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U.S. Nuclear Regulatory Commission
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NextEra Energy Duane Arnold, LLC
Duane Arnold Energy Center, Docket No. 50-331
Renewed Facility License No. DPR-49

Submittal of Environmental Report in Support of Restart of Duane Arnold Energy Center

On behalf of NextEra Energy Duane Arnold, LLC (NEDA), please find enclosed the Environmental Report (ER) prepared in support of the planned restart of Duane Arnold Energy Center (DAEC), NRC Docket No. 50-331. This report has been prepared to provide the environmental information necessary for the NRC's environmental review of the proposed restart activities pursuant to its obligations under the National Environmental Policy Act.

The DAEC 10 CFR Part 50 license has not been terminated and remains valid even though, at the time of cessation of power operation and removal of fuel from the reactor vessel, it was amended to reflect a facility in decommissioning. The DAEC shut down on August 10, 2020. Pursuant to 10 CFR 50.82(a)(1)(ii) and 10 CFR 50.4(b)(9), NEDA certified that all nuclear fuel was permanently removed from the DAEC reactor vessel and placed in the spent fuel pool on October 12, 2020. To date, NEDA has not commenced any major decommissioning activities at DAEC, as defined by 10 CFR 50.2. On January 23, 2025, NEDA submitted a request for exemption from 10 CFR 50.82(a), notifying NRC of NEDA's intention to return DAEC to power operation.

The ER describes the current environmental conditions at the site, evaluates the potential environmental impacts associated with restart activities and resumption of power operations, and describes mitigating actions to minimize environmental impacts. The report also includes updated information on permits and other authorizations, compliance status, and plans and procedures in place to monitor impacts from DAEC.

This submittal supports the licensee's intent to resume power operations at DAEC following a period of shutdown and transition activities. The ER is submitted to facilitate the NRC's environmental review process. This letter contains no new and no revised regulatory commitments.

If you have any questions or require additional information, please contact Robert Murrell at 319-651-9496.

Sincerely,

Kenneth Mack
Nuclear Director Licensing & Reg Compliance – Nuclear Fleet

Enclosure: Environmental Report – Duane Arnold Energy Center

Cc: USNRC Regional Administrator Region III
USNRC Project Manager, Duane Arnold Energy Center
USNRC Resident Inspector, Duane Arnold Energy Center
USNRC Branch Chief, Mr. Paul Zurawski

Environmental Report

Duane Arnold Energy Center

October 2025

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Abbreviations, Acronyms, and Symbols

§	Section
°F	degrees Fahrenheit
ALARA	as low as reasonably achievable
AQCR	air quality control region
AREOR	Annual Radiological Environmental Operating Report
ATF	accident tolerant fuel
bgs	below ground surface
BMP	best management practices
BWR	boiling water reactor
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
CRPP	Cultural Resources Protection Plan
CWA	Clean Water Act
DAEC	Duane Arnold Energy Center
DNR	Iowa Department of Natural Resources
DODAM	Defueled Offsite Dose Assessment Manual
DOT	U.S. Department of Transportation
DSAR	Defueled Safety Analysis Report
EA	Environmental Assessment
EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
ESA	Endangered Species Act
GEIS	2024 License Renewal Generic Environmental Impact Statement
GHG	greenhouse gas
gpm	gallons per minute
GWPP	groundwater protection program
HAP	hazardous air pollutant
HFC	hydrofluorocarbon
HVAC	heating, ventilation, and air conditioning
IAC	Iowa Administrative Code

IDPH	Iowa Department of Public Health
ISFSI	Independent Spent Fuel Storage Installation
km	kilometers
kV	kilovolts
LAR	License Amendment Request
LCHD	Linn County Health Department
LLD	lower limit of detection
LLMW	low-level mixed waste
LLRPSF	Low-Level Radwaste Processing and Storage Facility
LLRW	low-level radioactive waste
LR	license renewal
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
MGM	million gallons per month
MGY	million gallons per year
MWd/MTU	megawatt days per metric ton of uranium
MWe	megawatts electric
MWt	megawatts thermal
NAAQS	national ambient air quality standards
NEDA	NextEra Energy Duane Arnold, LLC
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
ODCM	Offsite Dose Calculation Manual
OL	operating license
OSHA	Occupational Safety and Health Administration
pCi/L	picocuries per liter
PFC	perfluorocarbon
PM_{10}	particulate matter coarse
PWS	public water supply

Q	quarter of a calendar year
RCRA	Resource Conservation and Recovery Act
REMP	Radiological Environmental Monitoring Program
RFOL	renewed facility operating license
ROW	right-of-way
SAMA	severe accident mitigation alternative
SEIS	Generic Environmental Impact Statement for License Renewal of Nuclear Plants Supplement 42 Regarding Duane Arnold Energy Center
SF_6	sulfur hexafluoride
SFP	spent fuel pool
SHPO	Iowa State Historic Preservation Officer
SLR	subsequent license renewal
SO_2	sulfur dioxide
SPCC	spill prevention, control, and countermeasures
SSCs	structures, systems, and components
SWPPP	stormwater pollution prevention plan
U.S.	United States
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
UV	ultraviolet
VOC	volatile organic compound
VSQG	very small quantity generator

1.0 INTRODUCTION

NextEra Energy Duane Arnold, LLC (NEDA) is seeking authorization to refuel and resume power operations at Duane Arnold Energy Center (DAEC) Unit 1. Specifically, NEDA is requesting exemption from portions of 10 Code of Federal Regulations (CFR) 50.82, Termination of license, paragraph (a), subparagraph (2), 10 CFR 50.82(a)(2), for DAEC. The exemption allows for resumption of power operations at DAEC after United States (U.S.) Nuclear Regulatory Commission (NRC) approval of license amendments necessary to reinstate DAEC's renewed facility operating license (RFOL) power operations licensing basis. NEDA understands that the NRC plans to conduct an environmental review pursuant to its obligations under the National Environmental Policy Act (NEPA) and prepare an Environmental Assessment (EA). As requested by the NRC pursuant to 10 CFR Section (§) 51.41, NEDA prepared this Environmental Report (ER) to provide information useful to the NRC in preparing an EA for the proposed action. Once resumption of power operations is approved, DAEC plans to transition from a facility in SAFSTOR status back to an operating power plant for the remainder of the operating term granted in the 2010 RFOL (i.e., until February 21, 2034). (NEDA 2025a; NRC 2010a)

1.1 Proposed Action

The proposed action is approval of NEDA's request for exemption from 10 CFR 50.82 and related license amendment requests (LARs) to update the facility license and technical specifications to restore the power operations licensing basis, and reinstate DAEC's physical security plan, cyber security plan, and emergency plan and emergency action levels for an operating reactor, which collectively support refueling and reauthorizing power operations at DAEC.

1.2 Purpose of and Need for Proposed Action

The purpose of and need for the proposed action, which enables refueling and reauthorization of power operations at DAEC, is to provide an option that allows for baseload clean energy power generation capability of approximately 610 megawatts electric (MWe) between the fourth quarter (Q4) of 2028 through the remainder of DAEC's RFOL term, to meet the unprecedented increase in electrical demand driven by commercial and industrial customers.

The Governor of Iowa has committed to an all-of-the-above energy strategy to meet growing demand. Among the strategies in her plan is the creation of a Nuclear Energy Task Force to make recommendations about adding nuclear to expand the state's energy portfolio (Nuclear Newswire 2025).

Beyond the need to support artificial intelligence infrastructure established in national policy and Iowa emerging energy policy, the need for more electrical power to meet demand is predicted by the North American Electric Reliability Corporation. Emerging trends in demand beyond the forecast have the potential to impact future reliability over the next 10 years (2025–2034) and

beyond. The growing demand from large load facilities like data centers and industrial facilities presents particular challenges for electricity reliability. For example, data centers operate continuously and have substantial heating and cooling requirements compared to typical commercial buildings. When large load facilities are added to the electrical system, they create additional complexity in predicting both peak demand periods and hourly consumption patterns. (NERC 2024)

1.3 Alternatives

1.3.1 No-Action Alternative

The purpose and need for the proposed action is presented in Section 1.2. The proposed action is anticipated to supply approximately 610 MWe for this purpose, beginning in Q4 2028, as noted in Sections 1.2 and 2.1. A reasonable alternative is one that is technically and economically feasible and meets the purpose and need of the proposed action, including the electrical generating capacity and availability date.

As discussed in Section 1.2, one purpose for the proposed action is to provide an option for clean energy baseload power generation from a projected resumption of power operations in Q4 2028. Given the Q4 2028 availability date, development of new generation sources is unlikely if not infeasible. In addition, new transmission capacity may be required to distribute electricity from existing generation sources and new generation sources. The timeline for availability being Q4 2028 also challenges the ability to develop additional transmission capacity. In the absence of new generation, power needs could be offset by instituting energy conservation and efficiency measures (demand side management), delaying the scheduled retirement of one or more existing power plants, or purchasing an equivalent amount of power from other energy suppliers.

In the 2024 License Renewal Generic Environmental Impact Statement (GEIS), the NRC examines the potential for conservation and energy efficient programs to provide power replacement. The NRC indicated, that while the energy conservation/energy efficiency potential in the United States is substantial, the NRC staff is not aware of any cases where demand-side management programs have been implemented expressly to replace/offset a large, baseload generating resource. (NRC 2024a)

Aside from the resumption of power operations at DAEC, the alternative option of delayed retirement/reactivation is anticipated to involve a fossil-fuel plant, such as a coal plant slated for closure. Reactivation of, or extended operation of, a fossil fuel plant is expected to result in much higher criteria air pollutant emissions, including greenhouse gases (GHGs), as compared to the operation of a nuclear power plant. (NRC 2024a) As noted in Section 1.2, continuing to operate traditional fossil fuel plants is counter to the goal set by the Iowa Environmental Council of 100 percent clean power generation by 2035.

As indicated in the GEIS, coal, natural gas, and nuclear-fueled power plants have historically been the most prevalent sources of baseload purchased power, though an increasing number of

renewable energy sources are emerging as viable options. As such, the effects of deploying offsetting alternatives, such as purchased power, are likely to be similar to the effects of operating a combination of alternative electrical energy-generating technologies. NRC examined the environmental impacts of operating these energy sources in the GEIS. (NRC 2024a)

The NRC assessed a range of alternatives to continuing operations at an existing nuclear power plant in the GEIS (NRC 2024a). NEDA concludes that the environmental impacts under the no-action alternative are not expected to be substantially different from those identified in the GEIS and do not represent an environmentally preferable alternative to resuming power operations at DAEC.

System alternative analysis generally focuses on cooling options. NEDA operations are expected to continue using a closed-cycle recirculating cooling system determined to be the best technology available for minimizing impingement and entrainment impacts (40 CFR 125). Therefore, system alternatives for resuming operations at DAEC are not warranted.

2.0 PLANT DESCRIPTION AND SUMMARY OF RESTART ACTIVITIES

2.1 Plant Description

2.1.1 Site Location and Description of Duane Arnold Energy Center

DAEC is located in Linn County, Iowa, approximately 2.5 miles northeast of the Village of Palo and about 8 miles northwest of Cedar Rapids. The site occupies approximately 500 acres along the west bank of the Cedar River. The surrounding land use is primarily agricultural and residential. (NEDA 2021a)

The site lies at an approximate elevation of 750 feet above mean sea level. The terrain is generally flat with gradual slopes toward the Cedar River (NEDA 2021a). The plant's exclusion area boundary is defined by the site property line, which lies approximately 2,000 feet from the reactor centerline at its nearest point. DAEC is bounded by a 6-mile low-population zone consistent with NRC siting regulations. (NEDA 2021a)

DAEC features a single boiling water reactor (BWR) licensed to operate at a thermal power output of 1,912 megawatts thermal (MWt), corresponding to a gross electrical output of approximately 610 MWe, prior to permanent cessation of operations in August 2020 (NEDA 2021a; FPL 2008). These values are expected to remain unchanged under restart conditions.

Figure 2.1-1 illustrates the location of DAEC relative to nearby communities, transportation corridors, and water bodies. Figure 2.1-2 shows the site layout, including major plant systems and support facilities. Figures 2.1-3a and 2.1-3b present two preliminary transmission line configuration options identified for interconnection of DAEC with the electrical grid under restart and subsequent license renewal (SLR) scenarios. Each option reflects different voltage levels (161 kilovolts [kV] or 345 kV), and routing alignments evaluated for feasibility and construction impact. These figures represent planning-level configurations and do not indicate a final selected route.

Table 2.1-1 summarizes key facility information, including reactor type, licensing status, and power output. Additional details on systems and components are provided in Section 2.1.2.

Table 2.1-1 Facility Overview Summary

Plant Name	Duane Arnold Energy Center
License Number	DPR-49
Reactor Type	BWR 4
Thermal Power Rating	1,912 MWt
Gross Electrical Output	Approximately 610 MWe
Site Acreage	Approximately 500 acres

(NEDA 2021a; FPL 2008)

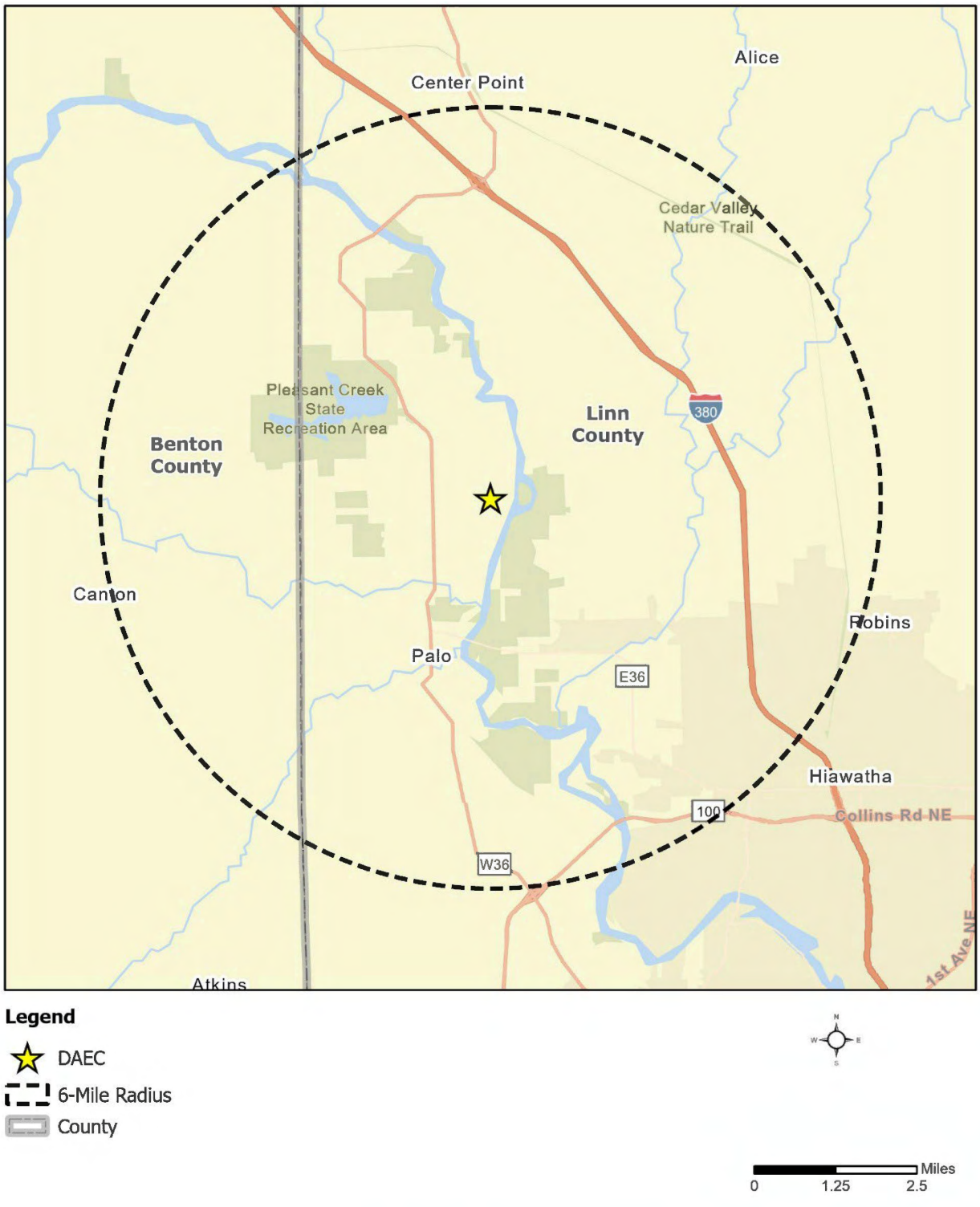

Figure 2.1-1 DAEC Vicinity

2.1.2 Reactor Design and Plant Systems

DAEC was originally designed as a single-unit BWR with a Mark I containment system. The reactor was supplied by General Electric, and the nuclear steam supply system includes a reactor pressure vessel, control rod drive systems, recirculation loops, and associated safety and support systems (FPL 2008). The turbine generator, standby diesel generators, plant heating boiler, and other associated auxiliaries are located in the Turbine Building, a reinforced-concrete and steel structure adjacent to the Reactor Building (NEDA 2021a).

The major safety-related systems include the emergency core cooling system, reactor protection system, and engineered safety features. These systems are designed to provide safe shutdown capabilities, mitigate design-basis accidents, and ensure the integrity of the fuel and containment structures (NEDA 2021a). Radiological effluent monitoring systems, including both gaseous and liquid effluent pathways, are designed to comply with regulatory dose limits and operate in accordance with DAEC's Offsite Dose Assessment Manual (NEDA 2021a).

Structures, systems, and components (SSCs) required for restart have been assessed for their condition, with planned replacements integrated into the restart strategy. Table 2.1-2 summarizes the operational status of major systems and structures that support plant restart and safe operation.

Transmission of electrical power from DAEC is facilitated by onsite switchyards and interconnections with the regional grid. Because the original plant-to-switchyard connections were removed following shutdown, new onsite transmission infrastructure is required to support resumption of operations. The potential use of either 161 kV or 345 kV transmission configurations has been proposed and is depicted in Figures 2.1-3a and 2.1-3b. Additional discussion of these configurations is provided in Section 2.2.3.

