites
ER-950012	Renee Hylton	2008 Architectural and Historic	Burns and McDonnell Engineering Company, Inc.; Architectural and Historical Research, LLC; Final Historic Context Study, Army National Guard. United States Army National Guard, National Guard Bureau.	P47697
ER17-262	Mathew Warwick	2016	Azuleras Farm LLC Properties – NRCS Field View, 76749 38 th Avenue, Covert Township, Van Buren County MI. United States Department of Agriculture Natural Resources Conservation Service.	No sites
ER02-261.19.648456	Larry Stillwell	2019	An Archaeological Field Reconnaissance of a Proposed Telecommunications Facility (Project #648456) in South Haven, Van Buren County, Michigan. Archaeological Consultants of Ossian.	No sites
ER-900402	Not Available	NA	Not Available (South Haven South Pier Light and Keeper's Dwelling)	P27511 and P58389

**Table 3.6-2 Michigan SHPO and DNR Archaeological Sites within 6 Miles of PNP
(Sheet 1 of 2)**

Michigan ID	Quadrangle	Site Type	NRHP Status
20UM114	South Haven	City of Green Bay three-mast schooner shipwreck	Unevaluated
20BE158	Colomo	Middle Woodland camp	Unevaluated
20BE446	Colomo	Trash dump with refuse dated 1900 to 1930	Not eligible for NRHP
20VA2	Covert	Woodland camp	Unevaluated
20VA3	McDonald	Unassigned prehistoric camp	Unevaluated
20VA4	Covert	Unassigned prehistoric village	Unevaluated
20VA5	McDonald	Unassigned prehistoric camp	Unevaluated
20VA7	McDonald	Unassigned prehistoric village	Unevaluated
20VA8	McDonald	Unassigned prehistoric camp	Unevaluated
20VA9	Covert	Unassigned prehistoric camp	Unevaluated
20VA10	Covert	Unassigned prehistoric camp	Unevaluated
20VA11	Covert	Multicomponent; Unassigned prehistoric camp; Unassigned historic period farmstead	Unevaluated
20VA15	Covert	Undetermined prehistoric camp and Woodland camp	Unevaluated
20VA17	Covert	Archaic site of undetermined type	Unevaluated
20VA24	Covert	Late Archaic camp	Unevaluated
20VA26	Covert	Middle Woodland camp	Unevaluated
20VA27	Covert	Woodland camp	Unevaluated
20VA28	Covert	Undetermined prehistoric site of undetermined type	Unevaluated
20VA32	McDonald	Undetermined prehistoric village	Unevaluated
20VA33	McDonald	Undetermined prehistoric camp	Unevaluated

**Table 3.6-2 Michigan SHPO and DNR Archaeological Sites within 6 Miles of PNP
(Sheet 2 of 2)**

Michigan ID	Quadrangle	Site Type	NRHP Status
30VA47	Covert	Undetermined prehistoric lithic scatter	Unevaluated
30VA55	McDonald	Undetermined prehistoric isolated find of a flake	Unevaluated
20VA56	McDonald	Undetermined prehistoric site of undefined type	Unevaluated
20VA60	Covert	Undetermined prehistoric isolated find of a flake	Unevaluated
20VA64	Covert	Multicomponent; Unassigned prehistoric camp; unassigned historic period artifact scatter	Determined ineligible
20VA65	Covert	Multicomponent; Unassigned prehistoric site of undetermined type; Mid-nineteenth to mid-twentieth century artifact scatter	Determined ineligible
20VA78	South Haven	Late nineteenth century farmstead	Unevaluated
20VA83	McDonald	Unassigned prehistoric site of undetermined type	Unevaluated
20VA85	McDonald	Unassigned prehistoric site of undetermined type	Undetermined
20VA86	McDonald	Unassigned prehistoric site of undetermined type	Unevaluated
20VA87	McDonald	Unassigned prehistoric site of undetermined type	Unevaluated
NA	Covert	Covert Cemetery	Protected by State Burial Law
NA	Covert	Fish Cemetery	Protected by State Burial Law
NA	McDonald	Unnamed Cemetery	Protected by State Burial Law

Table 3.6-3 Historic Structures Entries within 6 Miles of PNP

Michigan ID #	Historical Name	Historical Use	NRHP Status	Distance from PNP ^a
NRHP#83000892 P24873	Bailey, Liberty Hyde birthplace	House	Listed	5.30 miles
NRHP#95001160 P303255	Navigation Structures at South Haven Harbor	Harbor access channel	Listed	5.58 miles
P248	Center Street Pedestrian Bridge	Pedestrian bridge	Undetermined	5.54 miles
P758	First Congregational Church of Covert	Church	Undetermined	3.37 miles
P22043	U.S. Post Office (South Haven)	Post office	Eligible	5.89 miles
P24874	Hartman Elementary School	School, athletic field, community center	Eligible	5.94 miles
P24876	Marsland-Kenilworth Resort	Hospitality/recreation	Eligible	5.93 miles
P24878	Ward School	School	Eligible	5.49 miles
P26455	553 Center Street	Private dwelling	Eligible	5.61 miles
P27511	South Haven Light Keeper's Dwelling	Private dwelling	Eligible	5.67 miles
P47697	South Haven National Guard Armory	Military	Not eligible	4.94 miles
P49418	South Haven Downtown Historic District	Commercial	Eligible	5.85 miles
P58389	South Haven Pier Light	Harbor entry light	Eligible	5.58 miles
P70137	Carnegie Library	Public library	Eligible	5.96 miles
P72080	Forest House	Hospitality	Undetermined	5.87 miles

a. Distances are approximate and based on the PNP center point and MSHPO-HRGIS location data.

3.7 Air Quality

The CAA was established in 1970 [42 USC § 7401, et seq.] to reduce air pollution nationwide. The EPA has developed primary and secondary national ambient air quality standards (NAAQS) under the provisions of the CAA. The EPA classifies air quality within an air quality control region (AQCR) according to whether the region meets or exceeds federal primary and secondary NAAQS. An AQCR or a portion of an AQCR may be classified as being in attainment or nonattainment, or it may be unclassified for each of the six criteria pollutants: carbon monoxide (CO), lead, nitrogen dioxide, particulate matter (PM_{2.5}, fine particulates, and PM₁₀, coarse particulates), ozone, and sulfur dioxide (SO₂).

Emissions from nonradiological air pollution sources, including the criteria pollutants, are controlled through compliance with federal, state, and local regulations. Nonattainment areas are areas where the ambient levels of criteria air pollutants in the air violate the criteria set forth in federal, state, and local regulations. Attainment areas are areas that meet the criteria or cannot be classified (depending on the pollutant and other factors). A maintenance area is an area that formerly violated the attainment criteria but currently meets the attainment criteria. (EPA 2023)

As stated in the SEIS, there are no Class I Federal areas in which visibility is an important value, as designated in 40 CFR (81)(D), within 100 miles of PNP (NRC 2006). PNP falls within the South Bend-Elkhart (Indiana)-Benton Harbor (Michigan) Interstate Air Quality Control Region (40 CFR 81.73). The AQCR contains five counties in the State of Indiana and three counties in the State of Michigan.

As of July 31, 2023, four counties in the 62-mile area are nonattainment areas for 8-hour ozone (2015). These counties include Allegan, Berrien, and Muskegon Counties in Michigan and Porter County in Indiana. Porter County is also a maintenance area for 8-hour ozone (2008) and PM_{2.5} (1997) NAAQS. Ionia County, Michigan, is a maintenance area for lead (2008). La Porte County, Indiana, is a maintenance area for sulfur dioxide (1971). Van Buren County, Michigan, where the plant is located, is in attainment for all criteria pollutants. (EPA 2023)

PNP currently holds a conditional operating permit (Permit No. MI-ROP-B2934-2019a) to operate the emission sources. Table 3.7-1 lists the emission sources and summarizes the contents of the air permit.

There have been no notices of violation or noncompliances associated with PNP air emissions over the 5 years from 2018 to 2022. No ozone or nitrogen oxides emissions tests have been completed on PNP transmission lines. Table 3.7-2 includes emissions reported to the state for the past 5 years. All of the permitted emissions listed in Table 3.7-2 and emissions from the cooling towers are reported to the state. Note that the units in the table are in pounds per year.

Table 3.7-1 Permitted Air Emission Sources (Sheet 1 of 2)

Emission Source ^(a)	Description	Capacity Rating	Permit Conditions ^(e)
EUEVAPBOILER ^(b)	Evaporation heating boiler	23.2 MMBtu/hr (million British thermal units per hour)	Opacity shall not exceed 20% except for one 6-minute period per hour of not more than 27% opacity. May burn distillate fuel oil only containing no more than 1.5% sulfur.
EUPLANTHEATBLR ^(b)	Plant heating boiler	23.2 MMBtu/hr	Opacity shall not exceed 20% except for one 6-minute period per hour of not more than 27% opacity. May burn distillate fuel oil only containing no more than 1.5% sulfur.
EUOFFICEBLR	Office heating boiler	2.5 MMBtu/hr	Opacity shall not exceed 20% except for one 6-minute period per hour of not more than 27% opacity. May burn distillate fuel oil only containing no more than 0.40% sulfur by weight.
EUGEN1 ^(c)	Emergency generator #1	21.8 MMBtu/hr	May burn distillate fuel oil only containing no more than 1.5% sulfur. Limited to 100 hour per year.
EUGEN2 ^(c)	Emergency generator #2	21.8 MMBtu/hr	May burn distillate fuel oil only containing no more than 1.5% sulfur. Limited to 100 hour per year.
EUGEN3 ^(c)	Emergency generator #3	17.5 MMBtu/hr 2.0 megawatt	Nitrogen oxides (NOx) limited to 428 lb./1,000 gal diesel fuel. Limited to 1,100 hours per year. May burn distillate fuel oil only containing no more than 0.05% sulfur by weight.

Table 3.7-1 Permitted Air Emission Sources (Sheet 2 of 2)

Emission Source^(a)	Description	Capacity Rating	Permit Conditions^(e)
EUSECURITYGEN	Emergency generator for security operations	5.9 MMBtu/hr	May burn distillate fuel oil only containing no more than 15 parts per million. Limited to 50 hours per year for non-emergency situations and a maximum of 100 hours per year for any combination of purposes specified in 40 CFR 60.421(f)(2).
EUGENK-17 ^(c)	Auxiliary Feedwater System Emergency Diesel Engine	800 brake horsepower (BHP)	May burn distillate fuel oil only containing no more than 15 parts per million. Limited to 50 hours per year.
EUGENK-5 ^(c)	Emergency fire pump	175 BHP	Limited to 100 hours per year.
EUEGENK-10 ^(c)	Emergency fire pump	175 BHP	Limited to 100 hours per year.
EUGENK-1A ^(c)	Emergency air compressor	10 BHP	Limited to 100 hours per year.
EUGENK-1B ^(c)	Emergency air compressor	10 BHP	Limited to 100 hours per year.
EUCOLDCLEANER ^(d)	Various cold cleaners	N/A	Limited to using solvents with less than 5% of methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, chloroform, or any combination thereof.

(EGLE 2022)

a. Emission source unit reference is from Permit No. MI-ROP-B2934-2019a.

b. Also subject to 40 CFR Part 63, Subpart JJJJJ. National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources.

c. Stationary combustion sources also subject to 40 CFR Part 63, Subpart ZZZZ. National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

d. Operating under Rule 281(h) or Rule 285(r)(iv).

e. For a full discussion of conditions, see Michigan Department of Environment Permit No. MI-ROP-B2934-2019a.

Table 3.7-2 PNP Annual Emissions (Pounds Per Year)

Year	NH ₃	CO	Lead	NO _x	PM ₁₀	PM _{2.5}	SO ₂	TOC	TNMOC	VOC
2018	95.41	3,434	0.15	13,773	1,140	720	14.2	98.69	23.85	691
2019	41.27	2,863	0.07	11,070	1,072	255	6.99	17.71	10.32	427
2020	43.22	2,720	0.07	10,562	930	262	6.18	28.19	10.8	380
2021	45.28	2,748	0.07	10,666	1,018	583	11.21	13.9	11.32	372
2022	88.96	1,871	0.14	7,638	666	407	20.88	8.43	22.24	364

Abbreviations not previously defined: NH₃ – ammonia; TOC – total organic carbon; TNMOC – total non-methane organic compounds; VOC – volatile organic compounds

3.8 Noise

Noise measurements are not available for the PNP site. The closest residence is south-southwest of the reactor area (HDI 2023b). The PNP reactor area is approximately 2,500 feet from the northern and southern boundaries of the site (NMC 2005). The PNP cooling towers are located between the reactor area and southern boundary, as shown on SEIS Figure 2-3. The cooling towers were replaced in 2012 and 2017. The specification for the replacement cooling towers was a maximum sound level of 90 A-weighted decibels at 3 feet from the equipment. As was the case for the SEIS, PNP is surrounded by sand dunes and vegetation, and most equipment is located within the plant buildings. In addition, Interstate 196 encloses the eastern portion of the site and reduces the conspicuousness of any noise generated by PNP operations.

3.9 Human Health

3.9.1 Nonradiological Health

Resumed operations would be conducted under the existing environmental permits presented in Table 1.3-1. Water releases and air emissions are discussed in Sections 3.2 and 3.7, respectively.

PNP has continued to have a comprehensive industrial safety program in place since the SEIS that addresses all applicable Occupational Safety and Health Administration (OSHA) standards, including confined spaces entry, respiratory protection, and personal protective equipment.

3.9.2 Radiological Health

As required by NRC regulations at 10 CFR 20.1101, "Radiation Protection Programs," Holtec designed a radiation protection program to protect onsite personnel (including employees and contractor employees), visitors, and offsite members of the public from radiation and radioactive material at PNP. NRC regulations require that gaseous and liquid radioactive releases from nuclear power plants must meet radiation dose-based limits specified in 10 CFR Part 20, "Standards for Protection Against Radiation," and the As Low as is Reasonably Achievable (ALARA) criteria in 10 CFR Part 50, Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low as is Reasonably Achievable' for Radioactive Material in Light- Water-Cooled Nuclear Power Reactor Effluents." Through these release limits, the NRC places regulatory limits on the radiation dose that members of the public can receive from a nuclear power plant. Holtec uses its ODCM, which contains the methods and parameters for calculating offsite doses resulting from liquid and gaseous radioactive effluents. These methods ensure that radioactive emissions from PNP meet NRC and EPA regulatory dose standards.