Table 2.1-2 Operation Status of Major Systems and Structures at DAEC (Sheet 1 of 4)

Structure/System	Status	Notes
Reactor Building	Maintained and Accessible	Reinforced concrete structure housing the primary containment, reactor systems, and the spent fuel storage facility (spent fuel pool [SFP]). Fuel-handling systems and structures associated with the SFP are located within the Reactor Building. The SFP contains no fuel following transfer of all spent fuel to the Independent Spent Fuel Storage Installation (ISFSI). (NEDA 2021a; NEDA 2023a)
Turbine Building	Maintained and Accessible	Reinforced concrete and steel structure housing turbine-generator and secondary systems and the emergency diesel generators within a seismically protected portion of the building. Portions of systems are expected to be evaluated and potentially restored during restart preparation. Portions of the electrical distribution system, including the electric power system, remain energized to support monitoring and security. (NEDA 2021a)
Control Building	Maintained and Accessible	The control building remains intact and includes the main control room and plant administrative areas. Portions of the electrical distribution system within the building remain energized to support site monitoring, radiation protection systems, and security functions. (NEDA 2021a)

Table 2.1-2 Operation Status of Major Systems and Structures at DAEC (Sheet 2 of 4)

Structure/System	Status	Notes
Independent Spent Fuel Storage Installation (ISFSI)	Maintained and Actively Used	The ISFSI provides dry cask storage for all spent nuclear fuel previously stored in the SFP. As of April 2022, all spent fuel assemblies were permanently transferred to the ISFSI, and the SFP does not contain fuel. The ISFSI remains actively used and continues to meet applicable regulatory requirements. (NEDA 2023a)
Electric Power Systems	Maintained	The electric power system remains energized to provide dependable power for long-term facility needs. It supports safety-related systems, environmental monitoring, and building functions. NEDA plans to validate functional emergency components, such as diesel generators and associated switchgear, to support potential restart. (NEDA 2023a)
Radwaste Building	Maintained	The Radwaste Building remains structurally intact and continues to support low-level radioactive waste (LLRW) management. Waste handling systems are maintained in accordance with applicable procedures, and limited storage of LLRW continues. The building and systems are in a condition that supports restart licensing and potential operational resumption. Individual radwaste systems are shielded and separated to reduce exposure during maintenance activities, and the surrounding areas are adequately shielded. (NEDA 2023a)

Table 2.1-2 Operation Status of Major Systems and Structures at DAEC (Sheet 3 of 4)

Structure/System	Status	Notes
Plant Utility Systems (Service Water, Demin Water, Compressed Air)	Partially Operational	Portions of the utility systems remain partially maintained or energized to support limited site functions. The essential service water system is deactivated, and site water needs are supported by onsite wells. Compressed air and other utility systems may be available to support maintenance or restart preparation. (NEDA 2023a)
Radioactive Waste Management Systems	Deactivated (LLRW and LLMW Systems), ISFSI Active	The Low-Level Radwaste Processing and Storage Facility (LLRPSF) is preserved and contains mixed waste lanes and available storage. LLRW and low-level mixed waste (LLMW) processing systems are currently deactivated but are expected to be reactivated to support restart operations. (NEDA 2023a)
Water Systems (Service/Essential/Condensate)	Partially Maintained	The condensate and essential service water systems are deactivated. Potable and sanitary water is supplied from onsite wells and treated as needed. (NEDA 2023a)
Ventilation and Heating, Ventilation, and Air Conditioning (HVAC) Systems	Partially Maintained	Select HVAC systems are maintained to support the ISFSI, maintain building integrity, and support radiation protection and monitoring during SAFSTOR. The Radwaste Building and Control Build HVAC systems remain energized. (NEDA 2023a)
Fire Protection Systems	Maintained	The fire protection system remains operable and is actively maintained under the station's Fire Protection Program to ensure compliance with regulatory and safety requirements during SAFSTOR and in support of the ISFSI. (NEDA 2023a)

Table 2.1-2 Operation Status of Major Systems and Structures at DAEC (Sheet 4 of 4)

Structure/System	Status	Notes
Security Systems	Maintained	Physical security systems, including access controls and surveillance, are maintained to protect the site, including the spent fuel storage facilities in accordance with NRC security requirements. (NEDA 2023a)
Switchyard and Offsite Power Systems	Maintained	The onsite switchyard remains energized. Existing 161 kV and 345 kV transmission tie-ins remain in place.
Control Room	Maintained	The control room remains in place and continues to support monitoring and surveillance functions. (NEDA 2023a)
Cooling Tower and Circulating Water System	Deactivated	The circulating water system and cooling towers are currently deactivated. Most restart activities are expected to rely on groundwater, but Cedar River water is expected to be used to test the circulating water system and cooling towers. The replacement cooling tower design is not yet finalized.
Liquid and Gaseous Waste Systems	Deactivated	The liquid and gaseous radwaste systems are no longer operational but remain intact. The systems are preserved for future use and are currently used for post-release sampling and monitoring. Gaseous effluents are discharged through the offgas stack and vents from the LLRPSF, reactor turbine, and radwaste buildings. Samples are collected and analyzed in accordance with the Offsite Dose Calculation Manual (ODCM). These systems are anticipated to require full testing and potential upgrades prior to restart. (NEDA 2023a)

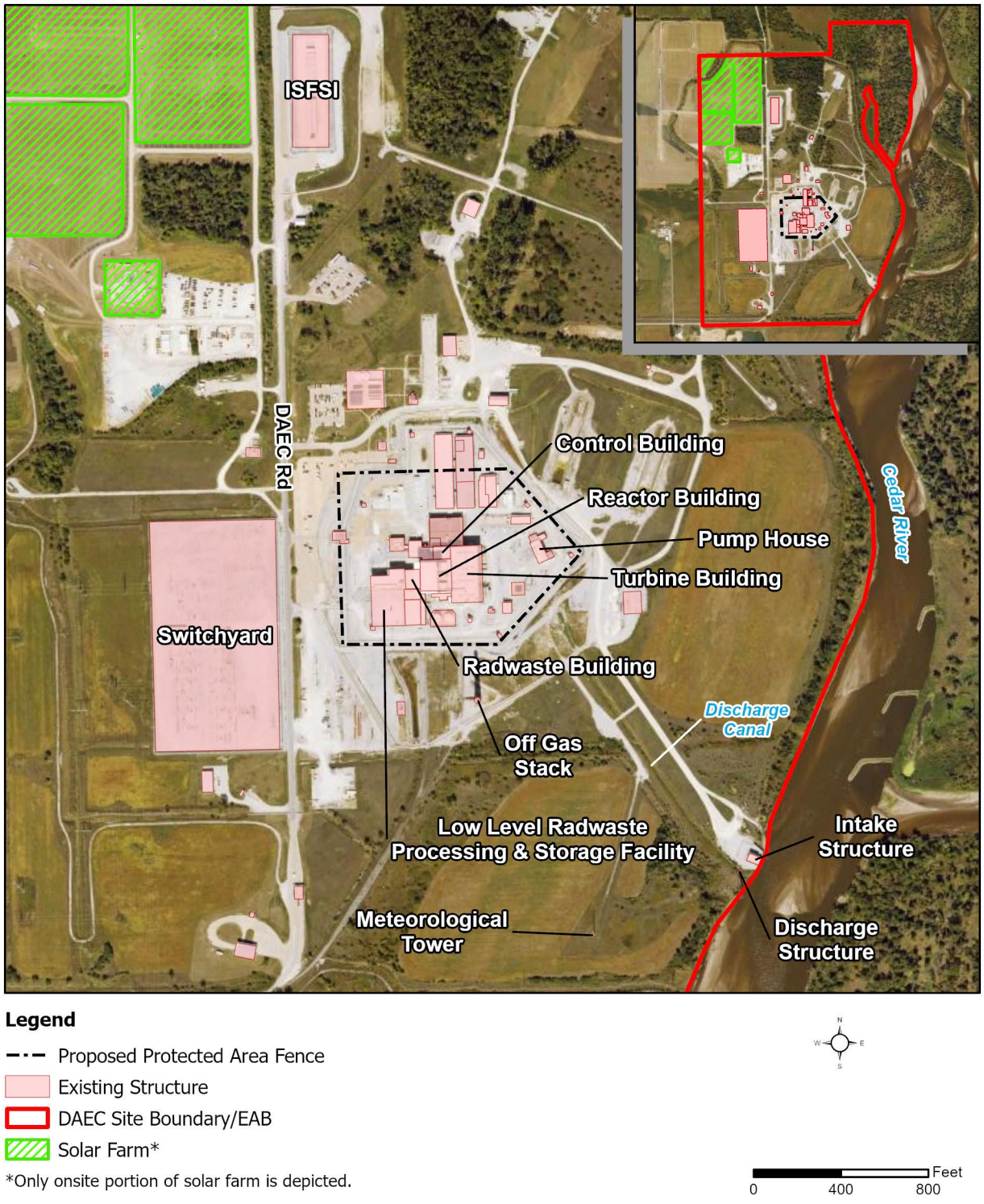

Figure 2.1-2 DAEC Site Layout

2.1.3 Licensing History

The licensing history for DAEC is summarized in Table 2.1-3 and further details are presented in the following discussion.

NEDA, Central Iowa Power Cooperative, and Corn Belt Power Cooperative applied for an operating license (OL) renewal in 2008 (FPL 2008). NRC reviewed the license renewal (LR) ER and issued Generic Environmental Impact Statement for License Renewal of Nuclear Plants Supplement 42 Regarding Duane Arnold Energy Center (SEIS) in October 2010. The SEIS assessed the environmental impacts of continuing to operate DAEC through February 21, 2034. (NRC 2010b) NRC granted a RFOL on December 16, 2010, with a license expiration of February 21, 3034. The RFOL authorized the facility to operate steady state reactor core power levels not in excess of 1,912 MWt (NRC 2010a).

Due to severe windstorm damage and market conditions, the reactor was shut down for retirement on August 10, 2020 (NRC 2025). NEDA certified to NRC that as of October 12, 2020, all fuel has been permanently removed from DAEC's reactor vessel and placed in the SFP (NEDA 2020a). As stated in 10 CFR 50.82(a)(2), upon docketing the certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel, the 10 CFR Part 50 license for DAEC no longer authorizes operation of the reactor emplacement or retention of fuel into the reactor vessel.

On January 23, 2025, NEDA announced its intent to pursue restoration of DAEC for commercial service. In support of this effort, NEDA submitted a request for exemption from certain license termination requirements under 10 CFR 50.82, formally notifying the NRC of its plan to return DAEC to power operation (NEDA 2025a; NEDA 2025b). Prior to permanent cessation in 2020 due to windstorm damage and economic conditions, DAEC generated approximately 610 MWe of clean, reliable electricity (NRC 2010b).

NEDA's licensing action requesting an exemption from 10 CFR § 50.82(a)(2) is expected to allow for a one-time rescission of the docketed 10 CFR § 50.82(a)(1) certifications submitted on August 27, 2020, and October 12, 2020. The exemption requests the removal of the current restrictions that prohibit operation of DAEC's reactor or emplacement/retention of fuel into DAEC's reactor vessel. The exemption is expected to allow NEDA to resume power operations at DAEC after the NRC approves the plant restoration, licensing actions, and programmatic restoration activities necessary to reinstate DAEC's RFOL. (NEDA 2025c)

NEDA submitted several licensing actions designed to reduce the regulatory footprint commensurate with the reduced risk of a shutdown and defueled plant. In Q4 2025, NEDA expects to submit a LAR to request restoration of the Operating License and Technical Specifications to the previously approved state at the time of shutdown and accounting for NEDA's projected future requirements for design and/or licensing basis attributes. NEDA also expects to submit two separate LARs in Q4 2025 to restore the Physical Security Program in accordance with 10 CFR § Part 73 and DAEC's Emergency Preparedness Program in accordance with 10 CFR § 50.47. (NEDA 2025a)

Table 2.1-3 Licensing Actions Summary

Operating License Renewed Date	December 16, 2010
Operating License Renewal Expiration	February 21, 2034
Shutdown Date	August 10, 2020
Certification of Permanent Cessation of Operations and Permanent Removal of Fuel	October 12, 2020
Request for Exemption from 10 CFR 50.82(a)(2)	January 23, 2025
LARs to restore Operating License, Technical Specifications, Physical Security and Emergency Preparedness Programs	Projected Q4 2025

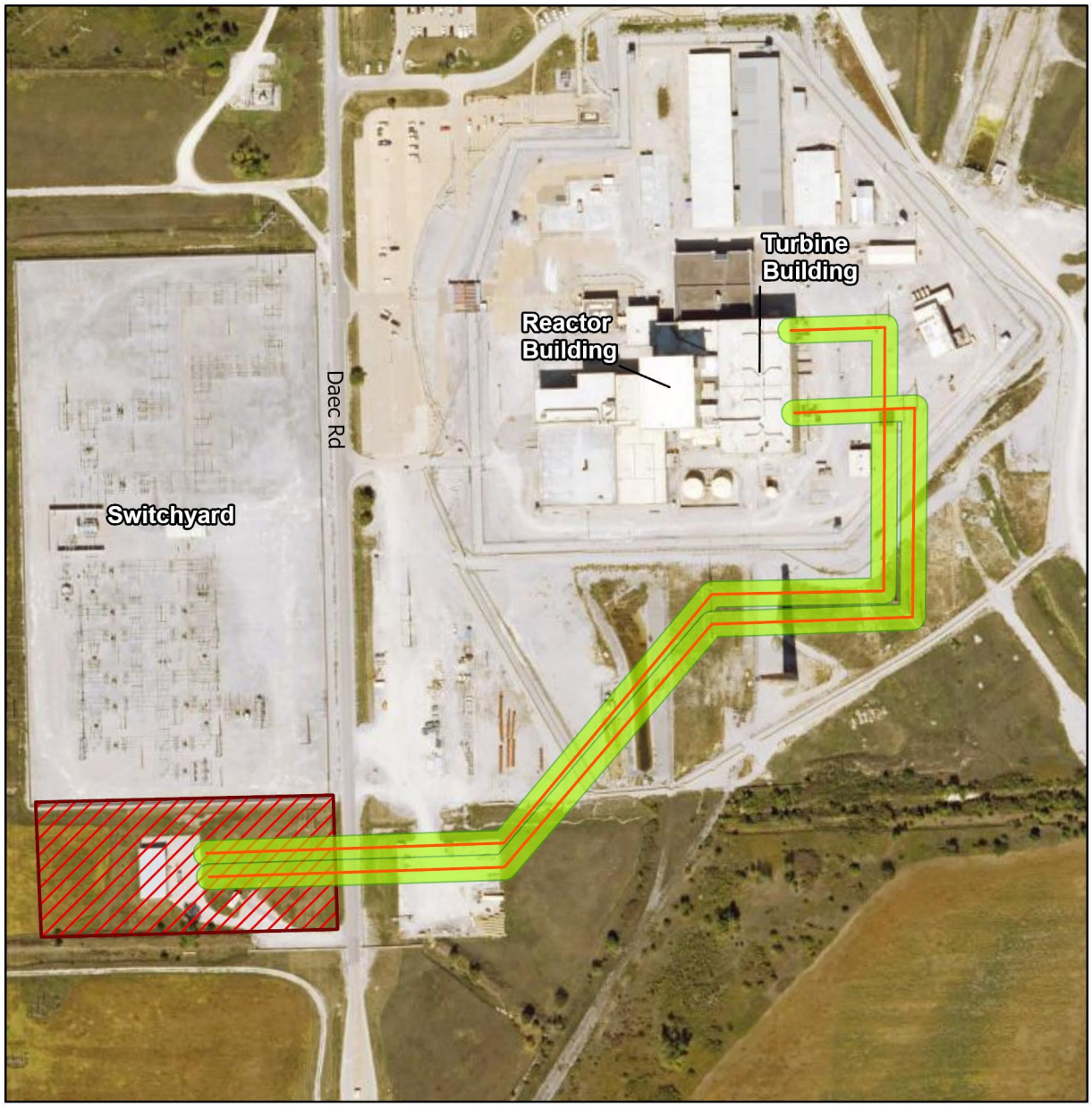

Figure 2.1-3a Preliminary DAEC Transmission Line Configuration Option 1

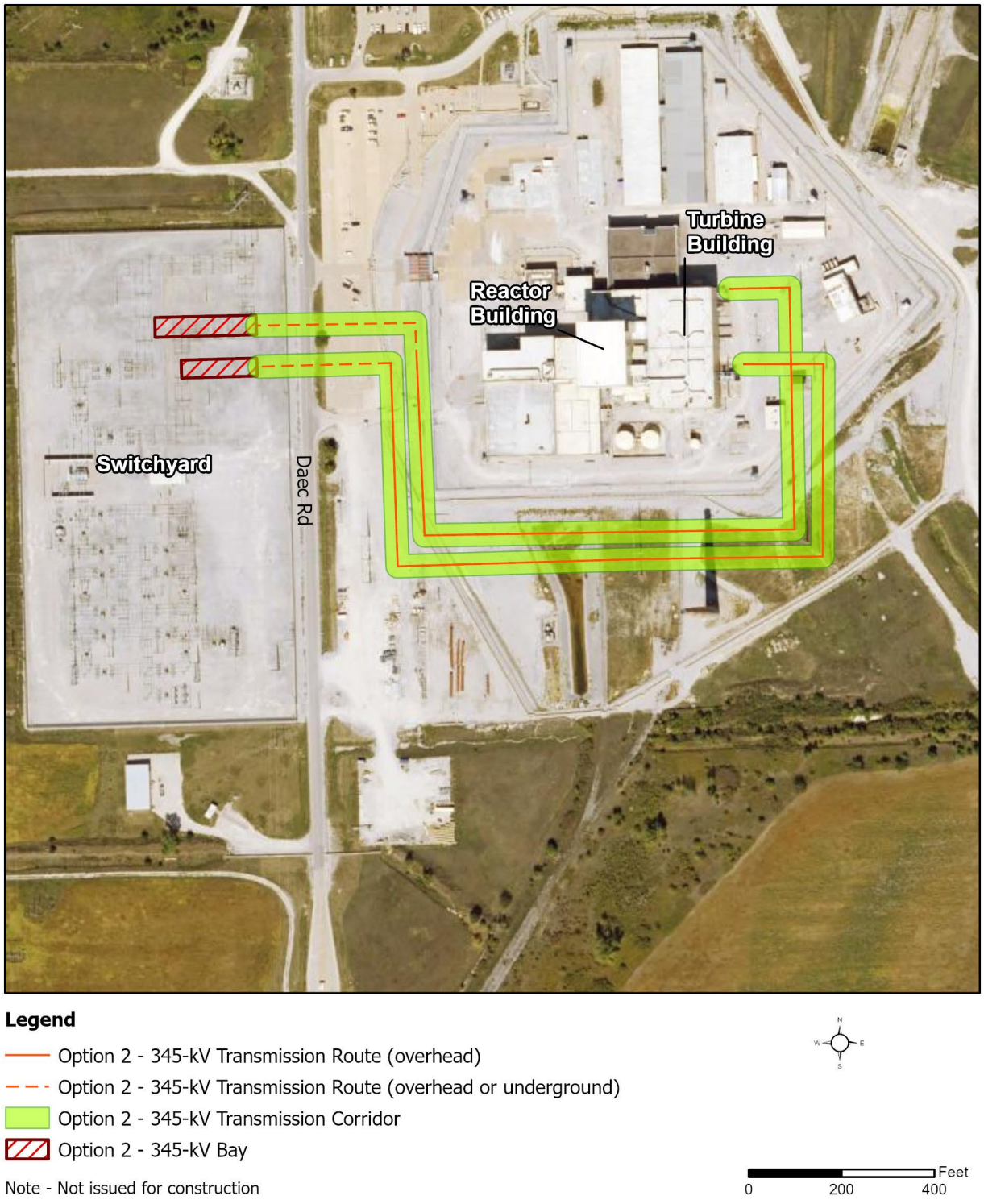

Figure 2.1-3b Preliminary DAEC Transmission Line Configuration Option 2

2.2 Summary of Restart Activities

NEDA is seeking authorization to resume power operations at DAEC. The proposed action is approval of NEDA's request for exemption from 10 CFR 50.82 and related LARs to update the facility license and technical specifications to restore the power operations licensing basis, and reinstate DAEC's physical security plan, cyber security plan, and emergency plan and emergency action levels for an operating reactor, which collectively support refueling and reauthorizing power operations at DAEC.