PNP's annual radioactive effluent release reports contain a detailed presentation of the releases from PNP and the resultant calculated doses. For 2018–2022, both liquid and gaseous effluents were well below the limits defined in the ODCM. The radiation dose to the public in the vicinity of PNP was calculated by using the concentration of radioactive nuclides from gaseous and liquid

effluents. For years 2018–2022, the 10 CFR 50 Appendix 1 evaluation showed that quarterly and annual doses were a fraction of the regulatory limits. For years 2018–2002, the 40 CFR 190 evaluation, which accounts for liquid and gaseous dose, direct shine, and the onsite ISFSI, likewise indicated that the public dose was a fraction of the regulatory limits. The dose for 2021, the most recent full year of power operations, was 0.112, 0.117, and 0.522 millirem for whole body, thyroid, and any other organ, respectively. (Entergy 2019; Entergy 2020; Entergy 2021; Entergy 2022a; HDI 2023a)

PNP's REMP provides additional assurance that there are no significant dose or radiological environmental impacts due to operations of the plant. The REMP measures the aquatic, terrestrial, and atmospheric environment for ambient radiation and radioactivity. Monitoring is conducted for the following: surface water, drinking water, monitoring well water (groundwater), sediment, milk, broad leaf vegetation, fish, fruit (blueberries and apples), and direct radiation. The REMP results for 2021 and 2022 are presented in Table 3.9-1. In assessing all the data gathered for 2021 and 2022, and comparing these results with preoperational data, it was concluded that the operation of PNP had no adverse radiological impact on the environment. (Entergy 2022b; HDI 2023b)

Occupational exposure at nuclear power plants is monitored by the NRC. The 3-year (2018–2020) average occupational dose per individual, total effective dose equivalent (TEDE), was 0.225 roentgen equivalent man (rem) for PNP. The annual TEDE limit is 5 rems [10 CFR 20.1201(a)(1)]. PNP had a 3-year (2018–2020) TEDE collective dose per reactor year of 151.607 person-rem. This 3-year timeframe included two extended outages. (NRC 2022c)

Table 3.9-1 REMP Sample Results (Sheet 1 of 2)

Media	Parameter	2021 Result	2022 Result
Airborne	Gross Beta	Mean of 2.69E-02 picocuries per cubic meter (pCi/m ³) for PNP indicator locations. Control Mean: 2.52E-02 pCi/m ³	Mean of 2.69E-02 pCi/m ³ for PNP indicator locations. Control Mean: 2.54E-02 pCi/m ³
	Iodine-131	None detected	None detected
	Cesium-137	None detected	None detected
Surface water	Gross Beta	Average detectable gross beta activity at 3.29 pCi/L and is attributable to naturally occurring radionuclide	Mean of 2.66 pCi/L for PNP indicator locations. Control Mean: 3.03 pCi/L
	Tritium (H-3)	None detected	None detected
	Gamma-emitting nuclides	None detected	None detected
Drinking water	Gross Beta	Mean of 2.92 pCi/L for PNP indicator locations and is attributable to naturally occurring radionuclide	Control Mean: 3.15 pCi/L
	Tritium	None detected	None detected
	Gamma-emitting nuclides	None detected	None detected
Offsite groundwater	Gamma-emitting nuclides	None detected	None detected
	Gross Beta	Mean of 4.93 pCi/L and is attributable to naturally occurring radionuclide	Mean of 3.79 pCi/L. Control Mean: 3.03 pCi/L
	Tritium	None detected	None detected
Fish	Gamma-emitting nuclides	Only radionuclides detected not attributed to PNP	None detected

Table 3.9-1 REMP Sample Results (Sheet 2 of 2)

Media	Parameter	2021 Result	2022 Result
Food products	Gamma-emitting nuclides	Only radionuclides detected not attributed to PNP	None detected
Broad leaf vegetation	Iodine-131	None detected	None detected
	Cesium-137	Naturally occurring radionuclide detected in broad leaf vegetation (Beryllium-7 and Potassium-40) are not attributed to PNP's effluents. Cs-137 detected in broad leaf vegetation was attributed to historical global atomic testing and biological uptake.	Mean of 73.5 picocuries per kilogram for PNP indicator locations
Sediment	Cesium-137	The only radionuclides detected (Potassium-40, Thorium-228, Thorium-232, and Actinium-228) were naturally occurring isotopes that are not attributed to PNP's effluents.	The only radionuclides detected (Potassium-40, Thorium-228, Thorium-232, and Actinium-228) were naturally occurring isotopes that are not attributed to PNP's effluents.
Direct radiation	Ambient gamma radiation	All TLDs trended normal and no TLDs were outside the baseline. This evaluation identified no noticeable trend that would indicate that the ambient radiation levels are being affected by plant operations.	Three of the 82 valid results trended at a value above the baseline; an evaluation concluded that the activity was from naturally occurring background radiation and not from PNP's direct or shine radiation.

(Entergy 2022b; HDI 2023b)

3.10 Waste Management

3.10.1 Radiological Waste Management

Disposal of radioactive waste prior to June 2022 was primarily handled by vendor Energy Solutions and secondarily handled by vendor Waste Control Specialists. Under ownership of Holtec, radioactive waste is handled primarily by Waste Control Specialists due to its experience servicing other decommissioning plants. The radiological waste shipped offsite from 2018 through 2022 is presented in Table 3.10-1.

PNP stores low-level mixed waste (LLMW) in a 50-gallon drum located in the east radwaste building. Minimal mixed waste has been generated at PNP in the past 5 years, and the only expected generation would be from decontamination activities, specifically decontamination of the primary coolant system. PNP holds an LLMW storage and treatment conditional exemption, meaning that PNP is not subject to the hazardous waste treatment, storage, and disposal facility requirements. With this exemption, Holtec does not have any corrective action obligations at PNP.

There are no planned modifications to PNP's radioactive waste management system that would increase the amount of radioactive waste generated in relation to the amount generated prior to ceasing operations. The only potential change in radioactive waste management is the movement of the LLMW 50-gallon drum from the east radwaste building to the protective area, which is currently called the south rad storage area.

Storage of radioactive materials is regulated by the NRC under the Atomic Energy Act of 1954, as amended, and storage of hazardous wastes is regulated by the EPA under the Resource Conservation and Recovery Act (RCRA) of 1976.

3.10.2 Nonradiological Waste Management

The Materials Management Division of EGLE oversees the solid and hazardous waste programs, including waste disposal, transportation, and storage. Nonradioactive waste produced at PNP includes, but is not limited to, universal waste such as fluorescent light bulbs, used batteries, e-waste, spent biocides, lubrication oil waste, resin regeneration waste, freon filters, and various used oils.

PNP is typically classified by the EPA as a small or very small quantity generator of hazardous waste; however, periodically special projects occur that cause PNP to be classified as a large quantity generator. PNP operations are under the EPA ID No. MID098644685 and are categorized in the Michigan Waste Data System under No. 398054. PNP has only been categorized as a large quantity generator once in the last 5 years (2018 through 2022), which was a planned and approved episodic event in 2019. (EGLE 2023b) Even upon renewed operations, PNP expects to remain a very small or small quantity generator, with the exception of potential episodic events such as a tank cleanout, which would create a high volume of liquid hazardous waste. In summary, PNP does not expect an increase in its hazardous waste generation rate for renewed operation.

Holtec maintains a list of approved waste vendors used to manage and dispose of universal, hazardous, nonhazardous, and recycled hazardous waste. These vendors served PNP prior to Holtec's management, and these vendors would continue to be used upon restart of PNP. Holtec has detailed procedures for nonradioactive waste management and minimization, which cover classification, storage, and shipping of the various types of nonradioactive waste.

The State of Michigan regulates all medical waste under the Medical Waste Regulatory Program, which enforces Michigan's Medical Waste Regulatory Act, Part 139, of the Public Health Code, 1978 Public Act 368. The program outlines proper handling, storage, treatment, and disposal of potentially infectious medical waste. (EGLE 2023c) PNP is subject to these regulations and maintains a procedure for bloodborne pathogens; however, medical incidents and generation of medical waste is very uncommon for PNP. In the event that medical attention was called for, the waste would typically be handled by the supporting medical facility.

Table 3.10-1 Types/Quantity of Solid Waste Shipped Off Site (Total Quantity Cubic Meters by Year)

Types of Waste	2018	2019	2020	2021	2022
Spent resins, filter sludges, evaporator bottoms, etc.	2.06E+01	4.51E+01	1.27E+01	1.94E+01	3.40E+00
Dry compressible waste, contaminated equipment, etc.	3.52E+02	1.34E+02	3.85E+02	1.65E+02	3.09E+02
Irradiated components, control rods, etc.	1.36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other (sludge, used oil, water, etc.)	2.02E+01	2.12E-01	2.97E+00	0.00E+00	0.00E+00

(Entergy 2019; Entergy 2020; Entergy 2021b; Entergy 2022b; HDI 2023b)

4.0 ENVIRONMENTAL IMPACTS

Table 4.0-1 and Table 4.0-2 present the environmental issues in effect for the SEIS, which were the environmental issues assessed in NRC's 1996 LR GEIS. Table 4.0-1 presents the issues determined to be not applicable to PNP and provides a 2023 update of whether the issue remains not applicable. Table 4.0-2 presents the Category 1 and 2 issues addressed in the SEIS as applicable to PNP. The following resource area subsections address these issues in light of their application and scope established in NRC's 2013 LR GEIS (NRC 2013a). Finally, Table 4.0-3 presents environmental issues that are "new" in the 2013 GEIS.

The following subsection address the applicable issues listed in Table 4.0-2 and Table 4.0-3 for the proposed resumption of power operations, except for decommissioning and termination of operations. PNP's post-shutdown decommissioning activities report provides the environmental impact assessment for decommissioning and termination of operations (HDI 2020). The no-action alternative is also addressed by the post-shutdown decommissioning activities report.

Table 4.0-1 SEIS Environmental Issues Not Applicable to PNP (Sheet 1 of 3)

1996 GEIS Issue	1996 GEIS Category	SEIS Comment	Still N/A?
Land Use			
Onsite land use (refurbishment)	1	No refurbishment is planned at Palisades.	Yes
Surface-Water Quality, Hydrology, and Use (For All Plants)			
Impacts of refurbishment on surface-water quality	1	No refurbishment is planned at Palisades.	Yes
Impacts of refurbishment on surface-water use	1	No refurbishment is planned at Palisades.	Yes
Altered salinity gradients	1	The Palisades' cooling system does not discharge to an estuary.	Yes
Water-use conflicts (plants with once-through cooling systems)	1	Palisades does not use a once-through cooling system.	Yes
Water-use conflicts (plants with cooling ponds or cooling towers using makeup water from a small river with low flow)	2	The Palisades' cooling system does not use makeup water from a small river with low flow.	Yes
Aquatic Ecology (For All Plants)			
Refurbishments	1	No refurbishment is planned at Palisades.	Yes
Aquatic Ecology (For Plants with Once-Through and Cooling Pond Heat Dissipation Systems)			
Entrainment of fish and shellfish in early life stages	2	This issue is related to heat-dissipation systems that are not installed at Palisades.	Yes
Impingement of fish and shellfish	2	This issue is related to heat-dissipation systems that are not installed at Palisades.	Yes
Heat shock	2	This issue is related to heat-dissipation systems that are not installed at Palisades.	Yes

Table 4.0-1 SEIS Environmental Issues Not Applicable to PNP (Sheet 2 of 3)

1996 GEIS Issue	1996 GEIS Category	SEIS Comment	Still N/A?
Groundwater Use and Quality			
Impacts of refurbishment on groundwater use and quality	1	No refurbishment is planned at Palisades.	Yes
Groundwater-use conflicts (potable and service water, dewatering; plants that use >100 gpm)	2	Palisades uses <100 gpm of groundwater.	Yes
Groundwater-use conflicts (plants using cooling towers withdrawing makeup water from a small river)	2	The Palisades' cooling system does not use makeup water from a small river.	Yes
Groundwater-use conflicts (Ranney wells)	2	Palisades does not have or use Ranney wells.	Yes
Groundwater-quality degradation (Ranney wells)	1	Palisades does not have or use Ranney wells.	Yes
Groundwater-quality degradation (saltwater intrusion)	1	Palisades uses <100 gpm of groundwater and is not located near a saltwater body.	Yes
Groundwater-quality degradation (cooling ponds in salt marshes)	1	The issue is related to heat-dissipation systems that are not installed at Palisades.	Yes
Groundwater-quality degradation (cooling ponds at inland sites)	2	Palisades is not located at an inland site.	Yes
Terrestrial Resources			
Refurbishment impacts	2	No refurbishment is planned at Palisades.	Yes
Cooling-pond impacts on terrestrial resources	1	This issue is related to a heat-dissipation system that is not installed at Palisades.	Yes
Threatened or Endangered Species (For All Plants)			
Threatened or endangered species (refurbishment)	2	No refurbishment is planned at Palisades.	Yes

Table 4.0-1 SEIS Environmental Issues Not Applicable to PNP (Sheet 3 of 3)

1996 GEIS Issue	1996 GEIS Category	SEIS Comment	Still N/A?
Air Quality			
Air quality during refurbishment (nonattainment and maintenance areas)	2	No refurbishment is planned at Palisades.	Yes
Human Health			
Radiation exposure to the public during refurbishment	1	No refurbishment is planned at Palisades.	Yes
Occupational radiation exposures during refurbishment	1	No refurbishment is planned at Palisades.	Yes
Microbial organisms (public health) (plants using lakes or canals, or cooling towers, or cooling ponds that discharge to a small river)	2	The Palisades' cooling system does not discharge to a small river.	Yes
Socioeconomics			
Public services, education (refurbishment)	2	No refurbishment is planned at Palisades.	Yes
Offsite land use (refurbishment)	2	No refurbishment is planned at Palisades.	Yes
Aesthetic impacts (refurbishment)	1	No refurbishment is planned at Palisades.	Yes

Table 4.0-2 Category 1 and 2 Issues Applicable to PNP (Sheet 1 of 4)

1996 GEIS Issue	Category	New and Significant Review Section
Surface-Water Quality, Hydrology, and Use		
Altered current patterns at intake and discharge structures	1	4.2.2
Altered thermal stratification of lakes	1	4.2.2
Temperature effects on sediment transport capacity	1	4.2.2
Scouring caused by discharged cooling water	1	4.2.2
Eutrophication	1	4.3.1
Discharge of chlorine or other biocides	1	4.2.2
Discharge of sanitary wastes and minor chemical spills	1	4.2.2
Discharge of other metals in wastewater	1	4.2.2
Aquatic Ecology		
Accumulation of contaminants in sediments or biota	1	4.3.1
Entrainment of phytoplankton and zooplankton	1	4.3.1
Cold shock	1	4.3.1
Thermal plume barrier to migrating fish	1	4.3.1
Distribution of aquatic organisms	1	4.3.1
Premature emergence of aquatic insects	1	4.3.1
Gas supersaturation (gas bubble disease)	1	4.3.1
Low dissolved oxygen (DO) in the discharge	1	4.3.1
Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses	1	4.3.1
Stimulation of nuisance organisms	1	4.3.1
Aquatic Ecology (Plants with Cooling-Tower-Based Heat Dissipation Systems)		
Entrainment of fish and shellfish in early life stages	1	4.3.1
Impingement of fish and shellfish	1	4.3.1
Heat shock	1	4.3.1

Table 4.0-2 Category 1 and 2 Issues Applicable to PNP (Sheet 2 of 4)

1996 GEIS Issue	Category	New and Significant Review Section
Terrestrial Resources		
Cooling-tower impacts on crops and ornamental vegetation	1	4.3.2
Cooling-tower impacts on native plants	1	4.3.2
Bird collisions with cooling towers	1	4.3.2
Power line right-of-way (ROW) management (cutting and herbicide application)	1	4.3.2
Bird collisions with power lines	1	4.3.2
Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock)	1	4.3.2
Floodplains and wetlands on power line right-of-way	1	4.3.2
Human Health		
Microbiological organisms (occupational health)	1	4.9.2
Noise	1	4.8
Electromagnetic fields, acute effects (electric shock)	2	4.9.2
Electromagnetic fields, chronic effects	2	(a)
Radiation exposures to the public (LR term)	1	4.9.2
Occupational radiation exposures (LR term)	1	4.9.2
Air Quality		
Air quality effects of transmission lines	1	4.7
Land Use		
Offsite land use (LR term)	1	4.1
Power line rights-of-way	1	4.1
Socioeconomics		
Public services: public safety, social services, tourism and reaction	1	4.4.2
Public services: education (LR term)	1	4.4.2
Aesthetic impacts (LR term)	1	4.1
Aesthetic impacts of transmission lines (LR term)	1	4.1

Table 4.0-2 Category 1 and 2 Issues Applicable to PNP (Sheet 3 of 4)

1996 GEIS Issue	Category	New and Significant Review Section
Housing impacts	2	4.4.1
Public services: public utilities	2	4.4.2
Offsite land use (LR term)	2	4.4.1
Public services: transportation	2	4.4.2
Historic and archaeological resources	2	4.6
Environmental Justice		
Environmental justice	2	4.5
Groundwater Use and Quality		
Groundwater use conflicts (potable and service water; plants that use <100 gpm)	1	4.2.1
Threatened or Endangered Species (For All Plants)		
Threatened or endangered species (LR term)	2	4.3.2
Postulated Accidents		
Design-basis accidents	1	(b)
Severe accidents	2	(b)
Uranium Fuel Cycle		
Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high-level waste)	1	4.11
Offsite radiological impacts (collective effects)	1	4.11
Offsite radiological impacts (spent fuel and high-level waste disposal)	1	4.11
Nonradiological impacts of the uranium fuel cycle	1	4.11
Transportation	1	4.11
Waste Management		
Low-level waste storage and disposal	1	4.10
Mixed waste storage and disposal	1	4.10
Onsite spent fuel	1	4.10
Nonradiological waste	1	4.10

Table 4.0-2 Category 1 and 2 Issues Applicable to PNP (Sheet 4 of 4)

1996 GEIS Issue	Category	New and Significant Review Section
Decommissioning		
Radiation doses	1	(c)
Waste management	1	(c)
Air quality	1	(c)
Water quality	1	(c)
Ecological resources	1	(c)
Socioeconomic impacts	1	(c)

- a. The NRC determined that its categorization and impact-finding definitions did not apply to chronic effects of electromagnetic fields. Because the categorization and impact finding definitions do not apply as noted in 10 CFR 51, Subpart A, Appendix B, Table B-1, Footnote 5, applicants are not currently required to submit information on this issue.
- b. Postulated accidents are not addressed in this supplement as there have been no significant updates identified in the probabilistic risk analysis. However, postulated accidents assessment would be completed per current NRC regulations for potential future LR.
- c. PNP PSDAR (HDI 2020).

Table 4.0-3 New Issues and Findings in the 2013 GEIS (Sheet 1 of 4)

1996 LR GEIS Issue	2013 LR GEIS Issue	2013 LR GEIS Finding
Only addressed for refurbishment	Air Quality	SMALL (Category 1). Air quality impacts from continued operations and refurbishment associated with LR are expected to be SMALL at all plants. Emissions resulting from refurbishment activities at locations in or near air quality nonattainment or maintenance areas would be short-lived and would cease after these refurbishment activities are completed. Operating experience has shown that the scale of refurbishment activities has not resulted in exceedance of the de minimis thresholds for criteria pollutants and BMPs, including fugitive dust controls and the imposition of permit conditions in state and local air emissions permits, would ensure conformance with applicable state or tribal implementation plans. Emissions from emergency diesel generators and fire pumps and routine operations of boilers used for space heating would not be a concern, even for plants located in or adjacent to nonattainment areas. Impacts from cooling tower particulate emissions, even under the worst-case situations, have been small.
Not addressed	Geology and Soils	SMALL (Category 1). The effect of geologic and soil conditions on plant operations and the impact of continued operations and refurbishment activities on geology and soils would be small for all nuclear power plants and would not change appreciably during the LR term.
Only addressed for refurbishment	Surface Water Use and Quality (Non-Cooling System Impacts)	SMALL (Category 1). Impacts are expected to be SMALL if BMPs are employed to control soil erosion and spills. Surface water use associated with continued operations and refurbishment associated with LR would not increase significantly or would be reduced if refurbishment occurs during a plant outage.
Not addressed	Effects of Dredging on Surface Water Quality	Small (Category 1). Dredging to remove accumulated sediments in the vicinity of intake and discharge structures and to maintain barge shipping has not been found to be a problem for surface water quality. Dredging is performed under permit from the U.S. Army Corps of Engineers and possibly from other state or local agencies.

Table 4.0-3 New Issues and Findings in the 2013 GEIS (Sheet 2 of 4)

1996 LR GEIS Issue	2013 LR GEIS Issue	2013 LR GEIS Finding
Only addressed for refurbishment	Groundwater Contamination and Use (Non-Cooling System Impacts)	SMALL (Category 1). Extensive dewatering is not anticipated from continued operations and refurbishment associated with LR. Industrial practices involving the use of solvents, hydrocarbons, heavy metals, or other chemicals, and/or the use of wastewater ponds or lagoons, have the potential to contaminate site groundwater, soil, and subsoil. Contamination is subject to state- or EPA-regulated cleanup and monitoring programs. The application of BMPs for handling any materials produced or used during these activities would reduce impacts.
Not addressed	Radionuclides Released to Groundwater	SMALL or MODERATE (Category 2). Leaks of radioactive liquids from plant components and pipes have occurred at numerous plants. Groundwater protection programs have been established at all operating nuclear power plants to minimize the potential impact from any inadvertent releases. The magnitude of impacts would depend on site-specific characteristics.
Only addressed for refurbishment	Effects on Terrestrial Resources (Non-Cooling System Impacts)	SMALL, MODERATE, or LARGE (Category 2). Impacts resulting from continued operations and refurbishment associated with LR may affect terrestrial communities. Application of BMPs would reduce the potential for impacts. The magnitude of impacts would depend on the nature of the activity, the status of the resources that could be affected, and the effectiveness of mitigation.
Not addressed	Exposure of Terrestrial Organisms to Radionuclides	SMALL (Category 1). Doses to terrestrial organisms from continued operations and refurbishment associated with LR are expected to be well below exposure guidelines developed to protect these organisms.

Table 4.0-3 New Issues and Findings in the 2013 GEIS (Sheet 3 of 4)

1996 LR GEIS Issue	2013 LR GEIS Issue	2013 LR GEIS Finding
Not addressed	Water Use Conflicts with Terrestrial Resources (Plants with Cooling Ponds or Cooling Towers Using Makeup Water from a River)	SMALL or MODERATE (Category 2). Impacts on terrestrial resources in riparian communities affected by water use conflicts could be of moderate significance.
Not addressed	Exposure of Aquatic Organisms to Radionuclides	SMALL (Category 1). Doses to aquatic organisms are expected to be well below exposure guidelines developed to protect these aquatic organisms.
Not addressed	Effects of Dredging on Aquatic Organisms	SMALL (Category 1). Dredging at nuclear power plants is expected to occur infrequently, would be of relatively short duration, and would affect relatively small areas. Dredging is performed under permit from the U.S. Army Corps of Engineers and possibly from other state or local agencies.
Only addressed for refurbishment	Effects on Aquatic Resources (Non- Cooling System Impacts)	SMALL (Category 1). Licensee application of appropriate mitigation measures is expected to result in no more than small changes to aquatic communities from their current condition.
Not addressed	Impacts of Transmission Line ROW Management on Aquatic Resources	SMALL (Category 1). Licensee application of BMPs to ROW maintenances is expected to result in no more than small impacts on aquatic resources.

Table 4.0-3 New Issues and Findings in the 2013 GEIS (Sheet 4 of 4)

1996 LR GEIS Issue	2013 LR GEIS Issue	2013 LR GEIS Finding
Not addressed	Human Health Impact from Chemicals	SMALL (Category 1). Chemical hazards to plant workers resulting from continued operations and refurbishment associated with LR are expected to be minimized by the licensee implementing good industrial hygiene practices as required by permits and federal and state regulations. Chemical releases to the environment and the potential for impacts on the public are expected to be minimized by adherence to discharge limitations of NPDES and other permits.
Not addressed	Physical Occupational Hazards	SMALL (Category 1). Occupational safety and health hazards are generic to all types of electrical generating stations, including nuclear power plants, and are of small significance if the workers adhere to safety standards and use protective equipment as required by federal and state regulations.

4.1 Land Use

4.1.1 SEIS Findings

The NRC assessed the land use impact of operating PNP until 2031 in the SEIS. As shown in Table 1, the Category 1 offsite land use in power line rights-of way was determined to be not applicable to PNP. The remaining Category 1 issues concerning onsite and offsite land uses were determined to have small impacts. The NRC did not identify any new and significant information regarding these issues, meaning the generic determination of small impact was valid. These issues were revisited below.

4.1.2 New and Significant Review for Reauthorization of Power Operations

4.1.2.1 Onsite Land Uses

Section 3.1 discusses onsite land use, which remains largely the same since the NRC's 2006 review. A review by Holtec identified two buildings that have been demolished since 2006. The removal of these structures did not result in land use changes as they were located in developed areas and the concrete pad for those structures remains in place. No other changes to onsite land uses have been identified since the SEIS or shutdown of PNP. Holtec does not have any plans for refurbishment or changes to existing land uses if operations are resumed at PNP.

4.1.2.1.1 *Offsite Land Uses*

Section 3.1 discusses offsite land uses within the vicinity of the PNP site. A review by Holtec for this issue found that much of the land uses surrounding PNP have remained similar to pre-shutdown conditions. Holtec has no plans for developing PNP facilities off site and no refurbishment activities have been identified. Offsite land uses would also be influenced by plant-related changes, such as changes with onsite land use, plant operations, or plant workforce. No changes to onsite land use as a result of resuming PNP operations are planned at this time. Holtec anticipates the PNP workforce would return to pre-shutdown staffing levels and, therefore, anticipates that impacts to offsite land use would be similar to pre-shutdown conditions.

4.1.2.1.2 *Power Line Rights-of-Way*

Since the SEIS was written, the 2013 GEIS revised the definition of in-scope-transmission lines to be those that connect the plant to the first substation of the regional electric power grid and power lines from the grid that feed the plant during outages (NUREG 1437, Rev. 1). Currently, as shown in Table 1, the issue of land use impacts associated with power line rights-of-way was considered not applicable to PNP. The NRC's 2006 review of this issue, though broader in scope than the 2013 GEIS, concluded that there would be no impacts related to land use, whether on site or off site, within rights-of-way during the renewal term beyond those discussed in the 1996 GEIS. Based on the revised scope in the 2013 GEIS, PNP's in-scope transmission lines are all within the site boundary and, therefore, offsite land use impacts due to transmission lines are no longer applicable. All onsite land use impacts are discussed in Section 4.1.2.1

4.1.2.1.3 *Aesthetic Impacts*

Visually, the PNP site has remained relatively unchanged since the SEIS, with the only change noted being the removal of the two structures. The turbine building, reactor dome, auxiliary building, cooling towers, and transmission lines remain the prominent features, with the tallest structure being the auxiliary building at 108 feet tall. All plant structures remain equal to or below the height of the surrounding sand dunes, and there have been no changes to the visibility of the plant and impacts to offsite resources since the SEIS. (NMC 2005) Based on the revised scope in the 2013 GEIS, PNP's in-scope transmission lines are all within the site boundary and, therefore, the aesthetic impacts of in-scope transmission lines are accounted for within those of the plant itself.

4.1.3 **Summary and Conclusion**

Holtec proposes to resume power operations at the PNP facility. The GEIS determined LR to have a small impact to onsite and offsite land uses. The NRC assessed the impacts of operating PNP until 2031 to onsite and offsite land uses and aesthetics and did not identify any new and significant information during its 2006 independent review of the LR ER, meaning the generic determination of SMALL impacts was valid. Holtec revisited these issues and did not identify any new and significant information for onsite and offsite land use and aesthetics addressed in the SEIS and concludes the SEIS findings remain valid for the resumption of power operations.

4.2 **Water Resources**

4.2.1 **Groundwater Resources**

4.2.1.1 **SEIS Findings**

The NRC assessed the impacts on groundwater resources of operating PNP until 2031 in the SEIS. As shown in Table 4.2-1 the Category 2 issues for groundwater use and quality were determined to be not applicable to PNP. The groundwater issue listed in Table 4.2-2 is a Category 1 issue. The NRC did not identify any new and significant information regarding these issues, meaning that the generic determination of SMALL impact was valid. These issues are revisited below.

4.2.1.2 **N&S Review for Reauthorization of Power Operations**

Some of the issues identified in the 1996 LR GEIS were consolidated or expanded in the 2013 LR GEIS. Table 4.2-1 is a comparison of these issues identified in the two GEIS versions and a summary of whether the issues as they are written in the 2013 LR GEIS apply to PNP. Issues found to apply to the PNP are discussed in further detail.