2.2.1 Preparation for Resumption of Power Operations

Following the cessation of power operations, DAEC completed initial activities to transition the facility into SAFSTOR. These activities included defueling the reactor and transferring fuel into the SFP; draining fluids and de-energizing systems; reconfiguring the electrical distribution, ventilation, heating, and fire protection systems; and minor deconstruction activities. The main power block buildings, including the reactor building, control building, turbine building, pumphouse, river intake structure, and radwaste building, remain intact. Some support structures such as external office buildings and some maintenance facilities have been removed. Large transformers and the non-safety cooling towers have also been removed. (NEDA 2025b) As shown in Figure 2.1-1, the locations of potential construction at DAEC are mostly limited to previously disturbed land within the operational area. Also shown in Figure 2.1-1, DAEC has sufficient area onsite that has been previously disturbed (due to construction or operations activities) upon which to conduct restart activities. The status of major systems and structures at DAEC is outlined in Table 2.1-2.

To facilitate plant restoration, NEDA has started a comprehensive evaluation to assess the status of plant systems. This process begins with a review of the system diagrams, past work orders, shutdown planning documents, and maintenance procedures. A walkdown is then performed which includes validation of equipment installed, assessment of the equipment condition, and inspection for signs of degradation. From this, work orders are created to ensure the equipment is restored to operational status. Proactive equipment upgrades to address obsolescence and ensure reliability are also expected to be conducted. NEDA's restart readiness plan includes performance of preventative maintenance tasks and technical specification surveillances to make them current. (NEDA 2025a)

Plant SSCs are expected to be tested and maintained to support technical specification operability and licensing basis functionality. Plant systems where configuration control was not maintained during shutdown are anticipated to be included in a return-to service plan. (NEDA 2025b) Activities for the resumption of power operations are expected to include construction of several new buildings, restoration, upgrades, and maintenance occurring within already disturbed areas.

NEDA initiated its evaluation process and has developed a staffing plan that is expected to gradually increase site and fleet staff to support inspections, renovations, and the proposed startup and operations (NEDA 2025b).

Pending receipt of required NRC approvals authorizing refueling and resumption of power operations, NEDA expects to initiate work activities to resume power operations in 2028. The preparation activities are anticipated to restore DAEC to its previous OL condition in 2020 in accordance with NRC's authorization. (NEDA 2025a)

Required programs and operational procedures are expected to be reinstated to support power operations, including the Quality Assurance Program, Inservice Inspection Program, and Emergency Operating Procedures, among others. In addition to the environmental work associated with NRC licensing activities, NEDA anticipates working with other state and federal agencies to obtain environmental permits and reviews as necessary to restore DAEC to power operations. (NEDA 2025c)

NEDA expects the number of employees required at DAEC for resumed power operations and outages to be similar to the operations and outage workforces in 2019. The restart and construction workforce are expected to be similar to the typical, previous outage workforce but for a longer duration.

NEDA maintained the processes and procedures for radwaste, non-radwaste, and mixed waste used at DAEC and expects to continue to use these for preparation activities and resumed power operations.

The traffic due to worker commuting and deliveries and shipments anticipated for preparation activities is expected to be comparable to previous power operations inclusive of outages. Deliveries and shipments are expected to be by road via County Road 36 and DAEC Road. The rail spur to DAEC connects to the south of the property; DAEC may utilize rail for shipments.

For consideration of environmental impacts, the timeframe of preparation activities from 2025 through Q4 2028. This timeframe considers planning and inspection activities occurring in 2025, implementation of specific work activities required to return the SSCs to service, as well as activities necessary to support NRC-approved amended licensing up to the resumption of power operations in Q4 2028.

2.2.2 Resumption of Power Operations

Return to operations is projected for Q4 2028. The operations term for this proposed action is through the expiration date of the RFOL, which is February 21, 2034 (NEDA 2025c). NEDA proposed to operate DAEC as the plant was operated prior to shut down in 2020, having restored it to previous OL condition, with NRC-approved amended license conditions. (NEDA 2025a) There are no expected changes to environmental interfaces, new sources, or environmental emissions/effluents, or significant changes in volumes/mass of environmental emission or effluents compared to plant operations prior to the 2020 shutdown.

2.2.3 Environmental Interfaces

DAEC systems interface with the surrounding environment through various engineered pathways, monitoring systems, and physical infrastructure. These interfaces are designed to support plant operations while minimizing environmental impacts and complying with applicable regulatory requirements.

Gaseous and liquid effluents are monitored and controlled in accordance with the Offsite Dose Assessment Manual and applicable NRC regulations. Radiological effluent monitoring systems are designed to comply with dose limits and ensure protection of public health and the environment (NEDA 2023a). No substantive changes to the Radiation Protection Program or the Radiological Environmental Monitoring Program (REMP) are planned for restart; however, REMP sampling is anticipated to resume using the 2020 sampling revision two years prior to resuming power operations. Section 3.8 provides additional discussion of REMP data, sampling methodology, and public dose assessments.

DAEC uses surface water from the Cedar River to support plant operations. The site holds a National Pollutant Discharge Elimination System (NPDES) permit, and a surface water withdrawal permit from the Iowa Department of Natural Resources (DNR), which includes provisions for protected river flow and withdrawal limits. During power operations (2015–2020), DAEC adhered to these limits. Water withdrawn from the Cedar River is discharged under permitted conditions, and effluent from Outfall 002 is monitored for compliance with limits for E. coli and nutrients, which DAEC has maintained.

The sewage treatment system at DAEC consists of a sequencing batch reactor with chlorine disinfection. During restart activities, the system is anticipated to be upgraded to ultraviolet (UV) light disinfection. DAEC does not plan to connect to municipal sewer or water supplies.

DAEC's groundwater protection program (GWPP) ensures groundwater safety through monitoring, evaluation of spills or leaks, and reporting. No recovery or injection wells are present, and no such activities are planned. Plume modeling and historical investigations have been conducted in accordance with administrative control procedures and are referenced in the GWPP documents. Section 3.2 provides the narrative for groundwater use and protection.

DAEC previously operated mechanical draft cooling towers. These systems are expected to be replaced prior to restarting with new towers that are anticipated to perform similarly to the original systems. Cooling tower consumption volumes and operational parameters are expected to remain within historical bounds. No historical shutdowns were triggered by river temperatures or discharge conditions. Additional details on cooling tower operation and water use are provided in Section 3.2.

Stormwater management systems are compliant with site permits and include inspection and maintenance procedures for bermed and diked areas. Wastewater discharges related to restart are not expected to differ substantially from prior operational discharges. NEDA anticipates

maintaining compliance with applicable Clean Water Act (CWA) provisions through its NPDES permit and internal controls.

Transmission of electrical power from DAEC is facilitated via onsite switchyard and interconnections to the regional grid. The current design includes options for either 161 kV or 345 kV lines from the generating unit to the switchyard, both of which are depicted in Figures 2.1-3a and 2.1-3b. These configurations are under evaluation, and their final routing considers electrical safety and compliance with National Electrical Safety Code (NESC) provisions. Transmission infrastructure is located within the site boundary and does not traverse publicly accessible areas.

DAEC maintains systems for managing both radiological and nonradiological waste. Mixed waste systems and LLRW are currently deactivated but structurally preserved, with procedures in place to support restart. Waste vendors are not currently under contract and are expected to be procured prior to operations resuming. Nonradiological waste management – including hazardous waste, sanitary waste, and stormwater runoff – is managed in compliance with applicable regulations. NEDA has confirmed the absence of active landfills on site; previously used landfill areas are not anticipated to be reopened during restart.

2.2.4 Status of Other Authorizations

This section describes the federal, state, and local environmental permits currently held by DAEC that are anticipated to be required to support preparations for resumption of power operations and resumption of power operations. Authorizations in this context include licenses, permits, approvals, or other entitlements necessary for facility operation, environmental compliance, or infrastructure modifications.

NEDA has identified permits and approvals that are either currently active, administratively continued, or expired but expected to be renewed as part of the restart effort. As applicable, DAEC environmental compliance staff are responsible for ensuring conformance with permit requirements, including monitoring, reporting, recordkeeping, and compliance with stated conditions and limits.

Table 2.2-1 provides a list of active environmental permits, regulatory authorities, expiration dates (if known), and authorized activities in the current shutdown state. The following permits are active but are not provided in Table 2.2-1 since they are not required for current activities, preparations for resumption of power operations, or for resumption of power operations.

- Linn County air permits (Permit Nos. 4868, 4869, and 4870) for the sulfuric acid tank and two underground storage tanks (USTs). These tanks are exempt per Iowa Administrative Code (IAC) 567 Chapter 135.1c(3) and the permits are not expected to be renewed.
- DNR stormwater general construction permit (Permit No. 10458) for the security training range. NEDA mistakenly renewed this permit in 2021; it is not required for current or planned activities at DAEC.

Activities planned in preparation for resumption of power operations are described in Section 2.2. NEDA intends to apply for new permits or to reinstate expired permits, registrations, and/or other authorizations to support activities that are expected to be required for preparations for resumption of power operations and/or resumption of power operations; a preliminary list of these required authorizations is provided in Table 2.2-2. In addition to the authorizations listed in Table 2.2-2, NEDA plans to apply for state and local permits required for proposed building demolition, new building construction, and roadway improvements.

The new cooling towers are not subject to federal emission standards under New Source Performance Standards or National Emission Standards for Hazardous Air Pollutants and therefore are exempt from major Title V permitting. NEDA is evaluating whether a local Linn County permit is needed for the cooling towers. NEDA expects the new towers to be built using good engineering practices and are expected to have similar flows as the previous towers.

Table 2.2-1 Environmental Authorizations for Current DAEC Operations

Agency	Authority	Requirement	Number	Expiration Date	Authorized Activity
NRC	Atomic Energy Act [10 CFR Part 50]	RFOL	NPF-30	February 21, 2034	Operation of DAEC
DNR	CWA Section 402 b Iowa Code 455B 174, IAC 567-64.3	NPDES Individual permit	Iowa NPDES Permit No. 5700104 EPA No. IA0003727	February 28, 2027	Authorizes discharge of wastewater to the Cedar River during the current shutdown state
DNR	Iowa Code 455B 261-274, IAC 567 50-51	Water Use Permit	3046-R7	June 30, 2032	Withdrawal of surface water and groundwater
DNR U.S. Environmental Protection Agency (EPA)	IAC 567:120-123 40 CFR Parts 260-273 (RCRA Subtitle C)	Hazardous waste generation	IAD984566133	N/A	Registers DAEC as a very small quantity generator (VSQG) of hazardous waste with the DNR and EPA in accordance with state regulations and federal requirements under Resource Conservation and Recovery Act (RCRA) Subtitle C.
Iowa Department of Public Health (IDPH) – Bureau of Radiological Health	IAC Chapter 136C; IAC 641 Chapter 39	Radioactive Material License	03011809-02	March 31, 2029	Authorizes possession, use, and storage byproduct, source, and special nuclear material in accordance with NRC Agreement State Regulations

Table 2.2-2 Environmental Authorizations for Preparations for and/or Resumption of DAEC Operations (Sheet 1 of 3)

Agency	Authority	Requirement	Authorized Activity	Status of Compliance
DNR	Iowa Code 455B	Sewage treatment construction permit	Construction permit to add UV treatment to the sewage treatment system	Sewage treatment system currently out of service. NEDA plans to apply for a construction permit if UV treatment is added.
DNR	Iowa Code 455B IAC 567:50-51	Public water supply (PWS) operation permit	Permits the potable water system and its operation	Inactive. NEDA plans to reactivate the PWS operation permit to support resumption of power operations. NEDA plans to use a temporary potable water system to serve individual buildings until the former potable water system is restored.
DNR	Iowa General Permit No. 1	Industrial stormwater discharges	Stormwater discharges associated with industrial activity	NEDA plans to submit a notice of intent for coverage under Iowa's NPDES General Permit No. 1 prior to resumption of power operations.
U.S. Department of Transportation (DOT)	49 USC 5108	Hazardous materials certification of registration	Hazardous materials shipments	Expired. NEDA plans to renew the registration prior to resumption of power operations.
IDPH - Bureau of Radiological Health	Iowa Code 136C; IAC 641 Chapter 39	Radioactive waste license; Radioactive waste transportation service license	State-issued licenses to store and transport LLRW	Expired. NEDA expects the licenses to be reinstated prior to resumption of power operations.

Table 2.2-2 Environmental Authorizations for Preparations for and/or Resumption of DAEC Operations (Sheet 2 of 3)

Agency	Authority	Requirement	Authorized Activity	Status of Compliance
DNR	Iowa Code 455B 261-274	NPDES permit modification/renewal application	Authorize cooling tower blowdown and low-volume wastewater discharges	Current NPDES permit reflects shutdown conditions; NEDA plans to submit NPDES modification/renewal application by the second quarter of 2026.
U.S. Army Corps of Engineers (USACE) DNR Linn County	CWA Section 404 River & Harbors Act (33 USC 403) Iowa Code 455B and 567 IAC Chapters 61 and 64	Dredging permits	Federal, state, and local permits required to dredge the intake structure	Expired. NEDA plans to submit dredging permit applications in late 2025 to early 2026.
DNR	CWA Section 401	Water quality certification	Certifies that federally permitted activities (e.g., dredging or modifications to the intake/discharge structures) comply with Iowa water quality standards. Required in support of the USACE Section 404 dredging permit.	NEDA plans to submit a water quality certification application in support of USACE Section 404 dredging permit.

Table 2.2-2 Environmental Authorizations for Preparations for and/or Resumption of DAEC Operations (Sheet 3 of 3)

Agency	Authority	Requirement	Authorized Activity	Status of Compliance
Linn County Health Department (LCHD)	Iowa Code 455B IAC 567 Chapter 22; Linn County Code Chapter 10, Article III	Air quality construction permit	Authorize installation and operation of air emission sources, including an auxiliary boiler, emergency diesel generators, fire pump, and minor support sources	NEDA plans to submit permit applications prior to resumption of power operations in accordance with DNR Chapter 22 air quality construction permit requirements.
LCHD	Clean Air Act (CAA), Iowa Code 455B:567, IAC 20-31, LCCO 10.5; Linn County Code Chapter 10, Article III	Air operation permits	Authorize operation of the auxiliary boiler (4863), 1G21 standby diesel generator (4864), 1G31 standby diesel generator (4865), and diesel fire pump (4866)	Previous permits were forfeited after shutdown. NEDA plans to apply for new permits with Linn County prior to resumption of power operations.

3.0 AFFECTED ENVIRONMENT

The affected environment for the potential reauthorization of power operations of DAEC is the current shutdown state at DAEC prior to implementing activities related to the preparation for the resumption of power operations. Transition to SAFSTOR activities at DAEC were conducted in August 2020 through 2022. Activities since 2023 represent the shutdown state of the station. The affected environment is defined for each resource area given this temporal baseline.

3.1 Land Use

DAEC is located on a western bank of the Cedar River, approximately 2.5 miles north-northeast of the Village of Palo in Linn County, Iowa. The area surrounding DAEC is generally characterized as a primarily rural, sparsely populated area. The closest city is Cedar Rapids, whose outer boundary is approximately 8 miles to the southeast. (NEDA 2023a)

The site encompasses approximately 500 acres and is entirely owned by NEDA (NEDA 2023a). Figure 2.1-2 depicts the site's features and associated boundaries. Approximately 158 acres of the site are occupied by the existing DAEC and associated facilities. Pleasant Creek Solar, owned by Alliant, now occupies approximately 40 acres of DAEC's site and adjacent areas west and northwest of the site boundary. NEDA retains ownership of the land and leases the onsite acreage to Alliant. There are several planned projects to reinstate infrastructure removed during the transition to SAFSTOR, such as repairing the access road and parking lots, as needed. Nearly all projects are to occur in previously disturbed areas, and no changes to existing land use associated with preparations for resumption of power operations or the resumption of power operations are anticipated. The only potential exception to this is the expansion of the existing switchyard which may extend south of the previously disturbed area as shown in Figure 2.1-3a. A response to the proposed expansion project's consultation request with the Iowa State Historic Preservation Officer (SHPO) was received on June 30, 2025. It is the Iowa SHPO's opinion that the proposed expansion of DAEC's Substation is unlikely to affect significant archaeological sites.