4.2.1.3 **Groundwater Contamination and Use (Non-Cooling System Impacts)**

This issue was expanded in the 2013 LR GEIS to include the impacts of industrial activities associated with continued operations on groundwater use and quality. The NRC considered that impacts to groundwater use would be associated with dewatering. Operational dewatering takes place at some plants, including for groundwater contaminant plume control. The NRC

determined that the impact of continued operations and refurbishment activities on groundwater use are SMALL because these activities are not expected to require any significant dewatering that would affect groundwater availability beyond that which has already taken place.

There are no groundwater contaminant plume extractions or dewatering activities at PNP. In addition, there are no groundwater withdrawals at PNP. Therefore, impacts to groundwater from plant use are expected to remain SMALL. Impacts to groundwater from plant use are also discussed further below under “groundwater use conflicts.”

The NRC considered that soil and groundwater contamination from general industrial practices may include the use of solvents, hydrocarbons, heavy metals, or other chemicals. In addition, the NRC determined that contaminants in wastewater disposal ponds and lagoons may be released to soil and groundwater. The NRC determined that impacts to groundwater quality from industrial activities related to continued operations and refurbishment activities are SMALL for the following reasons:

- The occurrence of releases nonradiological materials can be minimized by proper chemical storage, secondary containment, and leak detection equipment.
- Releases of nonradiological substances typically involve state regulatory agencies for monitoring and remediation.
- Nuclear plants have their own programs for handling chemicals, waste, and other hazardous and toxic materials in accordance with federal and state regulations.
- Permits from federal and state regulations generally require the use of BMPs to prevent chemical releases to the environment, such as pollution and spill prevention and control BMPs.
- The use of wastewater disposal ponds and lagoons is subject to discharge authorizations under NPDES and state wastewater discharge permit programs and monitoring.

As presented in Section 3.2.2, Holtec maintains the PNP SPCC-PIPP, which includes procedures for managing chemical spills. The use of secondary containment is also described in the SPCC-PIPP. Procedures are in place at PNP for handling, storing, and disposing of hazardous and nonhazardous materials. There are no wastewater disposal ponds or lagoons at PNP. Therefore, nonradiological impacts from industrial plant activities are expected to remain SMALL.

4.2.1.4 Groundwater Use Conflicts (Plants That Withdraw Less than 100 GPM)

The NRC considered that pumping groundwater for plant use, such as potable makeup water, service water, and landscaping, creates a cone of depression in the potentiometric surface around the pumping well. The amount that the water table or potentiometric surface declines

depends on multiple factors, such as hydraulic properties, the pumping rate, and the presence of nearby hydrologically connected surface water bodies. However, the NRC determined that the impact of pumping groundwater at a rate less than 100 gpm does not cause a significant cone of depression.

As presented in Section 3.2, water for the CWS and SWS are obtained from Lake Michigan. Domestic water and water for landscaping is supplied by the South Haven Municipal Water Authority. Prior to 2019, groundwater was withdrawn at PNP from three onsite water supply wells for landscaping purposes at a rate less than 24 gpm. These wells were capped in 2019, and there are no groundwater withdrawals at PNP. Because there are no groundwater withdrawals at PNP and water for domestic and landscaping uses is provided from a municipal source, impacts to groundwater from plant use are expected to remain SMALL.

4.2.1.5 Other Issues

In the 2013 LR GEIS, the NRC introduced a new Category 2 issue, the impact of radionuclides released to groundwater. This issue was added to the GEIS to evaluate the potential contamination of groundwater from the release of radioactive liquids from plant systems to the environment. All commercial nuclear power plants routinely release radioactive gaseous and liquid materials into the environment. These radioactive releases are designed to be planned, monitored, documented, and released into the environment at designated discharge points. There have been numerous events at nuclear power reactor sites involving unknown, uncontrolled, and unmonitored releases of liquids containing radioactive material into the groundwater. The majority of the inadvertent liquid release events involved tritium, which is a radioactive isotope of hydrogen. However, other radioactive isotopes, such as cesium and strontium, have also been inadvertently released into groundwater.

The NRC concluded that the impact to groundwater quality from the release of radionuclides could be SMALL or MODERATE, depending on the magnitude of the leak, the radionuclides involved, hydrogeologic factors, the distance to receptors, and the response time of plant personnel in identifying and stopping the leak in a timely fashion.

As presented in Section 3.2.1, a radiological release at PNP to groundwater would flow within the dune sand unit westward to Lake Michigan. This unit is hydraulically isolated from the lower bedrock aquifer; therefore, tritium would remain in the shallow dune sand. There are no nearby public groundwater supply wells, and the nearest domestic wells are located a half-mile east and south of the protected area, which could not be impacted by onsite groundwater based on the westward groundwater flow direction. A potentiometric surface map is depicted in Figure 3.2-1. In addition, there are no major sources of groundwater withdrawal that might reverse the direction of groundwater flow or cause groundwater flow from PNP toward any existing domestic wells (HDI 2023c).

As presented in Section 3.2.1, the PNP GPI program began in 2008. The current onsite groundwater monitoring network installed on site includes 23 monitoring wells and 16 temporary wells completed within the dune sand unit (see Figure 3.2-1). Samples are collected quarterly

and analyzed for gamma activity and tritium. Analytical results are reported in ARERRs. Tritium is the only target radionuclide that was historically detected above its MDA.

Between 2009 and 2018, tritium had been detected in some onsite wells at concentrations below the EPA MCL of 20,000 pCi/L. Minor leaks had been identified using sampling data from the onsite wells, and the leaks were subsequently repaired. Tritium concentrations decreased after the repairs were completed. In 2019 through 2020, tritium was detected above its MCL in several onsite monitoring wells, with a maximum detection of 63,153 pCi/L. As reported in the ARERRs for 2019 and 2020, these wells were impacted by tritium-containing processed liquid radiological waste discharged to the mixing basin. Due to high lake levels and, therefore, high mixing basin levels, some of the effluent migrated to a storm drain that normally discharges into the mixing basin. These tritium detections were determined to be the result of recapture of previously accounted-for effluents. In accordance with NRC RIS-2008, the tritium effluent via groundwater is not required to be reported because it was previously reported under the batch release process and does not introduce a new significant dose pathway. As presented in Section 3.2.1, a release from the boiler rooms' sump was detected in 2019 and 2020 using tritium data from temporary monitoring wells in the power block area. Once the source was determined and upgrades were conducted in 2020 and 2021, tritium detections in the temporary monitoring wells decreased.

In 2021 and 2022, tritium concentrations generally decreased. In 2022, tritium was detected above its MCL in two wells, with a maximum detection of 32,254 pCi/L in MW-2. The extent of tritium impact measured approximately 280 feet wide by 40 feet long. In 2023, tritium was not detected above MDAs in the 23 onsite monitoring wells. Tritium has not been detected in the three deeper monitoring wells, indicating that tritium remains in the upper 10 to 15 feet of the dune sand aquifer.

As presented in Section 3.2.1, there are no onsite contaminant plume groundwater extractions at PNP. Holtec continues to sample groundwater in accordance with plant procedures and its GPI program to promptly identify any impacts to groundwater from radiological releases. Analytical results show a decreasing trend in tritium concentrations. The extent of impact is limited to the plant site due to the hydraulic gradient. In addition, the vertical extent of impact is limited to the upper sand dune unit. Radiological impact has not been detected in monitoring wells set deeper within unconfined aquifer, and the sand dune unit is isolated from the lower bedrock aquifer. Holtec finds that the impact of radiological releases to groundwater at PNP is SMALL and would remain SMALL if power operations are reauthorized.

4.2.2 Surface Water Resources

4.2.2.1 SEIS Findings

The NRC assessed the impacts of operating PNP until 2031 on surface water resources in the SEIS. As shown in Table 4.2-1, the Category 2 surface water use, quality, and hydrology issue was determined to be not applicable to PNP. The surface water issues listed in Table 4.2-2 are Category 1 issues. The NRC did not identify any new and significant information regarding

these issues, meaning that the generic determination of SMALL impact was valid. These issues are revisited below.

4.2.2.2 N&S Review for Reauthorization of Power Operations

Some of the issues identified in the 1996 LR GEIS were consolidated or expanded in the 2013 LR GEIS. Table 4.2-2 is a comparison of these issues identified in the two GEIS versions and a summary of whether the issues as they are written in the 2013 LR GEIS apply to PNP. Issues found to apply to the PNP are discussed in further detail.

4.2.2.3 Surface Water Use and Quality (Non-Cooling System Impacts)

The NRC considered that continued operations and refurbishment activities would require water for non-cooling-related purposes, including some consumptive use. However, the NRC determined that impacts to surface water use are SMALL because surface water volumes used and consumed from continued operations and refurbishment activities would be insignificant when compared with that used and consumed by a plant's cooling system. In addition, the NRC determined that the use of public domestic water and groundwater would reduce the direct consumptive use impacts on surface water resources.

Demand for surface water for non-cooling system purposes at PNP is reduced by a municipal water source for domestic water and groundwater withdrawals. As presented in Section 3.2, the South Haven Municipal Water Authority provides water to PNP, which reduces demand for surface water at the plant. As presented in Section 3.2.1, groundwater has not been used at PNP since 2019. Therefore, non-cooling system impacts on surface water use at PNP are expected to remain SMALL.

The NRC considered that continued operations and refurbishment activities may degrade surface water quality within the receiving watershed. However, the NRC determined that such impacts to surface water quality would be SMALL due to conformance to plant-site NPDES permits, which typically include BMPs to control adverse effects of stormwater, such as pollution and erosion. Activities involving construction-related land disturbance were expected to be managed by a SWPPP, which also includes stormwater management BMPs. In addition, implementation of SPCC-PIPP plans would reduce the likelihood of liquid chemical spills.

No refurbishment or land disturbance activities are planned at PNP as part of the proposed resumption of power operations. Holtec maintains the PNP SWPPP in accordance with the facility NPDES permit and draft NPDES permit. The SWPPP includes BMPs to control soil erosion at stormwater outfalls. Structural and non-structural BMPs in use at PNP include riprap, concrete berms, periodic inspections, alarms, and emergency backup pumps. In addition, oil/water separators are in use for plant floor drains and transformers prior to discharging stormwater from these areas through the plant outfall. Holtec maintains the PNP SPCC-PIPP, which includes procedures for managing chemical spills. In addition, administrative procedures are in place for handling and disposing of hazardous and nonhazardous materials. Continued compliance with NPDES permit requirements and facility procedures would ensure a SMALL impact to surface water quality from non-cooling systems at PNP.

Altered Current Patterns at Intake and Discharge Structures, Scouring Caused by Discharged Cooling Water, Temperature Effects on Sediment Transport Capacity

The NRC considered that large flow rates associated with cooling system water use have the potential to alter current patterns. However, the NRC also considered that the size of large rivers, lakes, or reservoirs precludes significant current alterations except in the vicinity of the intake and discharge structures. The PNP is located on the eastern shore of Lake Michigan, which is a large Great Lake approximately 1,180 cubic miles in size by volume (NMC 2005).

The NRC considered that the high flow rate of water from a cooling system discharge structure has the potential to scour sediments and redeposit them elsewhere. In addition, the NRC considered that the increased temperature from cooling water effluent and the resulting decreased viscosity may affect the sediment transport capacity of water, leading to potential sedimentation problems. However, the NRC also considered that natural sediment transport processes could bring fresh sediment to the discharge flow area, thereby reducing the impact of scouring and sedimentation. In the eastern portion of Lake Michigan near PNP, winds cause a cyclonic circulation pattern resulting a northerly flow (NMC 2005).

There have been no significant changes to the PNP intake or discharge structures, or in the operation of the cooling system, since the SEIS, other than replacement of cooling towers in 2012 and 2017. The two banks of MDCTs are in place at PNP, which would reduce the impact of thermal effluent on lake sediments. PNP plans to use the MDCTs if power operations are reauthorized. Due to the size of Lake Michigan and its cyclonic circulation pattern near PNP, sedimentation and scouring problems are not anticipated. Therefore, plant discharge impacts on lake current patterns, sediment transport, and scouring are expected to remain SMALL.

4.2.2.4 Altered Thermal Stratification of Lakes

The NRC considered that cooling system thermal discharges may alter the thermal stratification of lakes because the cooling systems typically withdraw water from cooler, deeper portions of the water column and discharge to the surface. However, the NRC determined that the effects of thermal plumes are SMALL, in part because they are examined periodically through field measurements and modeling studies as part of the NPDES permit renewal process.

As presented in Section 3.2.2, MDCTs are used at PNP, which reduce thermal impacts into Lake Michigan. The current and draft PNP NPDES permits do not include thermal limits for CWS effluent. However, thermal surveys were conducted in 2000 through 2003 on the thermal characteristics of cooling water discharged into Lake Michigan, and it was found that the thermal plume was much smaller than it had been prior to MDCT installation (NRC 2006). The MDCTs would be used at PNP if power operations are reauthorized. Therefore, thermal stratification impacts of plant discharge to Lake Michigan are expected to remain SMALL.

4.2.2.5 Discharges (Metals in Cooling System Effluent; Biocides, Sanitary Wastes, and Minor Chemical Spills)

The NRC considered impacts to surface water quality from effluent and wastewater discharges that may include heavy metals leached from condenser tubing and other components of the

heat exchange system, sanitary wastes, and minor chemical spills. The NRC determined that these impacts are SMALL, in part because plant discharges are monitored through the NPDES program administered by the EPA or individual states.

The PNP NPDES and draft NPDES permits include monitoring requirements and permit limits for mercury and biocides. Condenser tubing at PNP is stainless steel; therefore, there is no expected impact from heavy metals to plant discharges (HDI 2023c). A septic system is in place at PNP. Although septic field effluent is not monitored, controls are in place to prevent septic system overflows to stormwater, including a high-level alarm, an emergency backup pump, and a structural curb (NRC 2006). Monitoring requirements and limits in the draft permit were retained to allow for operational flexibility. No significant changes to plant discharges are anticipated if power operations resume. In addition, as described earlier in this section, the PNP SPCC-PIPP includes procedures for managing chemical spills, and procedures are in place for handling and disposing of hazardous and nonhazardous materials. Therefore, impacts to surface water quality from plant discharges are expected to remain SMALL.

4.2.2.6 Other Issues

The 2013 GEIS added two new issues that were not included in the SEIS that are relevant to PNP. It added one issue under surface water use, quality, and hydrology: effects of dredging on surface water quality. The NRC considered the potential impacts to surface water quality from dredging operations in the vicinity of surface water intakes, canals, and discharge structures to maintain the function of plant cooling systems and to maintain barge shipping lanes. Dredging disturbs sediments in the surface water body and affects surface water quality by temporarily increasing the turbidity of the water column. In addition, dredging could potentially mobilize contaminants in sediments, such as heavy metals and polychlorinated biphenyls, from areas affected by industrial activity.

The NRC concluded that surface water quality impacts from dredging are SMALL because dredging operations are performed under permits issued by the U.S. Army Corps of Engineers and possibly from state or local agencies. Such permits regulate the discharge of dredged material under CWA Sections 401 and 404. In issuing a Section 404 permit, the USACE also considers potential impacts on aquatic resources, archaeological resources, Tribal concerns, and permitting requirements of state and local agencies.

There is no planned dredging in Lake Michigan should power operations resume at PNP. However, permissions are in place for periodic dredging activities outside of Lake Michigan. EGLE issued Permit No. WRP020704, v1.0, on April 16, 2020 (expiring April 16, 2025), to maintain drainage around structures, to remove sand for maintaining security and stormwater drainage systems, to dredge sand around security structures and stormwater outfall structures, and to place dredged materials on the unvegetated beach. In addition, the USACE issued a letter of permission on April 21, 2020, for as-needed dredging of sediment near an existing vehicle security barrier. Dredging has not been conducted at PNP over the last 9 years. Previously, dredged materials consisted of clean sand that was removed during a period of low water levels in Lake Michigan, and dredged sediments were either placed in the lake or placed

on a vegetated area of the beach. Projects requiring land disturbance, such as dredging, trigger an environmental review, which identifies potential environmental impacts and permit requirements. Compliance with federal and state permits would ensure that impacts to surface water quality from dredging would remain SMALL.

The 2013 LR GEIS added a new issue: the potential impacts from continued operations and refurbishment associated with LR on geologic and soil resources. The NRC considered disturbance of soil, sediment, and/or any associated bedrock, for projects related to continued operations or refurbishment activities, such as replacing or adding buildings, roads, parking lots, and belowground and aboveground utility structures. The NRC concluded that the impacts are SMALL because implementing BMPs would reduce soil erosion and subsequent impacts on surface water quality, and detailed geotechnical analyses would be required to address the stability of excavations, foundation footings, and slope cuts related to construction or refurbishment.

No land disturbance activities are planned due to any resumption of power operations. As presented earlier in this section, PNP maintains a SWPPP that includes BMPs for soil erosion control and stormwater management in compliance with the plant's NPDES permit. More specifically, the SWPPP includes soil erosion control requirements for construction activities, including a soil erosion and sedimentation control plan and protection of natural runoff areas, which is flexible and determined on a case-by-case basis. Projects at PNP requiring land disturbance triggers an environmental review in accordance with internal procedures to determine potential impacts to the environment. Continued compliance with facility permits and procedures ensures that impacts to soil and surface water quality from soil erosion would remain SMALL.

The NRC also concluded that impacts to geology are SMALL because nuclear power plants were originally sited, designed, and licensed in consideration of the geologic and seismic criteria set forth in 10 CFR 100.10(c)(1), 10 CFR Part 100, Appendix A, and 10 CFR Part 50, Appendix A. The NRC considers the risk to reactors from seismicity in the evaluation of severe accident mitigation alternatives and, where appropriate, seismic issues are assessed in site-specific safety reviews. Further, as part of the reactor oversight process, the NRC evaluates new seismic hazard information when it becomes available to determine whether changes are needed at existing plants.

4.2.3 Summary and Conclusions

Holtec proposes to resume power operations with the same operational configuration and would continue to comply with federal and state regulations, meet permit requirements, and implement associated plans and procedures.

4.2.3.1 Impacts to Groundwater

Most applicable issues that may impact groundwater availability or quality identified in the LR GEIS that pertain to PNP are Category 1 issues, meaning that the NRC determined that such impacts would be SMALL.

Impacts to groundwater availability from plant operations are SMALL because there are no groundwater withdrawals at PNP. Water for the SWS and CWS is withdrawn from Lake Michigan, and there is a municipal source of domestic water to the PNP. There are no groundwater contaminant plume extractions or dewatering activities at PNP.

The effects of spills or releases to groundwater are mitigated by the PNP SPCC-PIPP and procedures for handling, storing, and disposing of hazardous and nonhazardous materials. In addition, there are no wastewater disposal ponds or lagoons at PNP.

One new Category 2 issue related to impacts to groundwater quality from radionuclides was identified in the 2013 LR GEIS. A GPI program was implemented at PNP in 2008. Holtec continues to sample groundwater in accordance with plant procedures and its GPI program to promptly identify any impacts to groundwater from radiological releases. PNP has used this information to identify and repair minor leaks. Since 2019, tritium has been detected above its MCL in some wells in the power block area; however, analytical results show a decreasing trend in tritium concentrations, and the extent of impact is limited to the plant site due to the hydraulic gradient of the unconfined aquifer. In addition, the vertical extent of impact is limited to the upper sand dune unit, which is isolated from the lower bedrock aquifer. Holtec finds that the impact of radiological releases to groundwater at PNP is SMALL and would remain SMALL if power operations are reauthorized.

4.2.3.2 Impacts to Surface Water

All applicable issues that may impact surface water availability or quality identified in the LR GEIS that pertain to PNP are Category 1 issues, meaning that the NRC determined that such impacts would be SMALL.

Discharges from PNP are regulated by the NPDES permit for the facility. Holtec would continue to comply with the NPDES permit requirements if resumption of power operations is authorized. Impacts to surface water quality from PNP stormwater discharges are managed with BMPs to control erosion and to mitigate the impact of pollutants on surface water quality. BMPs are summarized in the PNP SWPPP, which is an NPDES permit requirement. In addition, inadvertent spills of nonradiological materials would be managed in accordance with the facility SPCC-PIPP and other internal procedures. Impacts to Lake Michigan from a thermal plume are reduced by the use of MDCTs, which would be used if resumption of power operations is authorized. Impacts of scouring and sedimentation from the plant discharge are expected to be mitigated by cyclonic current patterns in Lake Michigan in the PNP vicinity.

Holtec did not identify any new and significant information for the surface water resources issues addressed in the SEIS, and the SEIS findings remain valid for the resumption of power operations. In addition, Holtec did not identify any new and significant information for the two new 2013 issues addressing impacting soils and geology or impacts to surface water quality from dredging. The findings of the 2013 LR GEIS for these two issues are valid for the resumption of power operations at PNP.

Table 4.2-1 Comparison of 1996 and 2013 LR GEIS Groundwater Resources Issues

1996 LR GEIS	2013 LR GEIS	Applicable in 2023?
Impacts of refurbishment on groundwater use and quality	Groundwater contamination and use (non-cooling system impacts)	Yes (Category 1). This issue was modified and expanded to include the impacts of continued operations, including potential groundwater contamination.
Groundwater use conflicts (plants that withdraw <100 gpm)	Groundwater use conflicts (plants that withdraw <100 gpm)	Yes (Category 1).
Groundwater use conflicts (potable and service water and dewatering; plants that use >100 gpm)	Groundwater use conflicts (plants that withdraw >100 gpm)	No. These two issues were consolidated in the 2013 LR GEIS. There are no groundwater withdrawals at PNP.
Groundwater use conflicts (Ranney wells)		
Groundwater use conflicts (plants using cooling towers withdrawing makeup water from a small river)	Groundwater use conflicts (plants with closed-cycle cooling systems that withdraw makeup water from a river)	No. This issue was expanded in the 2013 LR GEIS to include all rivers. PNP does not withdraw makeup water from river.
Groundwater quality degradation (Ranney wells)	Groundwater quality degradation resulting from water withdrawals	No. These two issues were consolidated in the 2013 LR GEIS. Both issues consider the possibility of groundwater quality degradation from drawing water of potentially lower quality from a river or saltwater into an aquifer. PNP does not use Ranney wells, and PNP is not located adjacent to saltwater.
Groundwater quality degradation (saltwater intrusion)		
Groundwater quality degradation (plants with cooling ponds in salt marshes)	Groundwater quality degradation (plants with cooling ponds in salt marshes)	No. PNP does not use cooling ponds, and PNP is not located adjacent to a salt marsh.
Groundwater quality degradation (plants with cooling ponds at inland sites)	Groundwater quality degradation (plants with cooling ponds at inland sites)	No. Cooling ponds are not used at PNP.

Table 4.2-2 Comparison of 1996 and 2013 LR GEIS Surface Water Resources Issues and Applicability to PNP

1996 LR GEIS Issue	2013 LR GEIS Issue	Applicable in 2023?
Altered salinity gradients	Altered salinity gradients	No. This issue pertains to plants located on estuaries. PNP is not located on an estuary.
Surface water use conflicts (plants with once-through cooling systems)	Surface water use conflicts (plants with once-through cooling systems)	No. PNP does not have a once-through cooling system.
Surface water use conflicts (plants with cooling ponds or cooling towers using makeup water from a small river with low flow)	Surface water use conflicts (plants with cooling ponds or cooling towers using makeup water from a river)	No. This issue was expanded in the 2013 LR GEIS to include all rivers. PNP does not use makeup water from a river.
Impacts of refurbishment on surface water quality	Surface water use and quality (non-cooling system impacts)	Yes (Category 1). This issue was expanded in the 2013 LR GEIS to include the effects of continued operation on surface water use and quality.
Impacts of refurbishment on surface water use		
Altered current patterns at intake and discharge structures	Altered current patterns at intake and discharge structures	Yes (Category 1).
Altered thermal stratification of lakes	Altered thermal stratification of lakes	Yes (Category 1).
Scouring caused by discharged cooling water	Scouring caused by discharged cooling water	Yes (Category 1).
Eutrophication	Effects of cooling water discharge on DO, gas supersaturation, and eutrophication	Yes (Category 2). This issue was consolidated with other aquatic resources issues in the 2013 LR GEIS. This issue is discussed in Section 4.3.
Discharge of metals in cooling system effluent	Discharge of metals in cooling system effluent	Yes (Category 1).
Discharge of chlorine or other biocides	Discharge of biocides, sanitary wastes, and minor chemical spills	Yes (Category 1). These two issues were consolidated in the 2013 LR GEIS and treated as a single issue.
Discharge of sanitary wastes and minor chemical spills		
Temperature effects on sediment transport capacity	Temperature effects on sediment transport capacity	Yes (Category 1).

4.3 Ecological Resources

4.3.1 Aquatic Resources

4.3.1.1 SEIS Findings

The NRC assessed the impacts of operating PNP until 2031 on aquatic resources in the SEIS. Table 4.0-1 lists Category 2 aquatic resources issues that were determined to be not applicable to PNP. The aquatic resources issues applicable to PNP are listed in Table 4.0-2. The NRC did not identify any new and significant information regarding the Category 1 issues, meaning that the generic determination of SMALL impact was valid, consistent with the GEIS findings. These issues are revisited below.

4.3.1.2 N&S Review for Reauthorization of Power Operations

Holtec considered relevant new information on Category 1 issues applicable to PNP since initial LR. Some of the issues identified in the 1996 LR GEIS were consolidated or expanded in the 2013 LR GEIS. Table 4.3-1 is a comparison of these issues identified in the two GEIS versions and a summary of findings from 2006 and 2023.

Three new issues related to aquatic resources have been identified in the 2013 GEIS that were not considered in the SEIS. These are discussed below.

4.3.1.3 Exposure of Aquatic Organisms to Radionuclides

Holtec considered relevant new information on the exposure of aquatic organisms to radionuclides since the SEIS. PNP operates in compliance with NRC effluents standards and reports effluents annually to the NRC as required as part of its REMP. The REMP includes sampling indicator and control locations. The REMP utilizes indicator locations near the site to determine if any increases in radioactivity have occurred due to station operation and control locations farther away from the site to indicate the presence of only naturally occurring radioactivity. No measurable levels of radiation above baseline levels attributable to PNP operation were detected in the vicinity of PNP in 2022. The 2022 REMP thus substantiated the adequacy of source control and effluent monitoring at PNP, with no observed impact of plant operations on the environment. (HDI 2023d) All 2022 REMP results support the conclusion that the surrounding environment is not adversely affected by PNP's effluents. Continued compliance with NRC radiological effluent limits and implementation of the REMP would ensure that aquatic organisms' exposure to radionuclides are well within guidelines and adverse trends are detected to implement corrective actions. Holtec finds that impacts of exposure of aquatic organisms to radionuclides for the resumption of power operations at PNP are SMALL and consistent with GEIS findings.

4.3.1.4 Effects of Dredging on Aquatic Organisms

Holtec considered relevant new information on the effects of dredging on aquatic organisms since the SEIS. PNP conducts maintenance dredging in Lake Michigan to maintain drainage around structures, to remove sand for maintaining security and stormwater drainage systems, to dredge sand around security structures and stormwater outfall structures, and to place dredged

materials on the unvegetated beach. The activity is permitted in conjunction with the Michigan Department of Natural Resources and USACE. The location of the dredging activity is in previously disturbed areas and is conducted in compliance with its permit. Therefore, Holtec finds that impacts of the effects of dredging on aquatic organisms for the resumption of power operations at PNP would be SMALL.

4.3.1.5 Impacts of Transmission Line ROW Management on Aquatic Resources

Holtec considered relevant new information on the impacts of transmission line ROW management on aquatic resources since the SEIS. In-scope transmission lines are confined to the PNP site.

No refurbishment or land disturbance activities are planned at PNP as part of the proposed resumption of power operations. PNP maintains a SWPPP that includes BMPs for soil erosion control and stormwater management in compliance with the plant's NPDES permit. Holtec maintains the PNP SPCC-PIPP, which includes procedures for managing chemical spills. In addition, administrative procedures are in place for handling and disposing of hazardous and nonhazardous materials. Vegetation maintenance practices at PNP use selective application of EPA-approved herbicides. Continued ROW management would maintain aquatic communities and resources in their current condition. Implementation of BMPs and adherence to vegetation management protocols would ensure minimal impact on aquatic resources from ROW management and maintenance. Holtec finds that impacts of transmission-line ROW management on aquatic resources with the resumption of power operations at PNP would be SMALL.

4.3.2 **Terrestrial Resources**

4.3.2.1 SEIS Findings

The NRC assessed the impacts on aquatic resources of operating PNP until 2031 in the 2006 SEIS. Table 4.0-1 lists Category 2 terrestrial resources issues that were determined to be not applicable to PNP. The terrestrial resources issues applicable to PNP are listed in Table 4.0-2. The NRC did not identify any new and significant information regarding the Category 1 issues, meaning that the generic determination of SMALL impact was valid, consistent with the GEIS findings. These issues are revisited below.

4.3.2.2 N&S Review for Reauthorization of Power Operations

Holtec considered relevant new information on Category 1 issues applicable to PNP since initial LR. Some of the issues identified in the 1996 LR GEIS were consolidated or expanded in the 2013 LR GEIS. Table 4.3-2 a comparison of these issues identified in the two GEIS versions and a summary of findings from 2006 and 2023.