Figure 2.1-1 depicts DAEC in relation to communities and features within the vicinity (6-mile radius). The area surrounding DAEC is rural and primarily agricultural in nature. Since 2019, the general character of the surrounding area has remained largely the same. A review of available aerial imagery from the time of DAEC's shutdown in 2020 to 2024 showed the Pleasant Creek Solar as the only major change to offsite land use near DAEC. The site plan with the locations of proposed structures is presented in Figure 3.1-1.

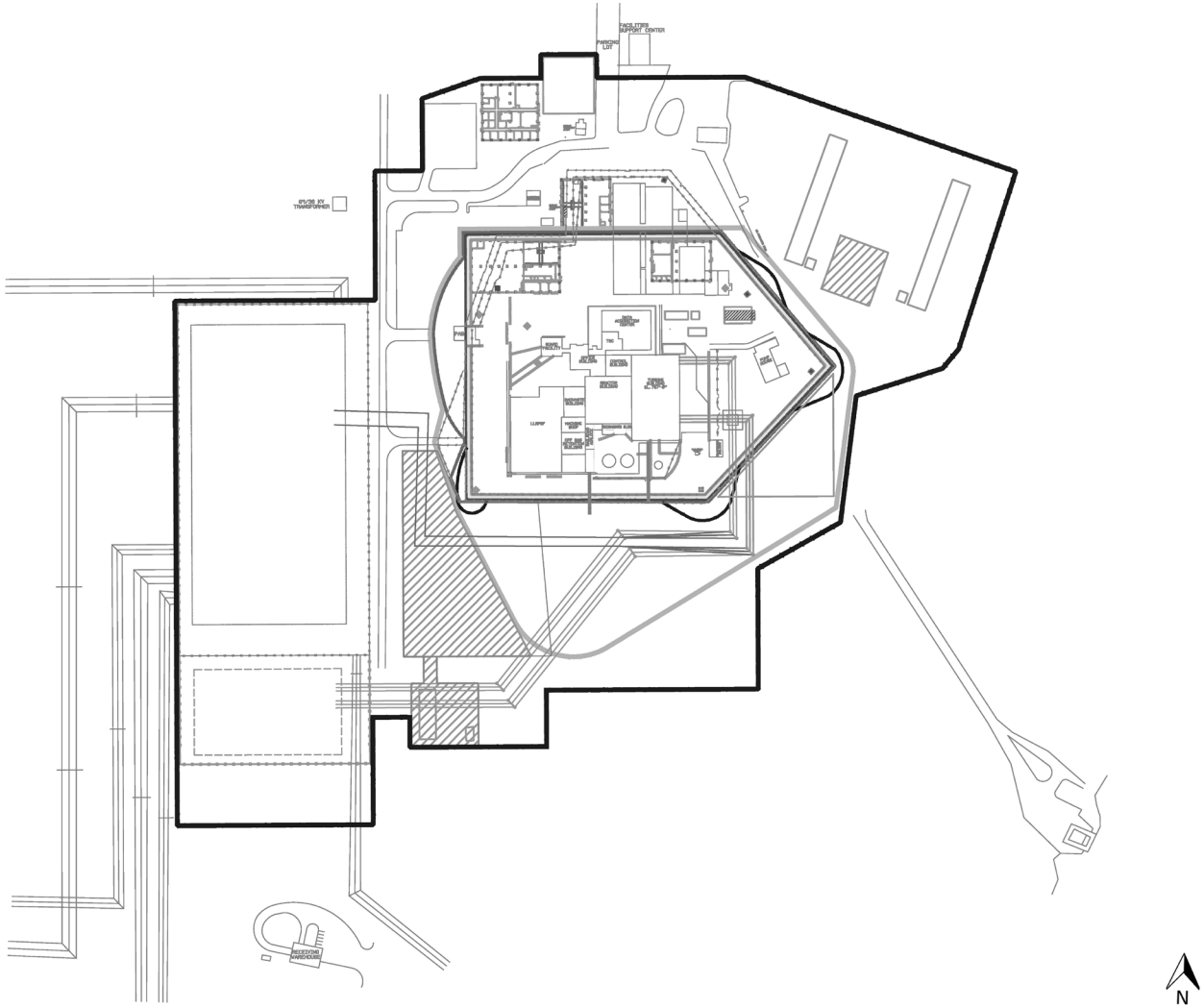

Figure 3.1-1 Proposed DAEC Site Plan for Restart

3.2 Water Resources

During operations, DAEC relied on the Cedar River as its source of makeup water for its cooling system. Onsite well water was used to cool many plant systems. (NRC 2010b) Section 3.2.1 provides a description of groundwater resources, groundwater use, and groundwater quality since the plant was shut down. Section 3.2.2 includes a description of surface water resources, surface water use, and surface water quality since the plant was shut down.

Per IAC 567 Chapter 50, a water use permit is required for use, withdrawal, or diversion of more than 25,000 gallons of water per day. The DNR issued Water Use Permit No. 3046-R7, effective July 1, 2022, and expiring June 30, 2032, authorizing DAEC to withdraw up to 1,575 million gallons per year (MGY) from four water supply wells and 12,575 MGY from the Cedar River. This water use permit authorizes a combined maximum quantity of 14,150 MGY (43,400 acre-feet per year) at a maximum rate of 27,000 gallons per minute (gpm), not to exceed a combined maximum rate of 3,000 gpm from the four wells. NEDA is required to maintain monthly water use records and to submit them annually to the DNR. (DNR 2025a) Permit 3046-R7 supports water use during the current non-operational state, preparations for resumption of power operations, and resumption of power operations.

3.2.1 Groundwater

Regional geology and stratigraphy are described in the Defueled Safety Analysis Report (DSAR) Section 2.5.1.1 (NEDA 2021a). In the Iowa Cedar River Basin, groundwater is obtained from two main sources: shallow wells in unconsolidated glacial deposits and underlying bedrock aquifers. Wells in glacial deposits usually range between 70 and 200 feet deep depending on location. Wells in bedrock range between 300 and 1,700 feet deep depending on location. (NEDA 2021a) A generalized stratigraphic column of eastern Iowa is provided in the DSAR as Figure 2.5-2, and geologic profiles at DAEC prior to plant construction are provided in the DSAR as Figure 2.5-7.

Surficial material at the site consists of floodplain deposits averaging about 20 feet in thickness and consists of fine to coarse sand with some silt and gravel. Till of Kansan, Iowan, and/or Wisconsinan age varies in thickness in the site area between 12 to 80 feet. The till is primarily clay with some sand and gravel interspersed. Hills adjacent to the site are composed of till mantled with Wisconsinan loess. (NEDA 2021a) Bedrock at the site varies between approximately 25 feet and 100 feet below ground surface (bgs) and consists of Devonian and Silurian limestones and dolomites.

Borings on DAEC’s site indicate that two shallow aquifers underlie most of the site, an upper water table aquifer composed of fine to medium sand, and a lower aquifer in weathered rock. The two aquifers are separated by clay-rich till. This clay extends above and below the river bottom elevation at most boring locations. (NEDA 2021a) The till deposit is extensive across the site except for areas where deep excavations were dug to facilitate construction of Class 1 structures, which have foundations built on the bedrock surface. The backfill around the perimeter of these structures consists of a medium sand engineered fill similar in permeability to

the alluvial formation. The permeable fill provides a potential preferential flow path between the shallow aquifer and the intermediate and bedrock aquifers.

The shallow aquifer predominantly flows to the southeast discharging to the Cedar River. The intermediate aquifer flows to the south-southeast with flow discharging to the Cedar River and provides recharge to the underlying limestone bedrock aquifer. The bedrock limestone aquifer has a south to southeast flow direction and likely does not provide significant local discharge to the Cedar River. DAEC structures provide barriers to groundwater flow in the shallow and intermediate till aquifers. Site foundations associated with the reactor building and intake structure are built on the bedrock surface approximately 50 feet bgs, and the turbine building is constructed on till approximately 35 feet bgs. These deep structures at the site cause groundwater in the shallow aquifer to flow around these structures as baseflow discharges to the south-southeast. A potentiometric surface map with water level elevations in the last 5 years is not available.

The limestone bedrock aquifer was artesian at the time of construction in the late 1960s. Based on the long-term groundwater monitoring results at DAEC, vertical groundwater gradients are consistently downward. The site-wide downward gradients are likely the result of regional groundwater withdrawals from the confined bedrock aquifer.

Within 1.5 miles of the plant, 14 property owners were identified with one or more water supply wells. The use of these wells included potable water supply, swimming pools, livestock watering, and irrigation. In the Village of Palo, approximately 2.5 miles southwest of DAEC, there are about 140 homes with individual well points driven to a depth of 18 feet. Residential water supply wells were also identified in the initial Final Safety Analysis Report at several locations. (NEDA 2021a) In 2021, a well survey was conducted within 5 miles of DAEC using the State of Iowa GeoSam database. No new wells were identified (NEDA 2022a).

3.2.1.1 Groundwater Use

During operation, DAEC used four water supply wells to provide approximately 100 gpm of demineralizer makeup, less than 10 gpm of potable water, and 1,400 gpm to an air-cooling system to provide cool water to assist in the removal of heat from system components during startup, normal operation, and shutdown (totaling approximately 793.7 MGY). Groundwater also provided a backup water source for emergency reactor injection, fire protection systems, and the reactor building closed cooling water heat exchangers. These four wells, designated A, B, C, and D, remain in place and range in depth from 285 feet to 380 feet. The wells are installed in the Silurian-Devonian aquifer. (FPL 2008; NRC 2010b)

DAEC ceased power production on August 10, 2020, following the severe windstorm, which destroyed the cooling towers. After evaluating the condition, NEDA chose not to restart the plant. (NEDA 2022a) Since shutdown, the plant has used well water for cooling and as a domestic water source. The volume of groundwater used for industrial purposes decreased since shutdown. Monthly groundwater withdrawal volumes for September 2020 through 2024

and annual groundwater withdrawal volumes for 2021 through 2024 are presented in Table 3.2-1. Groundwater use is below Water Use Permit 3046-R7 limits.

The potable water system at DAEC was registered with the DNR as PWS ID 5715150. The PWS was declassified and removed from the DNR's water supply inventory in December 2022 because the facility no longer met the definition of a PWS, as the water system no longer served at least 25 people for 60 or more days per year. (DNR 2025b)

The DNR issued a private water well construction permit (Permit No. 58665) to install a water supply well in February 2022. The permitted well was installed 240 feet deep and was designed to withdraw groundwater at approximately 20 gpm for drinking water and sanitary water for employees working onsite. There is no PWS system associated with this well because the facility no longer has an active PWS (DNR 2025c).

3.2.1.2 Groundwater Quality

A potential spill at DAEC could seep into the ground and into the upper aquifer (NEDA 2021a). The plant ceased operations in August 2020. Shortly thereafter, plant systems were drained, and radioactive water was processed. With no water pumped through piping, the risk of a potential radioactive release was reduced.

There were no abnormal releases in 2020 through 2022 (NEDA 2021b; NEDA 2022a; NEDA 2023b). With the relocation of spent fuel from the SFP to the ISFSI in 2022, NEDA changed the terminology from "unplanned release," which is an unintended discharge of a volume of liquid or airborne radioactivity to the environment, to "radioactive leak or spill," which is an uncontrolled escape of radioactive material, usually within the facility or its immediate surroundings. This change in terminology is based on the low probability of an unplanned release with no fission and low potential for gaseous or liquid effluents after relocation of spent fuel from the SFP in 2022. There were no spills or leaks of radioactive material in 2023 and 2024 (NEDA 2024a; NEDA 2025d).

The following historical radiological releases impacted groundwater underlying DAEC since the NRC issued the LR SEIS:

- October 2012: Approximately 700 gallons of tritiated water were released within an excavation immediately north of the condensate storage tank pit. Tritium was detected in two monitoring wells, MW-7A and MW-9A. Tritium was also detected at low concentrations within the intermediate aquifer in MW-8B, east of the release area.

- December 2015: Tritium detections in monitoring well MW-8A increased abruptly. Between December 2015 and February 2016, tritium concentrations increased from 1,450 to 91,900 picocuries per liter (pCi/L). A subsurface investigation was conducted in April 2016 by installing 29 temporary well points within the shallow alluvial aquifer to delineate the plume and to identify possible sources. The plume originated along the south-southeast end of the turbine building and extended downgradient to the southeast along the direction of groundwater flow. The cause of the leak was determined to be a

break in the slip fit cast iron pipe embedded in the concrete base mat of the turbine building. The pipe was scoped and repaired in 2016. Inspections and coating repairs of system drains and sumps occurred through 2019, and no other significant conditions were identified.

Following the April 2016 subsurface investigation, a numerical fate and transport model was developed to characterize the tritium plume in the shallow aquifer and to simulate several extraction well scenarios to optimize a design to intercept and remediate the tritium source and to prevent offsite migration. A remediation system was installed consisting of three permanent extraction wells (EW-01A, EW-02A, and EW-03A), a composite sampler, and a release mechanism for tritiated groundwater to be extracted, diluted, and discharged to the environment. Linn County issued permits to install the three extraction wells in 2016 with a maximum withdrawal limit of 25,000 gallons per day per well. The shallow extraction wells were installed southeast of the turbine building and in the southeast owner-controlled area in the path of groundwater flow (NEDA 2021a). The extraction wells are included in Figure 3.2-1.

The extraction wells began operation in 2017. Extraction well EW-01A is located adjacent to the reactor building. Extraction wells EW-02A and EW-03A supplied clean water from the shallow aquifer to mitigation system. During system operation, water from the three wells was combined in a release pipe from which a composite sampler collected water samples continuously in accordance with site procedures and was then piped to the dilution structure for further dilution with blowdown flow and eventual discharge to the Cedar River. As of June 2022, the concentration of tritium in onsite groundwater monitoring wells was less than 2,000 pCi/L, which is lower than the NRC environmental lower limit of detection (LLD) of 3,000 pCi/L. The extraction well system was secured and ceased operation in 2022.

While DAEC operated the extraction well system, a weekly composite sample of groundwater removed from the extraction well system was analyzed for tritium and gamma isotopes. If gamma isotopes were detected, analyses for Sr-89, Sr-90, and Fe-55 were expected to be performed. In 2020 through 2022, tritium was the only radionuclide detected. Discharges from the extraction wells were reported as a liquid effluent in Annual Radioactive Material Release Reports. (NEDA 2021c; NEDA 2022b; NEDA 2023c)

DAEC maintains a GWPP in accordance with the Nuclear Energy Institute's Industry Groundwater Protection Initiative, NEI 07-07. Groundwater monitoring results are reported in Annual Radiological Environmental Operating Reports (AREORs). (NEDA 2022b) The GWPP is included in DAEC's REMP (NEDA 2021b).

There are 56 shallow and intermediate groundwater monitoring wells at DAEC. Monitoring wells with an "A" designation monitor the shallow unconfined aquifer, and wells with a "B" designation monitor the intermediate aquifer.

The Defueled Offsite Dose Assessment Manual (DODAM) was revised in 2021 to reduce environmental sampling consistent with the plant's operational condition (NEDA 2022a). Prior to the DODAM revision, the 56 monitoring wells were sampled quarterly. DAEC's GWPP was

modified to include 31 shallow and intermediate groundwater monitoring wells sampled at least annually and analyzed for tritium and gamma isotopes. Sampling frequency depends on the concentrations of constituents detected in groundwater. Groundwater monitoring wells are sampled as frequently as necessary to sufficiently monitor the concentrations of tritium. (NEDA 2024b)

In 2020 through 2024, tritium was the only plant byproduct identified in groundwater samples collected. The maximum detected tritium concentrations decreased from 51,271 pCi/L in MW-08A in 2020 to 386 pCi/L in MW-22A in 2024. In 2022 through 2024, the maximum tritium concentrations were far below the EPA drinking water maximum contaminant level (MCL) of 20,000 pCi/L. In 2020 through 2024, tritium was not detected above the LLD in monitoring well MW-33A, which is located farthest down-gradient to the boundary of the owner-controlled area and the Cedar River. (NEDA 2021b; NEDA 2022a; NEDA 2023b; NEDA 2024b; NEDA 2025e)

Groundwater sampling results for DAEC's REMP are reported in AREORs. In 2020 and 2021, drinking water samples were collected monthly at three locations (treated municipal water and the inlet to the municipal water treatment system approximately 8.6 miles (13.9 kilometers [km]) southeast of DAEC and a plant potable water well) and quarterly from four locations (an onsite well and three offsite wells within 2.5 miles (4 km) of DAEC). Samples were analyzed for tritium and gamma isotopes. If there were detections, samples were expected to be analyzed for hard-to-detect isotopes Ni-63, Sr-89, Sr-90, Fe-55, and gross alpha. However, no constituents were detected above the LLDs. (NEDA 2021b; NEDA 2022a)

Since 2022, monthly drinking water samples were collected from two locations (plant potable water and treated municipal water) and analyzed for tritium and gamma isotopes. Positive identification of a reactor byproduct material initiates analyses for hard-to-detect isotopes of Ni-63, Sr-89, Sr-90, Fe-55, and gross alpha. No constituents were detected above the LLDs in 2022 through 2024. (NEDA 2023b; NEDA 2024b; NEDA 2025e)

3.2.2 Surface Water

DAEC is in the Cedar River Basin and is built near the west bank of the Cedar River. The Cedar River is a tributary of the Iowa River, 133 miles downstream from DAEC, and the combined flow is a tributary feeding into the Mississippi River. As part of DAEC construction, the Pleasant Creek Recreational Reservoir was created about 2 miles northwest of the power plant on a tributary of the Cedar River. The purpose of the reservoir was to supply water to the Cedar River during low-flow conditions. (NRC 2010b) NEDA had a permit to release water from the Pleasant Creek Reservoir during low-flow conditions in the Cedar River. NEDA allowed the permit to expire in March 2024 because water never had to be released from the reservoir.