One new Category 1 issue related to terrestrial resources that are applicable to PNP has been identified in the 2013 GEIS which were not considered in the SEIS. This is discussed below. In addition, the new 2013 GEIS issue of water use conflicts with terrestrial resources (plants with cooling ponds or cooling towers using makeup water from a river) is not applicable to PNP.

4.3.2.3 Exposure of Terrestrial Organisms to Radionuclides

Holtec considered relevant new information on the exposure of terrestrial organisms to radionuclides since the SEIS. PNP operates in compliance with NRC effluent standards and reports effluents annually to NRC as required as part of its REMP. The REMP includes sampling indicator and control locations. The REMP utilizes indicator locations near the site to determine if any increases in radioactivity have occurred due to plant operation and control locations farther away from the site to indicate the presence of only naturally occurring radioactivity. No measurable levels of radiation above baseline levels attributable to PNP operation were detected in the vicinity of PNP in 2022. The 2022 REMP thus substantiated the adequacy of source control and effluent monitoring at PNP, with no observed impact of plant operations on the environment. All 2022 REMP results support the conclusion that the surrounding environment is not adversely affected by PNP's effluents. (HDI 2023d) Continued compliance with NRC radiological effluent limits and implementation of the REMP would ensure that terrestrial organisms' exposure to radionuclides are well within guidelines and adverse trends are detected to implement corrective actions. Holtec finds that impacts of exposure of terrestrial organisms to radionuclides for the resumption of power operations of PNP would be SMALL and consistent with GEIS findings.

4.3.3 **Special Status Species and Habitats**

4.3.3.1 SEIS Findings

The NRC assessed the impacts of operating PNP until March 24, 2031, on federally listed threatened, endangered, and candidate species in the SEIS. No federally listed threatened or endangered aquatic species were found to occur in Lake Michigan in the vicinity of the PNP site nor in the streams crossed by the Palisades-Argenta transmission line. The SEIS addressed four federally listed (Pitcher's thistle [*Cirsium pitcher*], Karner blue butterfly [*Lycaeides melissa samuelis*], Mitchell's satyr butterfly [*Neonympha mitchelli mitchelli*], and Indiana bat [*Myotis sodalis*]) and one candidate (eastern massasauga rattlesnake [*Sistrurus catenatus catenatus*]) terrestrial species that occur or potentially occur in the vicinity of the PNP site.

The NRC concluded that continued operation of PNP during the LR term would not likely adversely affect any species that are federally listed, proposed for listing, or candidates for listing as endangered or threatened within the immediate vicinity of the PNP site and its associated transmission lines.

The SEIS does not specifically address impacts to state-listed species. However, the NRC evaluated the impacts on all biota and their habitats from operation of the plant cooling system and continued operation of the transmission lines, which included state-listed species. The NRC concluded that potential impacts on aquatic and terrestrial species, regardless of their status as federally listed or state-listed species, were considered in the assessment; the conclusion reached in the SEIS assessment was that the impacts from continued operation of the cooling system and transmission system on all biota and their habitats would be SMALL.

4.3.3.2 N&S Review for Reauthorization of Power Operations

Holtec considered relevant new information on the impacts to threatened, endangered, and protected species since initial LR. Potential impacts from resumption of power operations of PNP on state and federally listed protected species are discussed in the following sections.

Federally Listed Species

As discussed in Section 3.3.3, five new species were listed under the ESA after the SEIS was prepared: the northern long-eared bat (endangered), tricolored bat (proposed endangered), red knot (endangered), whooping crane (experimental population; nonessential), and monarch butterfly (candidate). The eastern massasauga rattlesnake, which was a candidate species in 2006, was changed to threatened status since the SEIS. The potential impacts of resumption of power operations of PNP on each of these newly listed species are discussed below.

Northern Long-Eared Bat and Tricolored Bat

Northern long-eared bats and tricolored bats have not been recorded as occurring on the PNP site. However, PNP's building structures and forested areas surrounding the plant potentially provide suitable roosting and maternity habitat for both species. No specific assessment has been made of the extent or quality of bat habitat at the PNP site or the vicinity. However, given the general habitat requirements of these species, it can be conservatively assumed that suitable habitat to varying degrees is present within the large amount of forested area in the vicinity of the site (for northern long-eared and tricolored bats), as well as man-made structures at the site (for tricolored bats).

Potential impacts to bats from the continued operations of PNP are discussed below:

- Mortality or injury from collisions with plant structures: Bat collisions with plant structures at nuclear power plants are not well documented but are likely to be rare. There have been no observations or records of bat incidents at the PNP site.
- Loss, degradation, or disturbance of habitat: No construction, land clearing, or other ground-disturbing activities outside of the developed plant areas are proposed. Additionally, all plant operations are located in disturbed areas, and no tree or vegetation clearing is proposed during the LR term that would potentially impact the habitat for bats. Holtec conducts an environmental review for all engineering-related activities, including ground disturbance prior to project activities.
- Behavioral changes from refurbishment and/or construction activities: No construction, ground-disturbing activities, or refurbishment activities have been identified or proposed at the PNP site. Bats, if present at the PNP site, have likely already acclimated to the noise, vibration, and general human disturbances associated with site maintenance, infrastructure repairs, and other site activities. Moreover, the undisturbed, forested areas surrounding the site likely provide more suitable habitat; hence, it is unlikely that bats

would establish colonies in the man-made structures at PNP. As such, behavioral changes to bats from refurbishment and/or construction activities during the operating term is unlikely.

When necessary, Holtec would consult with the USFWS to ensure compliance with the ESA. Compliance with all regulatory requirements associated with the federally listed species would continue to be an administrative control practiced by Holtec for the life of the facility. Holtec finds that the resumption of power operations of PNP MAY AFFECT but IS NOT LIKELY to ADVERSELY AFFECT the northern long-eared bat and the tricolored bat.

Red Knot

Red knots are shorebirds that use open habitats, such as beaches and mudflats. The shoreline of Lake Michigan at the PNP site potentially present suitable stopover habitat for the red knot. The species only needs to be considered for actions that occur along coastal areas during the red knot migratory window between May 1 and September 30. There are no land-disturbing actions proposed for resumption of power operations at PNP that would impact coastal habitat for the red knot. PNP currently holds a CWA Section 404 permit issued by the USACE for maintenance dredging in Lake Michigan to protect an existing security barrier. The location of the dredging activity is in previously disturbed areas and, therefore, is unlikely to impact potential red knot coastal habitat. As such, Holtec finds that the resumption of power operations at PNP would have NO EFFECT on the red knot.

Whooping Crane

Loss of wetlands and marsh habitat have significant negative impacts to the migratory corridor used by whooping cranes (USFWS 2023f). No construction, land clearing, or land-disturbing activities are proposed during the operating term that would impact wetland and marsh areas. All plant operations are located in disturbed areas, and no vegetation clearing is proposed during the operating term that would potentially impact the habitat for the whooping crane. Holtec conducts an environmental review for all engineering-related activities, including ground disturbance prior to project activities.

The risk of collision with in-scope transmission lines poses a potential threat to all avian species, including migrating whooping cranes. However, to date, there have been no reported incidents of whooping crane collisions with in-scope transmission lines at the PNP site.

When necessary, Holtec would consult with the USFWS to ensure compliance with the ESA. Compliance with all regulatory requirements associated with federally listed species would continue to be an administrative control practiced by Holtec for the life of the facility. As such, Holtec finds that the resumption of power operations at PNP would have NO EFFECT on the whooping crane.

Eastern Massasauga Rattlesnake

The eastern massasauga rattlesnake prefers bogs, ponds, swamps, and open canopy with a sedge or grass ground cover. The SEIS concluded that the eastern massasauga rattlesnake would not be adversely affected by continued operation of PNP during the LR period because no land-disturbing refurbishment activities are planned, and vegetation maintenance procedures for PNP transmission line rights-of-way would maintain the open habitats preferred by this species. The species was a candidate for listing when the SEIS was prepared and has since been recategorized to threatened. There is no new information or changes in site procedures during the proposed continued operation of PNP that would change the initial determination for this species. As such, Holtec finds that the resumption of power operations at PNP MAY AFFECT but IS NOT LIKELY to ADVERSELY AFFECT the eastern massasauga rattlesnake.

Monarch Butterfly

Suitable habitat for the monarch butterfly is potentially present in undeveloped portions of the PNP site that are not maintained by mowing. They may also use flowering plants in landscape features around the site. No specific assessment has been made of the extent or quality of such habitat at the PNP site or the vicinity. All plant operations are located in disturbed areas and vegetation clearing is not anticipated during the operating term. Vegetation maintenance practices at the PNP site use selective application of EPA-approved herbicides to ensure that habitats and wildlife are protected. Thus, Holtec finds that the resumption of power operations at PNP would have NO EFFECT on the monarch butterfly.

State-Listed Species

Potential habitat for state-listed species may be present in portions of the PNP site and the immediate vicinity. As detailed above, no construction, land clearing, or land-disturbing activities are proposed during the operating term that would impact habitat for state-listed protected species. All plant operations are located in disturbed areas and vegetation clearing is not anticipated. The various administrative controls and permits in place at PNP would ensure protection of aquatic and terrestrial habitat and species. These include the following:

- Compliance with NPDES permit requirements,
- Implementation of BMPs including SWPPP and SPCC-PIPP plans,
- Compliance with USACE and Michigan Department of Natural Resources dredge permit requirements,
- Implementation of vegetation maintenance practices including the use of selective application of EPA-approved herbicides,
- Environmental review for all engineering-related activities, including ground disturbance prior to project activities, and
- Consultation with state and federal agencies regarding protected species, when necessary.

Holtec finds that the resumption of power operations of PNP would have a SMALL impact on state-listed species.

Migratory Birds, Bald Eagles, and Golden Eagles

Seventeen species of migratory birds have the potential to occur in the vicinity of PNP. Migratory movements or local flight patterns may result in the occurrence of these birds at the site. Habitat for some of these species may be located on portions of the site not utilized for operations. There are no land-disturbing actions proposed during the continued operation of PNP that would impact potential habitat for migratory birds. As mentioned earlier, PNP currently holds a CWA Section 404 permit issued by the USACE for maintenance dredging in Lake Michigan to protect an existing security barrier. The location of the dredging activity is in previously disturbed areas and, therefore, is unlikely to impact potential coastal habitat for migratory birds. When necessary, consultation with responsible agencies would be conducted to maintain compliance with existing regulations to protect migratory birds. Holtec finds that the resumption of power operations at PNP would have a SMALL impact on migratory birds, including bald and golden eagles.

Essential Fish Habitat

No EFH is located within the vicinity of PNP, nor were any EFH areas protected from fishing. As HAPCs are derived from EFH, there are also no HAPCs located within the 6-mile vicinity of PNP. Thus, Holtec finds that the resumption of PNP power operations would have NO ADVERSE EFFECTS on EFH.

4.3.3.3 Summary and Conclusions

Holtec proposes to resume power operations with the same operational configuration and would continue to comply with federal and state regulations and meet permit requirements. Holtec reviewed new and significant information for aquatic and terrestrial resources issues applicable to PNP and determined that the SEIS findings of SMALL remain valid for the resumption of power operations at PNP.

Holtec considered relevant new information for the evaluation of the four new Category 1 issues related to aquatic and terrestrial resources identified in the 2013 GEIS which were not considered in the SEIS. Based on new information, Holtec finds that impacts of exposure of aquatic and terrestrial organisms to radionuclides, effects of dredging on aquatic organisms, and impacts of transmission line ROW management for the resumption of power operations at PNP would be SMALL and consistent with GEIS findings.

Holtec considered relevant new information on the impacts to state and federally protected species. Holtec concludes that the resumption of power operations at PNP would result in the following:

- MAY AFFECT but IS NOT LIKELY to ADVERSELY AFFECT the northern long-eared bat, tricolored bat, and eastern massasauga rattlesnake,

- NO EFFECT on the whooping crane, red knot, and monarch butterfly,
- SMALL effect on state-listed species
- SMALL effect on migratory birds, and
- NO ADVERSE EFFECTS on EFH.

Table 4.3-1 Comparison of Category 1 Aquatic Resources Issues Over Time and Applicability to PNP (Sheet 1 of 4)

1996 LR GEIS Issue	SEIS Findings	2013 LR GEIS Issue	2023 Findings	Rationale for 2023 Findings
Refurbishment (Category 1)	Not applicable.	Effects on aquatic resources (non-cooling system impacts)	No new and significant information; consistent with GEIS findings.	No land disturbance or refurbishment proposed. Plant operates under NPDES permit. Plant implements SWPPP and SPCC-PIPP.
Accumulation of contaminants in sediments or biota (Category 1)	No new and significant information; consistent with GEIS findings.	Effects of nonradiological contaminants on aquatic organisms	No new and significant information; consistent with SEIS and GEIS findings.	Dredging in accordance with state and federal permit conditions.
Entrainment of phytoplankton and zooplankton (Category 1)	No new and significant information; consistent with GEIS findings.	Entrainment of phytoplankton and zooplankton	No new and significant information; consistent with SEIS and GEIS findings.	No change in the closed-cycle cooling water intake system.

Table 4.3-1 Comparison of Category 1 Aquatic Issues Over Time and Applicability to PNP (Sheet 2 of 4)

1996 LR GEIS Issue	SEIS Findings	2013 LR GEIS Issue	2023 Findings	Rationale for 2023 Findings
Cold shock (Category 1)	No new and significant information; consistent with GEIS findings.	Infrequently reported thermal impacts (all plants)	No new and significant information; consistent with SEIS and GEIS findings.	Thermal plume smaller than it had been prior to MDCT installation (NRC 2006). No change in MDCT operation. Plant operates under NPDES permit which includes monitoring of invasive species. No fish kill reports, 2017–current.
Thermal plume barrier to migrating fish (Category 1)	No new and significant information; consistent with GEIS findings.			
Distribution of aquatic organisms (Category 1)	No new and significant information; consistent with GEIS findings.			
Stimulation of nuisance organisms (Category 1)	No new and significant information; consistent with GEIS findings.			
Premature emergence of aquatic insects (Category 1)	No new and significant information; consistent with GEIS findings.			