Except for seasonally dry periods, predominantly during mid- to late-summer, and during flood events, the Cedar River is characterized as a gaining surface water body that acts as a regional discharge boundary for the shallow aquifer. During dry periods and flood events, the river temporarily becomes a losing surface waterbody providing recharge to the surrounding

floodplain when the hydraulic head in the river exceeds the hydraulic heads in the aquifer along the river channel.

There are no potable water supplies taken from the Cedar River downstream of DAEC. River water is used for irrigation. Surface water withdrawals for livestock watering do not require permits, and there are no restrictions on withdrawals for livestock watering. (NEDA 2021a) The Cedar River was surveyed in October 2021 for water use downstream of DAEC to Cedar Rapids. No new usages of river water were identified. (NEDA 2022a)

3.2.2.1 Surface Water Use

During operation, the Cedar River was the water source for DAEC's circulating water and service water systems. The intake at the river water supply system provided makeup water to the circulating water system to offset the evaporation and blowdown losses at the cooling towers. (NRC 2010b)

Surface water use at DAEC decreased significantly since shutdown in August 2020. A severe windstorm on August 10, 2020, damaged the plant's cooling towers, and they were taken out of operation and removed from the site. The reactor was permanently defueled on October 12, 2020. (NEDA 2021b) Surface water was used for fire protection and SFP cooling. The need for cooling water continued to decrease as the heat load of spent fuel in the SFP declined and spent fuel was relocated from the SFP to the ISFSI. The amount of water used by the service water system also decreased. (NEDA 2020b) In November 2020 through July 2022, Cedar River water was used to dilute remaining process wastewater in accordance with the facility's NPDES permit. There were no surface water withdrawals at DAEC in August 2022 through December 2024. Surface water is currently not used for cooling during the shutdown state of the facility. However, Cedar River water is expected to be withdrawn for cooling purposes when the facility resumes power operations. The Cedar River water does not interact with plant cooling systems. Monthly surface water withdrawal volumes for September 2020 through 2024 and annual surface water withdrawal volumes for 2021 through 2024 are presented in Table 3.2-1. Surface water use is below Water Use Permit 3046-R7 limits.

There is no periodic sediment removal in onsite ditches or retention ponds. During operation, periodic dredging at the intake structure was conducted when there was a risk of sand impacting the structure and/or river water pumps.

3.2.2.2 Surface Water Quality

Plant effluent is discharged to the Cedar River in accordance with NPDES Permit No. 5700104 (EPA Permit No. IA0003727), which supports current shutdown conditions. Stormwater discharges are not covered under the NPDES permit. The permit was issued on March 1, 2022, and expires on February 28, 2027. No formal enforcement actions were issued regarding DAEC's NPDES permit in the last 5 years (2020 through 2024) (EPA 2025a). Discharges are permitted through three external outfalls.

- Outfall 002: Discharges from the sewage treatment facility to an unnamed creek that discharges to the Cedar River. Permit limits were established for carbonaceous biochemical oxygen demand, total suspended solids, total residual chlorine, total nitrogen, potential of hydrogen, and E coli. The facility is not increasing the concentration or adding to the concentration of total nitrogen in the Cedar River.

- Outfall 003: Alternative discharge location of Outfall 006 effluent back to the intake structure for de-icing purposes in the winter. There are no permit limits associated with discharges from this outfall.

- Outfall 006: Well water for non-contact cooling water, construction, potable use, and sanitary wastewater to the Cedar River. Permit limits were established for Ceriodaphnia and Pimephales acute toxicity and potential of hydrogen.

Continuous service water effluent releases ceased in June 2022. No reactor byproduct radionuclides were identified in samples from service water effluent. (NEDA 2023c) DAEC's sewage treatment facility was shut down, and the DNR was informed in May 2023. The influent pipes from the plant sources outside of the security building were cut and plugged, the influent pumps were shut off, the discharge pipe was plugged, and the system was emptied. Prior to May 2023, sewage treatment facility samples were collected biweekly; there were no plant byproducts identified in the samples. (NEDA 2025d)

DAEC's storm drain system discharges to a retention pond south of the security fence. The pond connects to a drainage ditch that runs to the Cedar River via the plant discharge canal. A sluice gate structure was installed at the outlet of the retention pond. (NEDA 2021a) DAEC maintains a Stormwater Pollution Prevention Plan (SWPPP) to manage stormwater discharges from the site. NEDA also manages inadvertent releases of oil and oil product discharges under its Spill Prevention, Control, and Countermeasures (SPCC) plan.

Surface water sampling results for DAEC's REMP are reported in AREORs. In 2020 and 2021, surface water samples were collected monthly from five locations as part of DAEC's REMP and analyzed for tritium and gamma isotopes. The locations included Lewis Access Road approximately 6.8 km north-northwest and upstream of DAEC (control location), the plant intake, the plant discharge, a location approximately 0.5 mile downstream of the plant discharge (indicator location), and Pleasant Creek Lake approximately 3.9 km west-northwest of DAEC. Additional analyses were performed from the control and indicator locations; monthly samples were analyzed for I-131 and quarterly composite samples were collected for Sr-89 and Sr-90. In 2020, no constituents were detected above the LLDs. In 2021, tritium was detected in one sample collected at the plant discharge at 1,335 pCi/L. (NEDA 2021b; NEDA 2022a) This detection is far below the EPA MCL of 20,000 pCi/L. As described in Section 3.2.1.2, DAEC's DODAM was revised in 2021 to reduce environmental sampling consistent with the plant's operational condition.

In 2022, REMP surface water samples were collected from the control (Lewis Access Road) and indicator (plant discharge) locations for monthly analysis of tritium and gamma isotopes and

quarterly analysis of Sr-89 and Sr-90. No constituents were detected above the LLDs. (NEDA 2023b) Since 2023, surface water samples from the indicator and control locations were analyzed monthly for tritium and gamma isotopes only. No constituents were detected above the LLDs in 2023 and 2024. (NEDA 2024b; NEDA 2025e)

Table 3.2-1 Groundwater and Surface Water Withdrawal Volumes at DAEC, September 2020–December 2024 (Sheet 1 of 2)

Month	Groundwater Withdrawal Volume (MGM)	Surface Water Withdrawal Volume (MGM)	Total Water Withdrawals (MGM)
January 2020	76.5	309	385.5
February 2020	73.6	276	349.6
March 2020	86.2	327	413.2
April 2020	84.9	321	405.9
May 2020	70.8	332	402.8
June 2020	69.6	290	359.6
July 2020	69.7	344	413.7
August 2020	61.1	229	290.1
September 2020	50.1	209.0	259.1
October 2020	44.2	140.0	184.2
November 2020	29.2	35.0	64.2
December 2020	29.3	34.0	63.3
January 2021	28.6	11.9	40.5
February 2021	24.9	9.9	34.8
March 2021	27.9	9.5	37.3
April 2021	27.3	7.6	34.9
May 2021	26.6	7.5	34.1
June 2021	26.0	6.2	32.2
July 2021	28.8	3.8	32.6
August 2021	27.3	7.7	35.1
September 2021	26.1	6.5	32.7
October 2021	27.9	9.9	37.8
November 2021	27.0	8.4	35.4
December 2021	27.0	7.6	34.6
January 2022	26.6	9.5	36.1
February 2022	23.1	11.4	34.5
March 2022	24.7	7.8	32.5
April 2022	21.8	66.9	88.7
May 2022	20.6	123.5	144.1
June 2022	21.6	142.0	163.6
July 2022	19.7	28.6	48.3
August 2022	18.0	0	18.0
September 2022	23.2	0	23.2
October 2022	13.3	0	13.3
November 2022	12.8	0	12.8
December 2022	12.5	0	12.5
January 2023	0	0	0
February 2023	0	0	0
March 2023	0	0	0

Table 3.2-1 Groundwater and Surface Water Withdrawal Volumes at DAEC, September 2020–December 2024 (Sheet 2 of 2)

Month	Groundwater Withdrawal Volume (MGM)	Surface Water Withdrawal Volume (MGM)	Total Water Withdrawals (MGM)
April 2023	0	0	0
May 2023	0	0	0
June 2023	0	0	0
July 2023	0	0	0
August 2023	0	0	0
September 2023	0	0	0
October 2023	3.3	0	3.3
November 2023	3.1	0	3.1
December 2023	2.8	0	2.8
January 2024	0	0	0
February 2024	2.3	0	2.3
March 2024	3.0	0	3.0
April 2024	0.0	0	0
May 2024	0.0	0	0
June 2024	2.8	0	2.8
July 2024	2.4	0	2.4
August 2024	10.3	0	10.3
September 2024	0.0	0	0
October 2024	0.0	0	0
November 2024	0.0	0	0
December 2024	0.0	0	0
Annual Totals	**Groundwater (MGY)**	**Surface Water (MGY)**	**Total (MGY)**
2020	745.2	2,846.0	3,591.2
2021	325.4	96.4	421.8
2022	237.9	389.7	627.6
2023	9.2	0	9.2
2024	20.7	0	20.7

MGM = Million gallons per month

MGY = Million gallons per year

Figure 3.2-1 Well Locations at DAEC

3.3 Ecological Resources

3.3.1 Terrestrial Ecology

3.3.1.1 Terrestrial Ecoregion

DAEC lies within the Western Corn Belt Plains EPA Level III ecoregion (Chapman et al. 2002). This ecoregion is enveloped by the Temperate Prairies (EPA Level II) and Great Plains (EPA Level I) ecoregions, respectively. (EPA 2006)

Once covered with tallgrass prairie, over 75 percent of the Western Corn Belt Plains is now used for cropland agriculture and much of the remainder is in forage for livestock. A combination of nearly level to gently rolling glaciated till plains and hilly loess plains, average annual precipitation of 26–37 inches, which occurs mainly in the growing season, and fertile, warm, moist soils make this one of the most productive areas of corn and soybeans in the world. Major environmental concerns in the region include surface and groundwater contamination from fertilizer and pesticide applications as well as impacts from concentrated livestock production. (Chapman et al. 2002)

3.3.1.2 Site and Vicinity – Terrestrial Resources

The NRC's 2010 SEIS for DAEC provides descriptions and characterizations of terrestrial resources at the site and 6-mile vicinity of the site (NRC 2010b). These descriptions remain valid. State and federally protected terrestrial species are discussed in further detail in Section 3.3.3 of this report.

3.3.1.3 Studies and Monitoring – Terrestrial Resources

3.3.1.3.1 Duane Arnold – 2021 Raptor Nest Survey

A ground-based raptor nest survey was conducted in the spring (March 10–12) of 2021 for the Duane Arnold solar project, which was renamed Pleasant Creek Solar. The objective of the survey was to identify raptor nests within and near the project site and to determine the species and status of each nest. The survey was completed to evaluate raptor nests within two miles of the project.

A total of seven raptor nests were observed during the survey. Three bald eagle (*Haliaeetus leucocephalus*) nests and four non-eagle raptor nests were identified. No nests were identified inside the project study area. The nearest active bald eagle nest was approximately 60 feet north of the study area along the Cedar River. Of the three bald eagle nests observed, two were occupied and the other nest was identified as in-use. Two red-tailed hawk (*Buteo jamaicensis*) nests were also observed. One was occupied, and the other was confirmed to be in-use at the time of the survey. The remaining two nests were confirmed as unoccupied alternate non-eagle raptor nests. No potential prey concentration areas for raptors were identified within the study area.

3.3.1.3.2 Duane Arnold – 2021 Biological Habitat Assessment Survey

A field survey was completed in January 2021 to investigate areas within the solar project area that could potentially serve as suitable habitat for listed species. Based on the results of the desktop analysis and a review of species' habitat preferences, the following land cover types within the project study area were determined to be the most likely to support listed species: riverine, herbaceous, hay/pasture, wetland, and forest. These land cover types were confirmed during the field habitat assessment survey. The survey results concluded that within the solar project study area, the distribution of listed species (see Section 3.3.3.4 below) was anticipated to be highly limited given the overall lack of suitable habitat.

3.3.1.4 Procedures and Protocols – Terrestrial Ecology

3.3.1.4.1 Excavation, Trenching, and Ground Disturbance Controls

DAEC has administrative procedures in place that provide the following controls for excavating activities: (1) prevent damage to underground components, utilities, and structures, (2) ensure the safety of personnel that may encounter underground hazards (e.g., contact with underground utilities) or that may be exposed to hazards during excavation (e.g., cave-ins), (3) ensure protection of cultural resources found as a result of ground moving, excavation, and trenching activities, and (4) ensure compliance of DNR stormwater construction requirements.

3.3.1.4.2 Duane Arnold – Phase I Vegetation Management Plan

The solar project vegetation management plan provides guidance for managing and sustaining vegetation throughout the solar facility. Vegetation management goals and objectives for the facility include (1) stabilization of the site by maintaining a minimum 70 percent vegetative cover over the soil surface to reduce erosion from stormwater runoff, reduce formation of gullies, and reduce wind-blown dust, (2) establish and sustain vegetation that do not require irrigation, regular fertilization, or pest management, and (3) comply with applicable regulatory requirements, including Linn County ordinances for ground cover, erosion and sediment control, stormwater management, and weed control.

3.3.1.5 Permits and Regulatory Controls – Terrestrial Ecology

DAEC does not currently maintain site-specific permits related to terrestrial ecology. Permits and regulatory controls related to aquatic resources and special status species and habitats are provided in Section 3.3.2 and Section 3.3.3, respectively.

3.3.1.6 Communications with Federal and State Agencies – Terrestrial Ecology

Olsson, on behalf of DAEC, consulted with the DNR and the U.S. Fish and Wildlife Service (USFWS) in December 2020 regarding the onsite solar project, and discussed their knowledge pertaining to environmental issues, and obtained recommendations for additional pre-construction surveys. Letters were sent to both agencies on December 22, 2020. A response was received on March 12, 2021, with additional clarification regarding setbacks to bald eagle nests and public lands received from DNR on April 13 and May 18, 2021. The DNR's environmental review did not indicate the known presence of state threatened, endangered or

special concern species within the project study area. The USFWS response received in April 2021 indicated that the agency is not expected to submit a formal response to the project.

NEDA has not had other communication (reports, emails, etc.) with state or federal agencies relating to terrestrial ecology issues (e.g., avian or wildlife incidents) onsite since the last 5 years of the station's operations.

3.3.2 Aquatic Ecology

3.3.2.1 Marine Ecoregion

DAEC is not near oceanic, estuarine, or gulf waters and is not situated within marine ecoregions as defined by the EPA.

3.3.2.2 Site and Vicinity – Aquatic Ecology

DAEC is located within the Cedar River Valley in Linn County, Iowa, on the western bank of the Cedar River, which is the largest tributary of the Iowa River. The headwaters of the Cedar River are located in Dodge County, Minnesota, where its tributaries, the Little Cedar, and the Shell Rock rivers merge. The Cedar River flows southeast for 329 miles through Iowa to its confluence with the Iowa River in Columbus Junction, Louisa County, Iowa, about 30 miles upstream of the mouth of the Iowa River. The NRC's 2010 SEIS provides descriptions and characterizations of aquatic resources (benthic invertebrates, mussels, fish communities) at DAEC and 6-mile vicinity of the site (NRC 2010b). These descriptions remain valid. State and federally protected terrestrial species are discussed in further detail in Section 3.3.3 of this report.

3.3.2.3 Studies and Monitoring – Aquatic Ecology

There have been no aquatic studies conducted at DAEC since the last 5 years of the station's operations.

3.3.2.4 Procedures and Protocols – Aquatic Ecology

There are currently no aquatic ecology related protocols or procedures at DAEC. However, as described in Section 3.2.2.2, DAEC maintains its SPCC Plan, SWPPP, and related best management practices (BMPs).

3.3.2.5 Permits and Regulatory Controls – Aquatic Ecology

DAEC has coverage under Iowa NPDES Permit No. 5700104 to discharge industrial wastewater to the Cedar River. The permit was issued on March 1, 2022, and expires on February 28, 2027. The permit has facility-specific effluent limitations, monitoring requirements, and operational conditions that protect water quality and the surrounding aquatic community.

3.3.2.6 Communications with Federal and State Agencies – Aquatic Ecology

NEDA has not had communication (reports, emails, etc.) with state or federal agencies relating to aquatic ecology issues (e.g., fish kills, invasive species, etc.) onsite since the last 5 years of the station's operations.

3.3.3 Special Status Species and Habitats

3.3.3.1 Federally Listed Species and Critical Habitats

The Endangered Species Act (ESA) provides protection for imperiled species and their habitat. The USFWS and the National Marine Fisheries Service (NMFS) are responsible for the administration and enforcement of the ESA. The ESA prohibits the "take" of federally listed threatened and endangered species. "Take" is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, relocating, or collecting of any federally listed threatened or endangered species or attempting to engage in any such conduct. Significant habitat modification or degradation that results in death or injury to federally protected species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering is also prohibited.

3.3.3.1.1 Endangered Species Act: Action Area

"Action areas" are areas affected directly or indirectly by the federal action and not merely the immediate area involved in the action, as described in 50 CFR 402.02. The action area bounds the analysis of federally listed species and critical habitats because only federally listed species and critical habitats that occur within the action area may be affected by the federal action. For the purpose of assessing the potential impacts of the proposed restart of operations and proposed resumption of operations on federally listed species, the action area is defined below and illustrated in Figure 3.3-1.

Terrestrial Region

The terrestrial region of DAEC's action area consists of the site boundary as illustrated in Figure 2.1-2. As described in Section 3.1, the site has remained largely the same since the shutdown of DAEC in August 2020. Approximately 208 acres of the site are occupied by existing facilities associated with DAEC and onsite solar farm, with the rest of the site (~292.6 acres) consisting of undeveloped areas.

Aquatic Region

The aquatic region of DAEC's action area encompasses the intake structure maintenance dredging area, as described in Section 3.2.2, as well as the region of the Cedar River that is anticipated to experience heightened temperatures related to DAEC's thermal mixing zone during the proposed restart and resumption of operations. As reported in the 2008 LR ER, thermal modeling conducted for the Final Environmental Statement for operation of DAEC indicated that outside of a small (less than 1 acre) mixing zone, the plant's discharge is anticipated to have a modest (0.1 to 0.5 degrees Fahrenheit [°F]) effect on downstream river

temperature in summer (FPL 2008). Hence, the aquatic action area for DAEC is expected to include the area immediately surrounding the intake structure, and the plant's small mixing zone area (less than an acre) in the Cedar River.