Table 4.3-1 Comparison of Category 1 Aquatic Issues Over Time and Applicability to PNP (Sheet 3 of 4)

1996 LR GEIS Issue	SEIS Findings	2013 LR GEIS Issue	2023 Findings	Rationale for 2023 Findings
Gas supersaturation (gas bubble disease) (Category 1)	No new and significant information; consistent with GEIS findings.	Effects of cooling water discharge on DO, gas supersaturation, and eutrophication	No new and significant information; consistent with SEIS and GEIS findings.	Plant operates under NPDES permit.
Low DO in the discharge (Category 1)	No new and significant information; consistent with GEIS findings.			
Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses (Category 1)	No new and significant information; consistent with GEIS findings.		No new and significant information; consistent with SEIS and GEIS findings.	Plant operates under NPDES permit. Plant implements SWPPP and SPCC-PIPP. Condenser tubing is stainless steel and would not contribute leached metals to the cooling water discharge.
Entrainment of fish and shellfish in early life stages (cooling-tower-based heat dissipation) (Category 1)	No new and significant information; consistent with GEIS findings.	Impingement and entrainment of aquatic organisms (plants with cooling towers)	No new and significant information; consistent with SEIS and GEIS findings. No new and significant information; consistent with SEIS and GEIS findings.	No change in cooling-tower-based heat dissipation system or the intake or discharge structures.
Impingement of fish and shellfish (cooling-tower-based heat dissipation) (Category 1)	No new and significant information; consistent with GEIS findings.			

Table 4.3-1 Comparison of Category 1 Aquatic Issues Over Time and Applicability to PNP (Sheet 4 of 4)

1996 LR GEIS Issue	SEIS Findings	2013 LR GEIS Issue	2023 Findings	Rationale for 2023 Findings
Heat shock (cooling-tower-based heat dissipation) (Category 1)	No new and significant information; consistent with GEIS findings.	Thermal impacts on aquatic organisms (plants with cooling towers)	No new and significant information; consistent with SEIS and GEIS findings.	No change in cooling-tower-based heat dissipation system or the intake or discharge structures. No change in MDCT operation. Thermal plume smaller than it had been prior to MDCT installation (NRC 2006). No fish kill reports, 2017–current.

Table 4.3-2 Comparison of Category 1 and 2 Terrestrial Resources Issues Over Time and Applicability to PNP (Sheet 1 of 2)

1996 LR GEIS Issue	SEIS Findings	2013 LR GEIS Issue	2023 Findings	Rationale for 2023 Findings
Refurbishment impacts (Category 2)	Not applicable.	Effects on terrestrial resources (non-cooling system impacts)	No new and significant information; consistent with SEIS and GEIS findings.	No land disturbance or refurbishment proposed. Plant operates under NPDES permit. Plant implements SWPPP and SPCC-PIPP. Plant maintains established ROW management protocols, including vegetation management and use of approved herbicide application (NMC 2005).
Cooling-tower impacts on crops and ornamental vegetation (Category 1)	No new and significant information; consistent with GEIS findings.	Cooling tower impacts on vegetation (plants with cooling towers)	No new and significant information; consistent with SEIS and GEIS findings.	No plant operations or modifications proposed that would significantly alter the operation of the cooling towers.
Cooling-tower impacts on native plants (Category 1)	No new and significant information; consistent with GEIS findings.			

Table 4.3-2 Comparison of Category 1 and 2 Terrestrial Resources Issues Over Time and Applicability to PNP (Sheet 2 of 2)

1996 LR GEIS Issue	SEIS Findings	2013 LR GEIS Issue	2023 Findings	Rationale for 2023 Findings
Bird collisions with cooling towers (Category 1)	No new and significant information; consistent with GEIS findings.	Bird collisions with plant structures and transmission lines	No new and significant information; consistent with SEIS and GEIS findings.	No plant operations or modifications proposed that would significantly alter plant structures and transmission lines.
Bird collisions with power lines (Category 1)	No new and significant information; consistent with GEIS findings.			
Power line ROW management (cutting and herbicide application) (Category 1)	No new and significant information; consistent with GEIS findings.	Transmission line ROW management impacts on terrestrial resources	No new and significant information; consistent with SEIS and GEIS findings.	In-scope transmission lines are confined to the developed portions of the PNP site No land disturbance or refurbishment proposed that would disturb terrestrial habitat.
Floodplains and wetlands on power line right-of-way (Category 1)	No new and significant information; consistent with GEIS findings.			
Impacts of electromagnetic fields (EMFs) on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock) (Category 1)	No new and significant information; consistent with GEIS findings.	Impacts of EMFs on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock)	No new and significant information; consistent with SEIS and GEIS findings.	In-scope transmission lines are 345 kV; EMFs produced by operating transmission lines up to 1,100 kV have not been reported to have any biologically or economically significant impact on plants, wildlife, agricultural crops, or livestock (NRC 2013).

4.4 Socioeconomics

4.4.1 Housing, Transportation, and Offsite Land

4.4.1.1 Background [GEIS Section 4.8.1.1]

Some communities experience seasonal transient population growth due to local tourism and recreational activities. Income from tourism and recreational activities creates employment and income opportunities in the communities around nuclear power plants.

Nevertheless, the effects of nuclear power plant operations on employment, income, recreation, and tourism are ongoing and have become well-established during the current license term for all nuclear power plants. The impacts from power plant operations during the LR term on employment and income in the region around each nuclear power plant are not expected to change from what is currently being experienced; thus, the impacts for this reauthorization are also not expected to change. In addition, tourism and recreational activities in the vicinity of nuclear plants are not expected to change as a result of reauthorization of power operations.

4.4.1.2 SEIS Findings

Employees receive income from the nuclear power plant in the form of wages, salaries, and benefits. Employees and their families, in turn, spend this income on goods and services within the community, thereby creating additional opportunities for employment and income. In addition, people and businesses in the community receive income for the goods and services sold to the power plant. Payments for these goods and services create additional employment and income opportunities in the community. The measure of a community's ability to support the operational demands of a power plant depends on the ability of the community to respond to changing socioeconomic conditions. In the 2006 SEIS, the NRC concluded that the impacts on employment and personal income occurring in the local socioeconomic environment as a result of LR activities, in addition to the impacts of other potential economic activity in the area, would be SMALL. Impacts on tourism and recreation are expected to be of SMALL significance at all sites. The NRC also concluded for the applicable Category 1 socioeconomic issues, the impacts would be SMALL based on no new and significant information being identified (see Table 4.0-2).

4.4.1.3 N&S Review for Reauthorization of Power Operations

Because Holtec anticipates that the workforce would be similar in size to the pre-shutdown workforce, impacts of the workforce on housing, transportation, or offsite land, whose impacts are largely dependent on the employed population at PNP, are expected to be SMALL (see Section 3.4). The socioeconomic factors that influence this issue are anticipated to be similar to pre-decommissioning conditions after the reauthorization of power operations. Staffing numbers would be similar to pre-decommissioning numbers, and staff would likely hail from the same or similar areas as described in the SEIS, preventing any significant impact on housing or transportation.

Because tax payments and staffing levels are expected to return to pre-decommissioning levels within the next few years, operating expenditures are not anticipated to increase beyond normal,

economy-wide increases due to inflation. Therefore, these expenditures would not have any additional impact on local economies beyond what was already considered in the SEIS.

Additionally, this reauthorization would not require additional land use beyond already disturbed land. A review of publicly available websites and documents did not reveal any current or upcoming projects in the vicinity of PNP that would be expected to significantly impact the local economy. While PNP itself expects to undergo various projects in the process of returning to normal power operations, these projects would be short-term and are not anticipated to have impacts beyond those discussed in the SEIS.

Holtec did not identify any new and significant information in its review for the PNP reauthorization of power operations from the previous SEIS finding regarding housing, transportation, or offsite land use.

4.4.2 Tax Revenues and Community Services

4.4.2.1 SEIS Findings

Nuclear power plants and the workers who operate them are an important source of tax revenue for many local governments and public school systems. Tax revenues from nuclear power plants mostly come from property tax payments or other forms of payments, such as payments in lieu of tax, although taxes on energy production have also been collected from several nuclear power plants. County and municipal governments and public school districts receive tax revenue either directly or indirectly through state tax and revenue-sharing programs.

In the 2006 SEIS, the NRC concluded that the impacts on employment and personal income occurring in the local socioeconomic environment as a result of LR activities, in addition to the impacts of other potential economic activity in the area, would be SMALL. This conclusion was reached because operating expenditures, NMC staffing levels, and local tax payments during renewal would be similar to those during the current license period. Impacts on tourism and recreation are expected to be of SMALL significance at all sites.

4.4.2.2 N&S Review for Reauthorization of Power Operations

In 2017, Entergy, the previous owner of PNP, announced the impending shutdown of PNP. Holtec then collaborated with local officials to minimize the tax impact and negotiate a glide path for tax assessment reductions through 2022, slowly reducing its tax payments year-over-year.

The primary impact of reauthorization of power operations would be a reversal of the decline in the amount of taxes paid by PNP to local governments and public school systems. Though variations in the amount of taxes paid are expected to occur as the value of the plant increases due to site modifications and improvements for plant restart are put in place (see Section 2.0), these payments are expected to level out in 2027 to roughly the value of the payments prior to decommissioning.

In the GEIS, the NRC concluded that “the amount of tax revenue paid during the LR term as a result of continued operations and refurbishment associated with LR is not expected to change.”

A review of the anticipated tax payments through 2030 establishes that PNP is likely to be assessed similarly in future years as before shutdown was announced; thus, tax payments, which are generally perceived as beneficial to local economies, would return to the pre-2016 levels. Holtec did not identify any new and significant information in its review for the PNP reauthorization of power operations concerning the impacts addressed by this GEIS finding.

4.5 Environmental Justice

4.5.1 SEIS Findings

The pathways through which the environmental impacts associated with LR for PNP can affect human populations are discussed throughout the SEIS. The NRC staff evaluated whether minority and low-income populations could be disproportionately affected by these impacts. The NRC staff found no unusual resource dependencies or practices, such as subsistence agriculture, hunting, or fishing, through which the populations could be disproportionately highly and adversely affected. In addition, the NRC staff did not identify any location-dependent disproportionately high and adverse impacts affecting these minority and low-income populations, including impacts on the seasonal migrant farm labor force, many of whom could be minorities. The SEIS concluded that offsite impacts from PNP on minority and low-income populations would be SMALL, and no special mitigation actions are warranted.

4.5.2 N&S Review for Reauthorization of Power Operations

As presented in Section 2.1, no LR-related refurbishment activities have been identified. Therefore, there would be no license-renewal-related refurbishment impacts to minority and low-income populations, and no further analysis is applicable.

As described in Section 3.5, the distribution of minority and low-income populations remains similar between 2000 and 2020. No subsistence populations were identified. Holtec's new and significant information review analyses of the Category 2 issues defined in 10 CFR 51.53(c)(3)(ii) determined that environmental impacts from resumption of power operations would either be SMALL or non-adverse. Therefore, high or adverse impacts to the general human population would not occur.

As described in Section 3.9, Holtec maintains a REMP. With this program, Holtec monitors important radiological pathways and considers potential radiation exposure to plant and animal life in the environment surrounding Holtec. The results of the program indicate Holtec has created no adverse environmental effects or health hazards. Therefore, no environmental pathways have been adversely impacted and are not anticipated to be impacted by resumption of power operations. Therefore, the findings in the SEIS remain valid for the resumption of power operations at PNP.

4.6 Historic and Cultural Resources

4.6.1 SEIS Findings

The NRC concluded that potential impacts on historic and archaeological resources would be SMALL. This conclusion was based on the fact that (1) no major refurbishment or replacement activities would occur during the renewal period, and (2) the applicant has environmental review procedures in place to ensure that any archaeological resources that may be present receive consideration and protection.

4.6.2 N&S Review for Reauthorization of Power Operations

As presented in Section 3.6, two NRHP properties are recorded within 6 miles of PNP, as of September 13, 2023. As was the case in the 2006 SEIS, the nearest of these is approximately 5.3 miles from PNP. Also as presented in Section 3.6, the records review at the Michigan SHPO indicated that there have been no new and significant information since the SEIS. As discussed in Section 2.2, resumption of power operations does not include refurbishment. Holtec did not identify any new and significant information in its review for the PNP reauthorization of power operations from the previous SEIS finding regarding historic and cultural resources and the findings remain valid.

4.7 Air Quality

The SEIS reported that the production of ozone and oxides of nitrogen is insignificant and does not contribute measurably to ambient levels of these gases. The 2013 GEIS reported the same impact level for all U.S. plants. Based on the 2013 GEIS, the Air Quality effects of transmission lines are SMALL for all plants including PNP.

In 2013, Revision 1 of the GEIS added an air quality impacts section that is not found in the previous GEIS. Impacts to air quality evaluated in the 2013 GEIS are considered to be generic (the same or similar at all plants), or Category 1. Section 3.7 presents the PNP air emissions and the permitted sources. Holtec would continue to operate in compliance with its air permit, including when resumption of power operations is authorized. Holtec is aware of no new and significant information regarding the environmental impacts associated with PNP. Therefore, the analyses and findings regarding this issue in the GEIS (NUREG-1437, Revision 1) and 10 CFR Part 51, Subpart A, Appendix B, Table B-1, are incorporated herein by reference, and no further analysis is required.

4.8 Noise

4.8.1 SEIS Findings

The NRC concluded that there was no new and significant information on noise impacts at PNP and, therefore, the generic determination of small impacts was valid for PNP's LR term ending in 2031.

4.8.1.1 N&S Review for Reauthorization of Power Operations

As discussed in Section 3.4, noise generated by Palisades operations is mitigated at the site boundary because the plant is located approximately 2,500 feet from the northern and southern boundaries (NRC 2006). The nearest residence is approximately a half-mile south-southwest of the plant (HDI 2023d). Currently, PNP is surrounded by heavily wooded areas, agricultural land, and rugged sand dunes along the lakeshore (NRC 2006).

There are two cooling towers located on the southern side of the plant, which are more than 1,000 feet from the nearest residences, with sand dunes and vegetation serving as natural sound barriers. Cooling tower noise consists of two components: One is the sound of the fans and fan drives, and the other is the sound of the water splashing down through the tower. The noise level from a mechanical draft cooling tower would decrease with distance and at 1,000 feet distance the noise level is approximated at 54 A-weighted decibels (Tetra Tech 2010). With the nearest residences being more than 1,000 feet from the cooling towers and with the natural sound barriers, the closest noise-sensitive receptor would experience a lower noise level.

No anticipated changes in noise levels associated with continued operations are expected. People living in the vicinity of PNP would not experience changes in noise levels during the proposed resumption of power operations beyond that experienced before shutdown of operations in 2022. Therefore, the impact of resumed operations would not exceed the noise impacts determined by the NRC in the SEIS.

Holtec did not identify any new and significant information for the noise impact issue. The findings of the SEIS for this issue remain valid for the resumption of power operations at PNP.