3.3.3.1.2 Endangered Species Act: Federally Listed Species and Critical Habitats under USFWS Jurisdiction

The USFWS maintains lists of species protected under the ESA. A list of federally listed and proposed species is provided in Table 3.3-1. According to the USFWS, the current known ranges of the endangered northern long-eared bat (*Myotis septentrionalis*), proposed threatened Monarch butterfly (*Danaus plexippus*), proposed threatened western regal fritillary (*Argynnis idalia occidentalis*), and threatened eastern prairie fringed orchid (*Platanthera leucophaea*), overlap with DAEC's action area. There is no proposed or final critical habitat present for these species within DAEC's action area. (USFWS 2025a)

Northern Long-eared Bat

In 2022, USFWS published a final rule to reclassify the northern long-eared bat as endangered under the ESA. This species of bat is medium-sized, about 3–3.7 inches in length with a wingspan of 9–10 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. The species faces extinction due to the range-wide impacts of white-nose syndrome, a deadly disease affecting cave-dwelling bats across the continent. (USFWS 2025b)

According to USFWS, the current known range of the northern long-eared bat overlaps with DAEC's action area (USFWS 2025a). Suitable roosting and maternity habitat for the northern long-eared bat is potentially present in DAEC's action area; however, no occurrences of northern long-eared bats have been documented at DAEC's action area.

Monarch Butterfly

In 2024, USFWS announced a proposal to list the monarch butterfly as a threatened 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 2025c)

According to the USFWS, the current known range of the monarch butterfly extends across the contiguous United States and overlaps with DAEC's action area (USFWS 2025a). Though there have been no reported observations of the species onsite, suitable habitat for the monarch butterfly is potentially present in undeveloped portions of DAEC's action area that are not maintained by mowing. Plant operations are in disturbed areas, and no vegetation clearing is proposed that may potentially impact habitat for the monarch butterfly. Potential ground disturbing activities associated with general operations and maintenance are anticipated to undergo an environmental review that includes an evaluation of potential impacts on protected species prior to the activity occurring. Existing regulatory programs to which the site is subject, including management of herbicide applications, ensure that terrestrial habitat is protected.

Western Regal Fritillary

On August 8, 2024, the USFWS proposed to list the western regal fritillary as threatened at the federal level in accordance with the ESA (USFWS 2025d). According to the USFWS, the current known range of the western regal fritillary butterfly overlaps with DAEC's action area (USFWS 2025a).

Suitable habitat for this butterfly is likely present in undeveloped portions of DAEC that are not maintained by mowing, as well as in the action area of the site. The larval stage of this butterfly species relies solely on violets as host plants. No observations of violets have been made on the site.

Plant operations are in disturbed areas, and no vegetation clearing is proposed that are anticipated to potentially impact habitat for the western regal fritillary butterfly. Potential ground disturbing activities associated with general operations and maintenance are expected to undergo an environmental review that includes an evaluation of potential impacts to protected species prior to the activity occurring. Existing regulatory programs for which the site is subject to, including management of herbicide applications, ensure that terrestrial habitat is protected.

Eastern Prairie Fringed Orchid

The eastern prairie fringed orchid is protected under the ESA as a threatened species. This orchid is a perennial plant that grows from an underground tuber. Flowering begins from late June to early July and lasts for 7–10 days. Blossoms often rise just above the height of the surrounding grasses and sedges. This orchid has a single upright, leafy stem with a vertical

flower cluster (flower spike). The flower spike has 5–40 creamy white flowers, and each flower has a three-part fringed lip. (USFWS 2025e)

This plant occurs in a wide variety of habitats, from wet to mesic prairie, to wetland communities, including sedge meadow, fen, marsh, and marsh edge. It can occupy a very wide moisture gradient of prairie and wetland vegetation. In general, the habitat is moist or moderately moist. The orchid requires full sun for optimal growth and flowering, which ideally is anticipated to restrict it to grass, and sedge dominated plant communities. However, in some plant communities where there are encroaching species such as cattail and/or dogwood, the orchid may be interspersed or within the edge zones of these communities and thus can sometimes occur in partially shaded areas. The substrate of the sites where this orchid occurs include glacial soils, lake plain deposits, muck, or peat, which could range from more or less neutral to mildly calcareous. In some cases, the species may also occur along ditches or roadways where this type of habitat is present. (USFWS 2025e)

Potential habitat for the eastern prairie fringed orchid exists within the terrestrial action area of the site. However, there have been no recorded occurrences of these species in the action area.

Bald Eagles, Golden Eagles, and Migratory Birds

In addition to species protected under federal and state ESAs, there are numerous bird species protected under the Migratory Bird Treaty Act (MBTA) that may visit DAEC. 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 2025f)

In addition to the MBTA, bald and golden eagles are protected under the Bald and Golden Eagle Protection Act. The Bald and Golden Eagle Protection Act, enacted in 1940 (16 U.S.C. 668-668d), prohibits the take of bald eagles, including their parts (including feathers), nests, or eggs without a permit issued by the Secretary of Interior. (USFWS 2025g)

The 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 2025h). 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 ranges of the following seven birds of conservation concern overlap with DAEC's action area: bald eagle (*Haliaeetus leucocephalus*), black-billed cuckoo (*Coccyzus erythropthalmus*), bobolink (*Dolichonyx oryzivorus*), grasshopper sparrow (*Ammodramus savannarum*), Kentucky warbler (*Geothlypis formosa*), red-headed woodpecker (*Melanerpes erythrocephalus*), and wood thrush (*Hylocichla mustelina*). The breeding ranges of these species overlap with DAEC's action area. (USFWS 2025a)

3.3.3.1.3 Endangered Species Act: Federally Listed Species and Critical Habitats under NMFS Jurisdiction

The NMFS maintains lists of species protected under the ESA. According to the NMFS, no federally listed species under NMFS jurisdiction occur in DAEC's action area. Subsequently, no critical habitat is present in DAEC's action area. (NOAA 2025a)

3.3.3.2 Essential Fish Habitat

For the purpose of this assessment, the affected area associated with essential fish habitat (EFH) are those areas defined under the aquatic region of the action area described in Section 3.3.3.1.1. 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. 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. (NOAA 2002)

A review of the NOAA EFH was conducted to determine the location of EFH in DAEC's affected area. No EFH is present within the affected area. (NOAA 2025b)

3.3.3.3 Sanctuary Resources

For the purpose of this assessment, the affected area associated with sanctuary resources are those areas defined under the aquatic region of the action area described in Section 3.3.3.1.1. National marine sanctuaries are federally designated areas within U.S. waters that protect areas of the marine environment with special conservation, recreational, ecological, historical, cultural, archaeological, scientific, educational, or aesthetic qualities. The term "marine resources" broadly defines the living marine resources, the water and currents, and the ocean floor and shoreline in a sanctuary. It also includes the historical and cultural resources in a sanctuary, from shipwrecks and lighthouses to archaeological sites and the cultural history of native communities. Sanctuaries are established to protect areas that encompass unique or significant natural and cultural features. The National Marine Sanctuary System consists of 18 marine protected areas that encompass more than 629,000 square miles of marine and Great Lakes waters from Washington State to the Florida Keys, and from Lake Huron to American Samoa. The NOAA Office of National Marine Sanctuaries manages a national system of 19 underwater-protected areas. (NOAA 2025c)

There are no national marine sanctuaries that overlap with DAEC's affected area (NOAA 2025d).

3.3.3.4 State-listed Species

The DNR's Natural Areas Inventory identifies 50 state-listed species, including 32 threatened and 18 endangered species potentially occurring in Linn County (DNR 2025d). The Habitat Assessment field survey conducted in 2021 concluded that while six of these listed species (Higgin's eye pearly mussel, [*Lampsilis higginsii*], eastern prairie fringed orchid, prairie bush

clover [*Lespedeza leptostachya*]*,* western prairie fringed orchid *[Platanthera praeclara*], northern long-eared bat, monarch butterfly) may have ranges that overlap, none are likely to occur at the site due to the lack of suitable habitat. The DNR's environmental review for this project also determined that state threatened, endangered, or special concern species are absent from the project area.

3.3.3.5 Studies and Monitoring – Special Status Species and Habitats

Information on terrestrial and aquatic resource studies and monitoring are described in Section 3.3.1.3 and Section 3.3.2.3 of this report, respectively. There have been no other recent studies or monitoring specific to special status species and habitats conducted at DAEC.

3.3.3.6 Procedures and Protocols – Special Status Species and Habitats

Information regarding procedures and protocols related to terrestrial and aquatic ecology are described in Section 3.3.1.4 and Section 3.3.2.4 of this report, respectively. DAEC has no other procedures or protocols specific to special status species and habitats.

3.3.3.7 Permits and Regulatory Controls – Special Status Species and Habitats

Permits and regulatory controls related to terrestrial and aquatic ecology are described in Section 3.3.1.5 and Section 3.3.2.5 of this report, respectively. DAEC has no other permits or regulatory controls specific to special status species and habitats.

3.3.3.8 Communications with Federal and State Agencies – Special Status Species and Habitats

Apart from the communications with federal and state agencies regarding special status species already described in Section 3.3.1.6, NEDA has had no additional communications since the last 5 years of the station's operations.

Table 3.3-1 Federally Protected Species Potentially Occurring in DAEC Action Area

Common Name	Scientific Name	ESA Protected Status
Northern Long-eared Bat	*Myotis septentrionalis*	E
Eastern Prairie Fringed Orchid	*Platanthera leucophaea*	T
Western Regal Fritillary	*Argynnis idalia occidentalis*	PT
Monarch Butterfly	*Danaus plexippus*	PT

(USFWS 2025a)

E – Endangered
T – Threatened
PT – Proposed Threatened

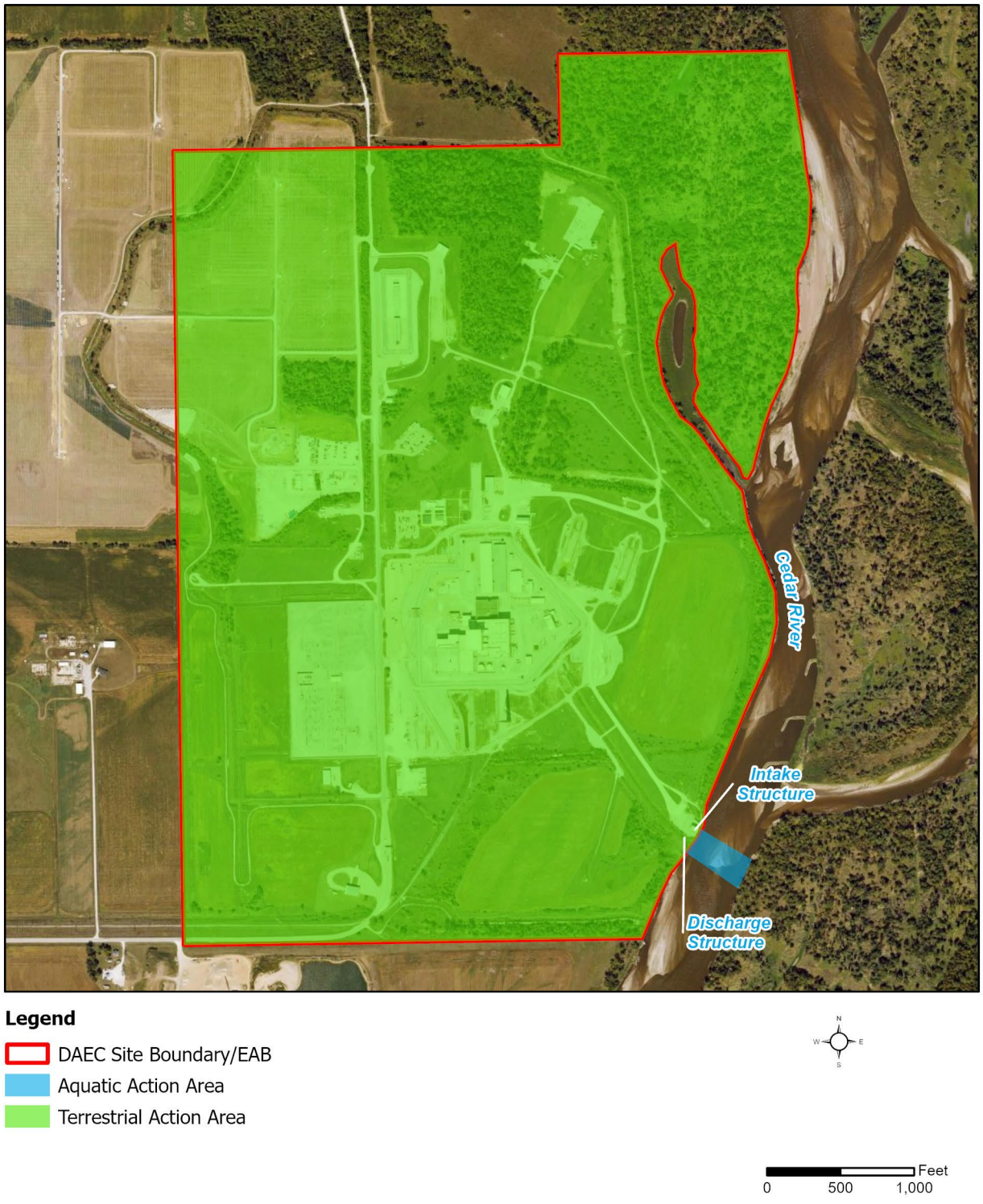

Figure 3.3-1 DAEC Action Area

3.4 Socioeconomics

This section uses U.S. Census Bureau data to determine regional population characteristics for portions of the State of Iowa within 50 miles of DAEC. The information is compared to information found in the SEIS to assess new and potentially significant population changes in the 50-mile area surrounding DAEC. Additionally, this section describes current DAEC staffing levels, tax payments, housing and income, as these are the primary factors that impact socioeconomic changes in the plant's region of influence.

The 50-mile radius surrounding DAEC encompasses 22 counties in Iowa. These include Benton, Black Hawk, Bremer, Buchanan, Cedar, Clayton, Clinton, Delaware, Dubuque, Fayette, Grundy, Iowa, Jackson, Johnson, Jones, Keokuk, Linn, Louisa, Muscatine, Poweshiek, Tama, and Washington counties.

County population estimates were obtained using 2000, 2010, and 2020 U.S. Census Bureau redistricting census data for the State of Iowa. According to the 2010 census, the permanent population of the 22 counties was approximately 954,871. There was an increase of 40,414 people residing within these counties between the years 2010 and 2020. (USCB 2010; USCB 2020)

Table 3.4-1 shows the reported 2000, 2010, and 2020 census population data and the population change for the 22 counties that are wholly or partially within the 50-mile radius of DAEC.

The two largest counties in the State of Iowa within a 50-mile radius of DAEC are Linn County (2020 population 230,299), and Johnson County (2020 population 152,854). Both counties experienced an increase in population from 2010 to 2020. (USCB 2010; USCB 2020)

Twelve counties wholly or partially within 50 miles of DAEC showed declining populations between 2010 and 2020. These included Benton, Buchanan, Clayton, Clinton, Delaware, Fayette, Grundy, Jackson, Keokuk, Louisa, Poweshiek, and Tama Counties. (USCB 2010; USCB 2020)

Currently, there are 39 full-time, permanent staff employed at DAEC. As of 2025, approximately 97 percent of the workforce hails from the Iowa counties of Linn and Benton, at 77 percent and 21 percent, respectively. Therefore, Linn and Benton are the counties of focus for the housing and income discussions.

Tables 3.4-2 and 3.4-3 present updated housing information, as well as employment and income information, for Linn and Benton Counties. In 2023, the homeowner vacancy rate in Linn County, where the largest portion of DAEC employees reside, was 0.9 percent, while the rental vacancy rate was 8.5 percent. (USCB 2023a) The percentage of unemployment in Linn County in 2023 was 3.2 percent, the median household income $72,279, and per capita income $40,082. (USCB 2023b)

From 2015–2019 (prior to shutdown), the total of DAEC generation tax payments (taxes paid to the State of Iowa in lieu of property tax) averaged $3,090,974 annually. In 2021 and 2022, DAEC paid traditional parcel-based property tax. Reassessments were finalized and adjustments posted for these 2 years of payments in 2023. In 2022–2023, DAEC continued paying property tax to Linn County.

Table 3.4-1 County Populations Totally or Partially within a 50-Mile Radius of DAEC

County	State	2000 Census Population	2010 Census Population	2020 Census Population	Population Change 2000-2010	Population Change 2010-2020
Iowa (22 Counties)						
Benton	IA	25,308	26,076	25,575	768	-501
Black Hawk	IA	128,012	131,090	131,144	3,078	54
Bremer	IA	23,325	24,276	24,988	951	712
Buchanan	IA	21,093	20,958	20,565	-135	-393
Cedar	IA	18,187	18,499	18,505	312	6
Clayton	IA	18,678	18,129	17,043	-549	-1,086
Clinton	IA	50,149	49,116	46,460	-1,033	-2,656
Delaware	IA	18,404	17,764	17,488	-640	-276
Dubuque	IA	89,143	93,653	99,266	4,510	5,613
Fayette	IA	22,008	20,880	19,509	-1,128	-1,371
Grundy	IA	12,369	12,453	12,329	84	-124
Iowa	IA	15,671	16,355	16,662	684	307
Jackson	IA	20,296	19,848	19,485	-448	-363
Johnson	IA	111,006	130,882	152,854	19,876	21,972
Jones	IA	20,221	20,638	20,646	417	8
Keokuk	IA	11,400	10,511	10,033	-889	-478
Linn	IA	191,701	211,226	230,299	19,525	19,073
Louisa	IA	12,183	11,387	10,837	-796	-550
Muscatine	IA	41,722	42,745	43,235	1,023	490
Poweshiek	IA	18,815	18,914	18,662	99	-252
Tama	IA	18,103	17,767	17,135	-336	-632
Washington	IA	20,670	21,704	22,565	1,034	861
Total (22 Counties)		908,464	954,871	995,285	46,407	40,414

(USCB 2000; USCB 2010; USCB 2020)

Table 3.4-2 Housing Statistics for Linn and Benton Counties, 2023

Metric	Linn	Benton
Total Housing Units	101,989	11,095
Occupied Units	95,051	10,111
Vacant Units	6,938	984
Homeowner Vacancy (percent)	0.9%	1.4%
Rental Vacancy (percent)	8.5%	7.1%
Median House Value ($)	204,400	198,400
Median Rent ($/month)	915	815

(USCB 2023a)

Table 3.4-3 Employment and Income Statistics for Linn and Benton Counties, 2023

Metric	Linn	Benton
Unemployment Rate	3.2%	2.3%
Median Household Income	$72,279	$84,742
Per Capita Income	$40,082	$40,995
Percentage of Families Living Below the Poverty Line	5.4%	4.2%
Percentage of People Living Below the Poverty Line	9.9%	7.9%

(USCB 2023b)

3.5 Reserved

3.6 Historic and Cultural Resources

Cultural resources include pre-contact 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 Native American tribes 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). Cultural resources listed on or eligible for the NRHP are considered historic properties under the National Historic Preservation Act of 1966 [Public Law 89-665].

Prior to taking 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 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.

The LR ER prepared as part of the previous OL renewal in 2008 for DAEC stated that there were no known historic properties located within the plant or its immediate vicinity, and there were three NRHP-listed properties within a 6-mile radius of DAEC. These properties included the Shellsburg Bridge (NRHP Number 980007700), Chain Lakes Bridge (98000529), and the Taylor-Van Note House (85003009). In April 2007, NEDA initiated consultation with the SHPO regarding the upcoming application for LR, in order to provide the opportunity to address potential concerns. No response was received at that time. NEDA also contacted 17 Native American tribes in association with the relicensing action. The Sac and Fox Nation of Missouri in Kansas and Nebraska responded with no objections but requested that the tribes be contacted should human remains or objects of cultural patrimony be uncovered during construction. (FPL 2008)

In order to identify new and significant cultural resources recorded since the 2008 LR ER, an updated review of available archaeological and historical files via the online I-Sites database maintained by the University of Iowa Office of the State Archaeologist was conducted on June 13, 2025. This review included archaeological sites and aboveground properties within DAEC's boundary and within a 6-mile radius of DAEC. The records review found that there have been 10 cultural resource investigations within DAEC boundary since the final environmental statement for DAEC in 1973, which are listed in Table 3.6-1. Three archaeological sites have been identified within DAEC's boundary: 13LN362, 13LN363, and 13LN365. DAEC's property was recorded as a historic building in 2022 and determined not eligible for the NRHP by the Iowa SHPO. These four total resources are listed in Table 3.6-2. The three archaeological sites are identified as historic-era, Euro-American habitation sites, while Site 13LN362 contains a

potential boat landing. Site 13LN362 is the only site out of the three recommended as not eligible for the NRHP, while 13LN363 and 13LN365 were both recommended as potentially eligible. No SHPO NRHP determination was identified for the three sites.

There are 42 cultural resources (which are archaeological sites) located within approximately 1 mile of the DAEC boundary. Review of recorded cultural resources within 6 miles of DAEC found that there are currently 102 aboveground resources and 332 archaeological resources. Aboveground sites are listed in Table 3.6-3, and archaeological sites are listed in Table 3.6-4. Of the total 434 resources, 10 resources are currently listed on the NRHP. These include the Notbohm Mill Archaeological District (NRHP Number 99001383) in addition to the Taylor-Van Note House, Chain Lakes Bridge, and Shellsburg Bridge mentioned above as well as six archaeological sites located within the Wickiup Hill Natural Area. These six archaeological sites (NRHP Numbers 100007333, 100007334, 100007335, 100007336, 100007337, and 100007338) consist of a network of habitation sites and mound groups spanning multiple precontact era time periods. Four of the six NRHP-listed archaeological sites also potentially contain humans remains, while another 24 resources within the 6-mile radius are cemeteries or archaeological sites. In total, there are 28 resource locations with the potential to contain human remains. One additional site, the Nideh Mound Group (13LN93), is not currently identified as potentially containing human remains; however, this may be due to the original site form being completed in 1974. There are 29 resources that have been determined eligible or potentially eligible, an additional 9 that have been recommended eligible or potentially eligible, and 2 archaeological sites recommended as contributing to an eligible historic district. Of the remaining cultural resources, 150 were recommended and/or determined not eligible for the NRHP while 209 resources were not evaluated or had no status available.

Table 3.6-1 Previous Cultural Resource Investigations within DAEC Site Boundary (Sheet 1 of 2)

Author(s)	Year	Title	Findings
Rogers, Leah, and William C. Page	1993	Archaeological, Historical and Architectural Survey Subsection E (Fayette Township), Linn County, Iowa	Report identifies three sites (13LN362, 13LN363, 13LN365) within the current DAEC boundary.
Fishel, Richard L.	2001	Phase I Intensive Archaeological Survey of a Proposed Dry Spent Fuel Storage Facility, Alliant Energy Corporation, Section 9, T84N-R8W, Linn County, Iowa	No archaeological sites identified.
Schoen, Christopher M., and Thomas J. Chadderdon	2005	Archaeological Survey Short Report of the Duane Arnold Energy Tower, Section 9, T84N-R8W, Linn County, Iowa	No archaeological sites identified.
Todd L. Butler	2005	Phase I Archaeological Survey for Cedar River Rip-Rap, Linn County, Iowa	No archaeological sites identified.
Butler, Todd L., and Camilla R. Deiber	2008	Phase IA Cultural Resources Assessment of the Duane Arnold Energy Center Property, Near Palo, Linn County, Iowa	Literature review and further recommendations for archaeological investigation.
Todd L. Butler	2009	Phase I Archaeological Investigation of a Proposed Work Area along the Southeast Corner of the Duane Arnold Energy Center Property Boundary, Linn County, Iowa	No archaeological sites identified. Previously identified site 13LN362 was not relocated.
Cultural Resource Analysts, Inc.	2022	Cultural Resources Records Review, Duane Arnold Solar Project - Phase I, Linn County, Iowa	Literature review and further recommendations for cultural resources investigation.
Andrew V. Martin	2022	Phase I Archaeological Reconnaissance and Architectural History Survey, Duane Arnold Solar Project - Phase I, Linn County, Iowa	Two previously recorded archaeological sites (13LN363 and 13LN364) were reinvestigated. Seven historic structures were identified by the architectural history survey.

Table 3.6-1 Previous Cultural Resource Investigations within DAEC Site Boundary (Sheet 2 of 2)

Author(s)	Year	Title	Findings
Greg Rainka and Shelley Rettig	2022	Linn – Energy Center NRHP evaluation – NRHP recommendation for the Duane Arnold Energy Center	DAEC was recorded and determined Not Eligible for the NRHP.
Andrew V. Martin and Paul Bundy	2022	Phase I Archaeological Survey of a Proposed Jurisdictional Crossing for the Duane Arnold Solar Project – Phase 1	No archaeological sites identified.

Table 3.6-2 Cultural Resources Located within DAEC Site Boundary

Site ID	Time Period	Type (Historic Building Name)	SHPO NRHP Status
Not Found	Historic Euro-American, late 20th century	Power Plant (DAEC)	Not Eligible
13LN362	Historic Euro-American	Habitation/possible steamboat landing	No Evaluation Listed
13LN363	Historic Euro-American	Habitation/debris scatter	No Evaluation Listed
13LN365	Historic Euro-American	Habitation/debris scatter	No Evaluation Listed

Table 3.6-3 Aboveground Resources within the 6-Mile Radius of DAEC (Sheet 1 of 5)

Resource ID (NRHP ID)	Historical Name	County	Resource Type	NRHP Status
06-00111 (98000770)	Shellsburg Bridge	Benton	Structure	NRHP Listed
57-00853 (98000529)	Chain Lakes Bridge	Linn	Structure	NRHP Listed
57-02903 (85003009)	Taylor-Van Note House	Linn	Building(s)	NRHP Listed
06-00794	Beatty Farmstead: House	Benton	Building(s)	Eligible or Potentially Eligible
57-00837	Bridge over E Otter Creek # 221510	Linn	Structure	Eligible or Potentially Eligible
57-00934	Farmstead	Linn	District	Eligible or Potentially Eligible
57-05489	Miller/Railsback Barn	Linn	Building(s)	Eligible or Potentially Eligible
57-06476	Hutchinson / Walker Farmstead	Linn	District	Eligible or Potentially Eligible
57-07220	Sugar Grove Farmstead	Linn	District	Eligible or Potentially Eligible
57-07221	Miller Farmstead	Linn	Building(s)	Eligible or Potentially Eligible
57-07251	Neighbor General Store	Linn	Building(s)	Eligible or Potentially Eligible
57-07252	McNeil Hardware Store	Linn	Building(s)	Eligible or Potentially Eligible
57-09560	House	Linn	Building(s)	Eligible or Potentially Eligible
57-09561	Minor, Eldon V. and Alberta P., House	Linn	Building(s)	Eligible or Potentially Eligible
57-09567	House	Linn	Building(s)	Eligible or Potentially Eligible
57-09570	Yates Building	Linn	Building(s)	Eligible or Potentially Eligible
57-09573	Palo Savings Bank	Linn	Building(s)	Eligible or Potentially Eligible
57-09574	Cain, John and Sally, House	Linn	Building(s)	Eligible or Potentially Eligible
57-09575	Hall, James and Mary, House	Linn	Building(s)	Eligible or Potentially Eligible

Table 3.6-3 Aboveground Resources within the 6-Mile Radius of DAEC (Sheet 2 of 5)

Resource ID (NRHP ID)	Historical Name	County	Resource Type	NRHP Status
57-09576	Booth, I.J. and Elizabeth, House	Linn	Building(s)	Eligible or Potentially Eligible
57-09577	Modern Woodman of America Hall	Linn	Building(s)	Eligible or Potentially Eligible
57-10569	Strawn Cemetery	Linn	Cemetery	Potentially Eligible
57-0007250	William Kolb and Sons Nursery and Fruit Farm Potential Historic District	Linn	District	Potentially Eligible
57-0009578, 57-09578	Palo Downtown Potential Historic District	Linn	District	Potentially Eligible
57-0011362	Palo Vinton Street Potential Historic District	Linn	District	Potentially Eligible
57-00940	Greens Grove Community Church	Linn	Building(s)	Potentially Eligible
57-05386	Church of Christ	Linn	Building(s)	Potentially Eligible
57-07222	Bonebreak, John W., House	Linn	Building(s)	Potentially Eligible
57-07249	House	Linn	Building(s)	Potentially Eligible
57-06477	Spring Grove Cemetery	Linn	Cemetery	Not Eligible
06-00110	Canton Street Bridge	Benton	Structure	Not Eligible
06-00409	Commercial Building	Benton	Building(s)	Not Eligible
06-00412	People Savings Bank	Benton	Building(s)	Not Eligible
06-00413	Moeller's	Benton	Building(s)	Not Eligible
06-00416	Commercial Building	Benton	Building(s)	Not Eligible
06-00516	Railroad Depot	Benton	Building(s)	Not Eligible
06-00684	Shellsburg Elementary School	Benton	Building(s)	Not Eligible
06-00795	Water Treatment Plant and Water Tower	Benton	Building(s)	Not Eligible
57-00838	Grasshopper Bridge #221530	Linn	Structure	Not Eligible

Table 3.6-3 Aboveground Resources within the 6-Mile Radius of DAEC (Sheet 3 of 5)

Resource ID (NRHP ID)	Historical Name	County	Resource Type	NRHP Status
57-00839	Bridge over Otter Creek #221540	Linn	Structure	Not Eligible
57-00840	Troy Road Bridge	Linn	Structure	Not Eligible
57-00849	Bridge #221780	Linn	Structure	Not Eligible
57-00850	Bridge over Dry Creek #221810	Linn	Structure	Not Eligible
57-00851	Bridge over Dry Creek #221830	Linn	Structure	Not Eligible
57-00852	Bridge over Lone Tree Creek #221840	Linn	Structure	Not Eligible
57-00854	Barn	Linn	Building(s)	Not Eligible
57-00926	Bridge over W Otter Creek #222380	Linn	Structure	Not Eligible
57-00928	Bridge over E. Otter Creek # 222450	Linn	Structure	Not Eligible
57-05375	House	Linn	Building(s)	Not Eligible
57-05376	Palo United Methodist Church	Linn	Building(s)	Not Eligible
57-05378	House	Linn	Building(s)	Not Eligible
57-05379	House	Linn	Building(s)	Not Eligible
57-05385	Johnson Brothers Store and Toddville Post Office Building	Linn	Building(s)	Not Eligible
57-05714	Caldwell Property	Linn	Building(s)	Not Eligible
57-05715	Tauke Farmstead	Linn	District	Not Eligible
57-05716	Tauke Farmstead: House	Linn	Building(s)	Not Eligible
57-05717	Tauke Farmstead: Barn	Linn	Building(s)	Not Eligible
57-05718	Tauke Farmstead: Barn 2	Linn	Building(s)	Not Eligible
57-05719	Tauke Farmstead: Barn 3	Linn	Building(s)	Not Eligible

Table 3.6-3 Aboveground Resources within the 6-Mile Radius of DAEC (Sheet 4 of 5)

Resource ID (NRHP ID)	Historical Name	County	Resource Type	NRHP Status
57-05720	Evanow Property	Linn	Building(s)	Not Eligible
57-05844	Ross Farmstead	Linn	District	Not Eligible
57-05845	Ross Farmstead: House	Linn	Building(s)	Not Eligible
57-05846	House	Linn	Building(s)	Not Eligible
57-05847	Railsback Farmstead	Linn	Building(s)	Not Eligible
57-05848	Railsback Farmstead: House	Linn	Building(s)	Not Eligible
57-05849	Railsback Farmstead: Barn	Linn	Building(s)	Not Eligible
57-06309	Chain Lakes Road Bridge	Linn	Structure	Not Eligible
57-06310	Morris Farmstead	Linn	District	Not Eligible
57-06311	Wahlstrom Residence	Linn	Building(s)	Not Eligible
57-06429	Toddville Public School	Linn	Building(s)	Not Eligible
57-07253	Midway Gas Station and Store	Linn	Building(s)	Not Eligible
57-09135	Blummer, James J. & Jeannie A., House	Linn	Building(s)	Not Eligible
57-09136	Horticulture Specialties, Inc.	Linn	Building(s)	Not Eligible
57-09137	Packingham, Chad & Emily, House	Linn	Building(s)	Not Eligible
57-09138	Bloodgood, John F. & Kristine A., House	Linn	Building(s)	Not Eligible
57-09139	Owens, John E., House	Linn	Building(s)	Not Eligible
57-09140	McCurrie, Jesse, House	Linn	Building(s)	Not Eligible
57-09142	Palo Consolidated School	Linn	Building(s)	Not Eligible
57-09143	Burgin, Denise & Steve, House	Linn	Building(s)	Not Eligible

Table 3.6-3 Aboveground Resources within the 6-Mile Radius of DAEC (Sheet 5 of 5)

Resource ID (NRHP ID)	Historical Name	County	Resource Type	NRHP Status
57-09144	Greene, Jo Ann, House	Linn	Building(s)	Not Eligible
57-09145	Karminski, Stanley J. & Linda K., House	Linn	Building(s)	Not Eligible
57-09146	Van Dorston, Andy, House	Linn	Building(s)	Not Eligible
57-10582	House	Linn	Building(s)	Not Eligible
57-10583	House	Linn	Building(s)	Not Eligible
57-10584	House	Linn	Building(s)	Not Eligible
57-10585	Tower Trailer Terrace	Linn	District	Not Eligible
57-10586	CCB Packing Inc.	Linn	Building(s)	Not Eligible
57-10587	Johnny Ketelsen RV	Linn	Building(s)	Not Eligible
57-10801	Chicago, Rock Island and Pacific Railroad Bridge over Cedar River	Linn	Structure	Not Eligible
06-00789	McBroom Cemetery	Benton	Cemetery	No Evaluation Listed
06-01009	Oakwood Cemetery	Benton	Cemetery	No Evaluation Listed
57-10857	Morrison Cemetery	Linn	Cemetery	No Evaluation Listed
57-10858	Palo Cemetery	Linn	Cemetery	No Evaluation Listed
57-10859	Old Palo Cemetery	Linn	Cemetery	No Evaluation Listed
57-10860	Pleasant Ridge Cemetery	Linn	Cemetery	No Evaluation Listed
57-10861	Squires Cemetery	Linn	Cemetery	No Evaluation Listed
57-10871	Dunkard Cemetery	Linn	Cemetery	No Evaluation Listed
57-10875	Oliphant Cemetery	Linn	Cemetery	No Evaluation Listed
57-10880	Lafayette Cemetery	Linn	Cemetery	No Evaluation Listed
57-10881	Baptist Church Cemetery	Linn	Cemetery	No Evaluation Listed
57-10527	Pleasant Creek State Recreation Area	Linn	Site	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 1 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN296 (99001383)	Historic Euro-American	Notbohm Mill Archaeological District	NRHP-Listed
13LN85 (100007334)	Middle and Late Archaic, Early and Late Woodland, Historic Euro-American	Historic farm/residence, open habitation/camp site	NRHP-Listed
13LN87 (100007336)	Woodland	Conical mounds; Wickiup Hill Mound Group No. 2	NRHP-Listed
13LN88 (100007338)	Precontact	Conical mounds; Wickiup Hill Mound Group No. 4	NRHP-Listed
13LN517 (100007333)	Late Woodland	Open habitation; Wickiup Hill Village Site	NRHP-Listed
13LN522 (100007335)	Precontact	Conical mounds; Wickiup Hill Mound Group No. 1	NRHP-Listed
13LN1231 (100007337)	Precontact	Conical mounds; Wickiup Hill Mound Group No. 3	NRHP-Listed
13LN529	Late Woodland	Open habitation, precontact scatter	Potentially Eligible
13LN829	Historic Euro-American	Historic farm/residence	Potentially Eligible
13LN831	Historic Euro-American	Historic farm/residence	Potentially Eligible
13LN841	Historic Euro-American	Historic farm/residence	Potentially Eligible
13LN226	Precontact	Open habitation, possible village	Not Eligible
13LN30	Precontact	Open habitation	Not Eligible
13LN37	Early Historic/Protohistoric	Open habitation	Not Eligible
13LN42	Precontact, Historic Euro-American	Open habitation	Not Eligible
13LN518	Late Woodland, Historic Euro-American	Historic farm/residence, open habitation	Not Eligible
13LN524	Late Woodland, Middle Woodland, Historic Euro-American	Open habitation, historic farm/scatter/dump and road/trail	Not Eligible
13LN807	Historic Euro-American	Historic farm/residence	Not Eligible
13LN812	Precontact	Precontact scatter	Not Eligible