4.9 Human Health

4.9.1 **SEIS Findings**

The NRC assessed the human health impacts of operating PNP until 2031 in the SEIS. As shown in Table 4.0-1, the Category 2 microbiological public health hazard was determined to be not applicable to PNP. The remaining Category 2 human health issue concerning electric shock was determined as a SMALL impact. However, as explained below, the assessment focused on transmission lines that are no longer in scope for LRs. The remaining human health issues are listed in Table 4.0-2 and are Category 1 issues. The NRC did not identify any new and significant information regarding these issues, meaning that the generic determination of a SMALL impact was valid. These issues are revisited below apart from noise impacts, which are addressed in Section 4.8.

4.9.2 **N&S Review for Reauthorization of Power Operations**

4.9.2.1 Microbiological

As shown in Table 4.0-1, the human health microbiological public health issue was considered not applicable to PNP. The basis was the plant did not discharge to a small river. This issue was

expanded in 2013 to address discharge to any river and still focused on plants with cooling ponds, lakes, or canals. This issue continues to be not applicable because the discharge is to Lake Michigan; further, the plant's NPDES-permitted discharge is restricted to public access by a U.S. Coast Guard-established security zone as detailed in 33 CFR § 165.910(4).

The human health microbiological occupational health issue was considered applicable to PNP. The operation of the mechanical draft cooling towers could potentially expose PNP workers to *Legionella* spp. Plant personnel most likely to come into contact with *Legionella* aerosols would be those who dislodge biofilms, where *Legionella* are often concentrated, such as during the cleaning of condenser tubes and cooling towers (NRC 2013a). PNP has a comprehensive industrial safety program that addresses all applicable OSHA standards, including confined-spaces entry, respiratory protection, and personal protective equipment.

4.9.2.2 Electric Shock

The transmission lines originating/terminating at the PNP substation were assessed for the electric shock issue in the SEIS, with NRC finding the lines posing a small human health impact. The 2013 GEIS revised the scope of the transmission lines considered in scope for the human health electric shock issue. In-scope transmission lines would be those lines that connect the plant to the first substation of the regional electric power grid and power lines from the grid that feed the plant during outages (per Regulatory Guide 4.2, Supplement 1). These lines are typically those between the turbine building or main transformers within the protected area and the onsite switchyard.

PNP's generating structures and the in-scope transmission lines (i.e., the transmission lines to the switchyard) are within the National Electrical Safety Code's (NESC) definition of an electrical supply station. NESC clearance and induced shock standards are different for an electrical supply station versus the publicly accessible areas with overhead transmission lines. The 2013 GEIS uses the NESC standard applicable to publicly accessible areas with overhead lines to establish that in-scope transmission lines that have a potential for induced shock less than or equal to 5 milliamperes voltage would be a SMALL impact. Thus, this voltage threshold is not applicable to PNP's in-scope transmission lines that lie within an electrical supply station.

There have been no changes to the PNP in-scope transmission lines since the SEIS with the following exception. As part of decommissioning activities, to remove the connection between the PNP main transformer and the PNP substation a disconnect switch and section of wiring was removed from the substation bus. The connection is planned to be restored prior to resuming power operations.

PNP has a comprehensive industry safety program that includes an electrical safety procedure.

4.9.2.3 Radiological

The proposed action is to resume operations as currently designed; no refurbishment activities are proposed, so radioactive effluents would be similar to those prior to the shutdown of operations in 2022.

As discussed in Section 3.9.2, PNP operates in compliance with NRC effluents standards and reports effluents annually to the NRC as required. The dose attributable to PNP is a fraction of the regulatory limits. There are no proposed substantive changes or upgrades to the Radiation Protection Program for the proposed resumption of power operations. Because there is no reason to expect effluents to increase in the period of extended operation, annual doses to the public from continued operation are expected to be well within regulatory limits.

4.9.2.4 Other Issues

The 2013 GEIS added two new issues under human health: chemical hazards for the public and workers and physical hazards to workers. Both of these are Category 1 issues.

NRC determined that chemical hazards are expected to be minimized by the licensee by implementing good industrial hygiene practices as required by permits and federal and state regulations. As stated above, PNP has a comprehensive industrial safety program. The program addresses all types of hazards, including chemical hazards and physical hazards, and meets all applicable OSHA requirements. PNP also has a hazardous waste management procedure. As presented in Section 1.3, PNP has permits governing NPDES discharges and air emissions.

4.9.3 **Summary and Conclusion**

Holtec proposes to resume power operations with the same operational configuration and would continue to comply with federal and state regulations and meet permit requirements. Holtec would continue to implement a comprehensive industrial safety program at PNP. Holtec did not identify any new and significant information for the human health issues addressed in the SEIS, and the SEIS findings remain valid for the resumption of power operations. In addition, Holtec did not identify any new and significant information for the two new 2013 human health issues addressing chemical hazards and occupational physical hazards. The findings of the 2013 GEIS for these two issues are valid for the resumption of power operations at PNP.

4.10 Waste Management

4.10.1 **SEIS Findings**

The NRC assessed waste management, storage, and disposal of low-level waste, mixed waste, and nonradiological waste in the SEIS. Table 4.0-2 lists these issues, which are all Category 1. The NRC concluded that there was no new and significant information for low-level waste storage and disposal, mixed waste storage and disposal, and nonradiological waste associated with LR beyond those discussed in the GEIS.

4.10.2 **N&S Review for Reauthorization of Power Operations**

4.10.2.1 Low-Level Waste Storage and Disposal

In the 2013 LR GEIS, the NRC considered that during normal plant operations, routine plant maintenance and cleaning activities would generate low-level waste (LLW). As discussed in

Section 4.13.1 of the GEIS, the NRC does not expect the generation and management of the LLRW during the LR term to result in significant environmental impacts.

PNP has established radiological waste programs and controls in accordance with NRC regulations, including procedures for management of LLW. PNP maintains a list of approved and licensed waste disposal vendors for multiple types of waste, including LLW. Upon resumption of power operations, previous verified vendors would continue to be used. Holtec does not anticipate a significant increase in LLW from normal operations and does not have planned or anticipated changes in its radioactive waste management program for resumption of operations.

In accordance with the NRC's finding, PNP's compliance with comprehensive regulatory controls and use of licensed treatment and disposal facilities would ensure the continued SMALL impacts from the storage and disposal of LLW.

4.10.2.2 Mixed Waste Storage and Disposal

In the 2013 LR GEIS, the NRC reviewed mixed waste storage and disposal. Several factors associated with the guidance for handling, storing, and disposing of mixed waste were considered by the NRC (NRC 2013a). The NRC determined that the comprehensive regulatory controls and the facilities and procedures in place at nuclear power plants ensure that the mixed waste is properly handled and stored and that doses to and exposure to toxic materials by the public and the environment are negligible at all plants.

PNP has established radiological waste programs, including a work instruction titled Radiological Controls and Instrumentation for East Radwaste. The East Radwaste building is where all LLMW is stored on the PNP site. As stated above, PNP manages waste in accordance with NRC regulations and utilizes only licensed waste disposal facilities. Minimal LLMW has been generated by PNP in the past 5 years, and this is not expected to increase. There are no planned modifications to PNP's radioactive waste management system that would increase the amount generated.

Given the small quantities of mixed waste generated at PNP, the minimal impact (i.e., SMALL) would also be applicable upon the restart of PNP.

4.10.2.3 Nonradioactive Waste Storage and Disposal

In the 2013 LR GEIS, the NRC considered that nuclear plants generate small quantities of hazardous waste (including universal waste) during operation and refurbishment. The management of hazardous wastes generated at nuclear facilities, both on site and off site, is strictly regulated by the EPA or the responsible state agencies per the requirements of the RCRA. Nonradioactive nonhazardous waste generated at nuclear facilities is managed by following BMPs and are generally disposed of in local landfills permitted under RCRA Subtitle D regulations.

The NRC reviewed the findings of the 1996 GEIS in Section 4.11.1.5 of the 2013 LR GEIS, which stated that the impacts associated with managing nonradioactive wastes at uranium fuel

cycle facilities, including nuclear power plants, were found to be SMALL. It was indicated that no changes to nonradioactive waste generation would be anticipated for LR, and that systems and procedures are in place to ensure continued proper handling and disposal of waste at all plants.

PNP is currently classified as a small quantity generator of hazardous waste and does not anticipate any change in this status, with the exception of special projects, which would be planned permitted and infrequent events.

Given the small quantities of nonradioactive waste generated at PNP, the minimal impact (i.e., SMALL) would be applicable to renewed operations.

4.10.3 Summary and Conclusion

PNP would continue to store and/or dispose of radioactive and nonradioactive wastes in accordance with EPA, state, and local regulations and contract with appropriately permitted disposal facilities upon restart. The continued use of existing systems and procedures to ensure proper storage and disposal would allow the impacts to be SMALL. Based on the discussion above, the impacts for this issue with respect to PNP are consistent with those of the 2013 GEIS.

4.11 Fuel Cycle

4.11.1 SEIS Findings

NRC assessed the uranium fuel cycle impacts of operating PNP until 2031 in the SEIS. Table 4.0-2 lists these issues, which are all Category 1. The NRC concluded that there was no new and significant information on uranium fuel cycle impacts at PNP and, therefore, the generic determinations of SMALL impacts were valid for PNP's LR term ending in 2031.

4.11.2 N&S Review for Reauthorization of Power Operations

The impacts to the public from radiological exposures were considered by the NRC in Table S-3 of 10 CFR 51.51. Impacts from radioactive gaseous and liquid releases, including radon-222 and technetium-99, would remain at or below regulatory limits as long as facilities operate under a valid license issued by either the NRC or an agreement state. NRC affirmed this conclusion in the 2013 LR GEIS. Further, the 2013 GEIS stated that the generic issues related to the uranium fuel cycle would not be affected by continued operations associated with LR of nuclear power plants. For resumed power operations at PNP, the nuclear fuel would be supplied by vendors with the appropriate licenses, and radioactive waste services are contracted with facilities having the appropriate licenses and permits.

In the 2013 LR GEIS, the NRC reviewed transportation impacts of the uranium fuel cycle. The impacts associated with transporting fresh fuel and spent fuel and radioactive waste (LLW and mixed waste) are provided in Table S-4 in 10 CFR 51.52. In the 2013 GEIS, the NRC confirmed that the values given in Table S-4 would still be bounding, as long as the (1) enrichment of the fresh fuel was 5 percent or less, (2) burnup of the spent fuel was 62,000 megawatt days per

metric ton uranium (MWd/MTU) or less, and (3) higher-burnup spent fuel (higher than 33,000 MWd/MTU) was cooled for at least 5 years before being shipped off site. (NRC 2013a)

Holtec anticipates the maximum enrichment of fuel to be used at PNP for resumed power operations to be below 5 percent and the average burnup level of the peak rod not to exceed 62,000 MWd/MTU. There is no planned change in the fresh fuel vendor and the same MAP-12 shipping container design would be utilized.

Spent nuclear fuel is stored on site in the spent fuel pool for adequate cooling prior to transfer to onsite dry storage. Newly generated spent nuclear fuel would likewise be stored in the spent fuel pool for adequate cooling. The expected increase in volume of spent fuel can be safely stored on site in either pool or dry storage. PNP currently has east and west ISFSIs. Expansion is needed and was planned to support decommissioning and the emptying of the spent fuel pool. If reauthorization of power operations is approved, the expansion would support power operations. An East Pad expansion is planned to be able to store 12 additional HI-STORM Flood and Wind systems.

4.11.3 Summary and Conclusion

Holtec does not have planned changes for resumption of power operations with regard to the uranium fuel cycle. Holtec proposes to resume power operations with the same operational configuration and would continue to use nuclear fuel vendors with the appropriate licenses and radioactive waste services that are contracted with facilities having the appropriate licenses and permits. The nuclear fuel enrichment and peak rod burnup limits would not be exceeded. Therefore, Holtec did not identify any new and significant information for the uranium fuel cycle issues addressed in the SEIS, and the 2006 SEIS findings remain valid for the resumption of power operations.

4.12 Cumulative

In its SEIS, the NRC staff considered the potential impacts resulting from operation of PNP during the LR term and other past, present, and future actions in the vicinity of the plant. The NRC staff's determination is that the potential cumulative impacts resulting from operation of PNP during the LR term would be SMALL.

Changes to the site and vicinity were evaluated, as well as reasonably foreseeable future actions that could contribute to adverse cumulative impacts. Past actions are included in the SEIS. Overall, there are no noticeable changes to the site and surrounding areas since the SEIS was written. There have been no noticeable changes to the adjacent Van Buren State Park nor in the seasonal recreational neighborhood to the south.

As discussed in Section 3.1, there are plans for construction of staff support facilities (e.g., a new training facility, parking garage, a building to house a new visitors center, a day-care facility) and an expanded ISFSI. As such, the impacts of these projects would be limited to the site and would not contribute to cumulative impacts for any resource area. In addition, Holtec is

interested in having the PNP host additional generating units. No plans beyond visionary statements have been made. Any future use of the PNP site for additional generating units would be subject to federal, state, and local authorization and permitting that would take into account direct and cumulative environmental impacts. Holtec did not identify any new and significant information that would change the findings listed in the SEIS. Therefore, the SEIS findings remain valid for the resumption of power operations.

5.0 SUMMARY OF IMPACTS AND MITIGATING ACTIONS

In its SEIS, the NRC concluded that there was no new and significant information related to any of the applicable Category 1 issues associated with operations of PNP during the renewal term. Consequently, the NRC staff concluded that the environmental impacts associated with these issues were bounded by the impacts described in the GEIS. For each of these issues, the GEIS concluded that the impacts would be SMALL, and that additional plant-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation.

In the SEIS, plant-specific environmental evaluations were conducted for eight Category 2 issues applicable to operation of PNP during the renewal term and for environmental justice and chronic effects of electromagnetic fields. For all eight issues and environmental justice, the NRC staff concluded that the potential environmental impact of operation of PNP during the renewal term would be of SMALL significance in the context of the standards set forth in the GEIS, and that additional mitigation would not be warranted. In addition, the NRC staff determined that a conclusion has not been reached by the appropriate federal health agencies regarding chronic adverse effects from electromagnetic fields. Therefore, the NRC staff did not conduct an evaluation of this issue.

As discussed in Chapter 4, since the SEIS, the NRC has revised the issues in the 2013 GEIS with some issues combined and incorporating new scope and with some new issues (Table 4.0-3). Updated information, analyses, and reviews of site-specific issues provided in this supplement did not identify any new and significant impacts that would alter the conclusions of the NRC in its SEIS, nor any that require mitigating measures above those already in place at PNP.

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