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 2 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN832	Historic Euro-American	Historic farm/residence	Not Eligible
13LN833	Historic Euro-American	Historic farm/residence	Not Eligible
13LN840	Historic Euro-American	Historic farm/residence	Not Eligible
13LN854	Historic Euro-American	Historic farm/residence	Not Eligible
13LN855	Historic Euro-American	Historic farm/residence	Not Eligible
13LN856	Historic Euro-American	Historic farm/residence	Not Eligible
13LN861	Historic Euro-American	School	Not Eligible
13LN867	Historic Euro-American	Road/trail – Old road bed and bridge	Not Eligible
13LN895	Precontact	Precontact scatter	Not Eligible
13LN896	Historic Euro-American	Historic scatter	Not Eligible
13LN914	Historic Euro-American	Historic farm/residence	Not Eligible
13BE109	Lat Archaic	Precontact scatter	No Evaluation Listed
13BE110	Historic Euro-American	Historic scatter	No Evaluation Listed
13BE111	Precontact	Lithic workshop	No Evaluation Listed
13BE112	Historic Euro-American	School, Structure/building remains	No Evaluation Listed
13BE113	Precontact	Lithic workshop	No Evaluation Listed
13BE114	Precontact	Precontact scatter	No Evaluation Listed
13BE115	Woodland, Archaic, Late Precontact	Lithic workshop	No Evaluation Listed
13BE116	Historic Euro-American	Road/trail	No Evaluation Listed
13BE117	Precontact	Lithic workshop	No Evaluation Listed
13BE118	Historic Euro-American	Historic farm/residence/ building remains	No Evaluation Listed
13BE119	Precontact	Precontact scatter	No Evaluation Listed
13BE120	Historic Euro-American	Historic scatter	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 3 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13BE189	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13BE190	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13BE191	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13BE192	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13BE20	Precontact	Precontact scatter, possible temporary camp	No Evaluation Listed
13BE200	Precontact, Late Archaic, Early Woodland	Precontact scatter	No Evaluation Listed
13BE21	Precontact	Precontact scatter, possible temporary camp	No Evaluation Listed
13BE22	Precontact	Precontact scatter, possible temporary camp	No Evaluation Listed
13BE23	Woodland	Precontact scatter, camp	No Evaluation Listed
13BE24	Precontact	Precontact scatter, temporary camp	No Evaluation Listed
13BE25	Early, Middle, and Late Woodland	Precontact scatter, multicomponent	No Evaluation Listed
13BE26	Precontact	Precontact scatter, multicomponent habitation	No Evaluation Listed
13BE27	Precontact	Isolated find	No Evaluation Listed
13BE272	Historic Euro-American	Structure/building remains, bridge abutment ruin	No Evaluation Listed
13BE28	Precontact	Open habitation	No Evaluation Listed
13BE29	Precontact	Precontact scatter, temporary camp	No Evaluation Listed
13BE30	Precontact	Open habitation	No Evaluation Listed
13BE31	Precontact	Precontact scatter, temporary camp	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 4 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13BE32	Woodland	Precontact scatter, temporary camp	No Evaluation Listed
13BE33	Precontact	Precontact scatter, Temporary Camp or Work Site	No Evaluation Listed
13BE34	Precontact	Precontact scatter, Temporary Camp or Work Site	No Evaluation Listed
13BE35	Precontact	Precontact scatter, Camp or Work Site	No Evaluation Listed
13BE36	Middle and Late Woodland, Late Precontact, Early Historic/Protohistoric	Open habitation	No Evaluation Listed
13BE37	Precontact	Precontact scatter, Camp or Work Site	No Evaluation Listed
13BE41	Woodland	Village	No Evaluation Listed
13BE42	Woodland	Open habitation	No Evaluation Listed
13BE44	Woodland	Lint Mounds: unspecified type, 2 groups of mounds	No Evaluation Listed
13BE45	Precontact	Precontact scatter, camp	No Evaluation Listed
13BE47	Precontact	Precontact scatter, camp	No Evaluation Listed
13BE96	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN10	Precontact	Precontact scatter, resource procurement	No Evaluation Listed
13LN100	Precontact	Precontact scatter, camp	No Evaluation Listed
13LN101	Precontact	Precontact scatter, camp	No Evaluation Listed
13LN102	Precontact	Precontact scatter	No Evaluation Listed
13LN103	Precontact	Precontact scatter	No Evaluation Listed
13LN1036	Historic Euro-American	Structure/building remains, Brick Cistern	No Evaluation Listed
13LN104	Precontact	Precontact scatter	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 5 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN105	Precontact	Precontact scatter	No Evaluation Listed
13LN1054	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN106	Precontact	Precontact scatter	No Evaluation Listed
13LN107	Precontact	Precontact scatter	No Evaluation Listed
13LN108	Precontact	Precontact scatter	No Evaluation Listed
13LN109	Precontact	Precontact scatter	No Evaluation Listed
13LN110	Precontact	Precontact scatter	No Evaluation Listed
13LN111	Precontact	Precontact scatter	No Evaluation Listed
13LN112	Precontact	Precontact scatter	No Evaluation Listed
13LN1135	Historic Euro-American	Concrete bridge piers, Road/trail	No Evaluation Listed
13LN114	Precontact	Precontact scatter	No Evaluation Listed
13LN115	Precontact	Precontact scatter	No Evaluation Listed
13LN116	Precontact	Precontact scatter	No Evaluation Listed
13LN1163	Late Precontact	Precontact scatter	No Evaluation Listed
13LN119	Precontact	Precontact scatter	No Evaluation Listed
13LN12	Precontact	Mound groups, location error due to mismapping	No Evaluation Listed
13LN120	Precontact	Precontact scatter	No Evaluation Listed
13LN121	Precontact	Precontact scatter	No Evaluation Listed
13LN122	Precontact	Precontact scatter	No Evaluation Listed
13LN123	Precontact	Precontact scatter	No Evaluation Listed
13LN1237	Precontact	Lithic scatter	No Evaluation Listed
13LN124	Precontact	Precontact scatter	No Evaluation Listed
13LN125	Precontact	Conical mounds	No Evaluation Listed
13LN1253	Precontact	Resource procurement	No Evaluation Listed
13LN1254	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN1256	Precontact	Isolated find	No Evaluation Listed
13LN126	Precontact	Precontact scatter	No Evaluation Listed
13LN1260	Late Woodland	Conical and linear mounds	No Evaluation Listed
13LN127	Precontact	Precontact scatter	No Evaluation Listed
13LN128	Precontact	Precontact scatter	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 6 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN1283	Historic	Historic dump	No Evaluation Listed
13LN129	Precontact	Lithic scatter	No Evaluation Listed
13LN13	Precontact	Open habitation	No Evaluation Listed
13LN130	Precontact	Precontact scatter, occupation	No Evaluation Listed
13LN132	Archaic, Middle Woodland	Open habitation	No Evaluation Listed
13LN133	Middle and Late Woodland	Open habitation	No Evaluation Listed
13LN134	Archaic, Middle Woodland	Open habitation	No Evaluation Listed
13LN135	Woodland	Open habitation	No Evaluation Listed
13LN136	Archaic	Precontact scatter, possible chipping station	No Evaluation Listed
13LN137	Precontact	Precontact scatter, chipping station	No Evaluation Listed
13LN138	Woodland	Precontact scatter, camp	No Evaluation Listed
13LN14	Precontact	Open habitation	No Evaluation Listed
13LN15	Precontact	Conical mounds	No Evaluation Listed
13LN16	Late Paleo/Early Archaic, Archaic, Woodland, Late Precontact	Precontact scatter	No Evaluation Listed
13LN17	Woodland	Conical mounds, mound group	No Evaluation Listed
13LN18	Precontact	Village	No Evaluation Listed
13LN185	Archaic, Woodland	Precontact scatter, occupational	No Evaluation Listed
13LN186	Precontact	Mounds, unspecified type	No Evaluation Listed
13LN187	Precontact	Precontact scatter, occupational	No Evaluation Listed
13LN19	Woodland, Historic Euro-American	Historic scatter, habitation/Precontact scatter, occupational	No Evaluation Listed
13LN207	Precontact	Precontact scatter, occupational	No Evaluation Listed
13LN21	Precontact	Open habitation	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 7 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN22	Precontact	Mounds, unspecified type/mound group	No Evaluation Listed
13LN227	Precontact	Isolated find	No Evaluation Listed
13LN228	Precontact	Open habitation	No Evaluation Listed
13LN229	Precontact	Open habitation	No Evaluation Listed
13LN23	Precontact	Open habitation	No Evaluation Listed
13LN230	Precontact	Open habitation	No Evaluation Listed
13LN231	Historic Euro-American	Historic farm/residence – Barn	No Evaluation Listed
13LN232	Precontact	Open habitation	No Evaluation Listed
13LN233	Precontact	Open habitation	No Evaluation Listed
13LN234	Precontact	Open habitation	No Evaluation Listed
13LN235	Precontact	Open habitation	No Evaluation Listed
13LN236	Precontact	Open habitation	No Evaluation Listed
13LN24	Precontact	Open habitation	No Evaluation Listed
13LN247	Precontact	Conical mounds	No Evaluation Listed
13LN248	Precontact	Precontact scatter, camp	No Evaluation Listed
13LN25	Precontact	Open habitation	No Evaluation Listed
13LN251	Historic Native American	Resource procurement – Maple Sugar Camp	No Evaluation Listed
13LN26	Precontact	Open habitation	No Evaluation Listed
13LN28	Precontact	Open habitation	No Evaluation Listed
13LN287	Precontact	Conical mounds	No Evaluation Listed
13LN29	Precontact, Woodland	Precontact scatter, camp	No Evaluation Listed
13LN295	Historic Euro-American	Historic scatter, Church	No Evaluation Listed
13LN32	Precontact	Open habitation	No Evaluation Listed
13LN320	Historic Euro-American	Structure/building remains – historic river landing	No Evaluation Listed
13LN33	Precontact	Open habitation	No Evaluation Listed
13LN332	Precontact, Historic Euro-American	Historic scatter, habitation	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 8 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN333	Historic Euro-American	Industrial – Grist Mill	No Evaluation Listed
13LN334	Historic Euro-American	Quarry	No Evaluation Listed
13LN335	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN336	Historic Euro-American	Industrial – sawmill, structure/building remains	No Evaluation Listed
13LN337	Precontact, Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN338	Precontact, Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN339	Historic Euro-American	Historic farm/residence – Farmstead	No Evaluation Listed
13LN34	Early Historic/Protohistoric, Historic Native American	Historic scatter, habitation	No Evaluation Listed
13LN340	Historic Euro-American	Historic scatter, habitation/farm	No Evaluation Listed
13LN341	Historic Euro-American	Historic scatter, habitation/farm	No Evaluation Listed
13LN342	Historic Euro-American	Historic scatter, School	No Evaluation Listed
13LN343	Historic Euro-American	Historic scatter, habitation/farm	No Evaluation Listed
13LN344	Precontact	Open habitation	No Evaluation Listed
13LN345	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN346	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN347	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN348	Historic Euro-American	School	No Evaluation Listed
13LN349	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN35	Precontact	Open habitation	No Evaluation Listed
13LN350	Historic Euro-American	School	No Evaluation Listed
13LN351	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 9 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN352	Historic Euro-American	Historic scatter, habitation/farm	No Evaluation Listed
13LN353	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN354	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN355	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN356	Historic Euro-American	School	No Evaluation Listed
13LN357	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN358	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN359	Historic Euro-American	School	No Evaluation Listed
13LN36	Precontact	Open habitation	No Evaluation Listed
13LN360	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN361	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN364	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN366	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN367	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN368	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN369	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN370	Precontact, Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN371	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN372	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN373	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN375	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 10 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN377	Precontact, Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN378	Precontact, Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN379	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN38	Precontact	Open habitation	No Evaluation Listed
13LN380	Historic Euro-American	Railroad related – Depot	No Evaluation Listed
13LN381	Historic Euro-American	Quarry	No Evaluation Listed
13LN382	Historic Euro-American	Quarry	No Evaluation Listed
13LN383	Historic Euro-American	Quarry	No Evaluation Listed
13LN384	Historic Euro-American	Road/trail	No Evaluation Listed
13LN385	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN386	Historic Euro-American	Historic scatter, habitation	No Evaluation Listed
13LN39	Precontact	Open habitation	No Evaluation Listed
13LN391	Historic Euro-American	Dump	No Evaluation Listed
13LN392	Precontact	Resource procurement	No Evaluation Listed
13LN393	Precontact	Resource procurement	No Evaluation Listed
13LN394	Precontact	Resource procurement	No Evaluation Listed
13LN395	Precontact, Historic Euro-American	Historic farm/residence, dump	No Evaluation Listed
13LN396	Precontact	Resource procurement, open habitation	No Evaluation Listed
13LN40	Precontact	Open habitation	No Evaluation Listed
13LN41	Woodland	Open habitation	No Evaluation Listed
13LN416	Historic Euro-American	Railroad related	No Evaluation Listed
13LN417	Historic Euro-American	Historic scatter	No Evaluation Listed
13LN418	Historic Euro-American	Historic scatter	No Evaluation Listed
13LN419	Historic Euro-American	Historic scatter	No Evaluation Listed
13LN420	Historic Euro-American	Historic scatter	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 11 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN421	Historic Euro-American	Historic scatter	No Evaluation Listed
13LN422	Precontact	Resource procurement	No Evaluation Listed
13LN423	Precontact	Resource procurement	No Evaluation Listed
13LN43	Precontact	Open habitation	No Evaluation Listed
13LN44	Precontact, Woodland, Early Historic/Protohistoric	Historic scatter, Precontact scatter	No Evaluation Listed
13LN45	Woodland	Open habitation	No Evaluation Listed
13LN46	Precontact	Open habitation	No Evaluation Listed
13LN47	Precontact, Historic Euro-American	Historic scatter, Precontact scatter	No Evaluation Listed
13LN48	Precontact	Open habitation	No Evaluation Listed
13LN49	Precontact	Open habitation	No Evaluation Listed
13LN50	Precontact	Open habitation	No Evaluation Listed
13LN51	Precontact	Open habitation	No Evaluation Listed
13LN52	Precontact	Open habitation	No Evaluation Listed
13LN520	Late Woodland	Open habitation	No Evaluation Listed
13LN521	Precontact	Open habitation	No Evaluation Listed
13LN523	Woodland, Historic Euro-American	Woodland open habitation, historic refuse dump	No Evaluation Listed
13LN525	Late Woodland	Open habitation	No Evaluation Listed
13LN526	Precontact, Late 20th century	Open habitation, historic scatter	No Evaluation Listed
13LN528	Precontact	Open habitation	No Evaluation Listed
13LN53	Precontact	Open habitation	No Evaluation Listed
13LN54	Middle and Late Woodland	Open habitation	No Evaluation Listed
13LN55	Precontact, Historic Euro-American	Precontact scatter, Historic farm/residence	No Evaluation Listed
13LN56	Precontact	Open habitation	No Evaluation Listed
13LN57	Precontact	Open habitation	No Evaluation Listed
13LN58	Precontact	Open habitation	No Evaluation Listed
13LN59	Precontact	Open habitation	No Evaluation Listed
13LN60	Precontact	Open habitation	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 12 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN606	Precontact, Historic Euro-American	Precontact scatter, Historic farm/residence	No Evaluation Listed
13LN607	Precontact	Open habitation	No Evaluation Listed
13LN608	Woodland	Open habitation	No Evaluation Listed
13LN61	Precontact	Precontact scatter	No Evaluation Listed
13LN62	Precontact	Precontact scatter	No Evaluation Listed
13LN63	Precontact	Precontact scatter	No Evaluation Listed
13LN64	Precontact	Open habitation	No Evaluation Listed
13LN65	Precontact	Open habitation	No Evaluation Listed
13LN66	Woodland	Open habitation	No Evaluation Listed
13LN662	Woodland	Precontact scatter	No Evaluation Listed
13LN668	Woodland	Precontact scatter	No Evaluation Listed
13LN669	Late Woodland	Precontact scatter	No Evaluation Listed
13LN67	Precontact	Open habitation	No Evaluation Listed
13LN670	Precontact, Historic Euro-American	Precontact scatter, historic scatter	No Evaluation Listed
13LN68	Woodland	Open habitation	No Evaluation Listed
13LN69	Precontact	Open habitation	No Evaluation Listed
13LN70	Precontact	Precontact scatter	No Evaluation Listed
13LN71	Woodland	Open habitation	No Evaluation Listed
13LN72	Precontact	Precontact scatter	No Evaluation Listed
13LN73	Precontact	Isolated find	No Evaluation Listed
13LN74	Precontact	Precontact scatter	No Evaluation Listed
13LN75	Precontact	Precontact scatter	No Evaluation Listed
13LN76	Precontact	Precontact scatter	No Evaluation Listed
13LN760	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN761	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN762	Precontact	Precontact scatter	No Evaluation Listed
13LN763	Late Woodland	Precontact scatter – seasonal encampment	No Evaluation Listed
13LN764	Late Woodland	Precontact scatter – seasonal or short term habitation	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 13 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN765	Precontact	Precontact scatter	No Evaluation Listed
13LN766	Precontact	Precontact scatter	No Evaluation Listed
13LN767	Precontact	Precontact scatter	No Evaluation Listed
13LN768	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN769	Precontact	Precontact scatter	No Evaluation Listed
13LN77	Precontact	Open habitation	No Evaluation Listed
13LN770	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN771	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN78	Precontact	Precontact scatter	No Evaluation Listed
13LN79	Precontact	Precontact scatter	No Evaluation Listed
13LN80	Precontact	Precontact scatter	No Evaluation Listed
13LN81	Precontact	Precontact scatter	No Evaluation Listed
13LN82	Precontact	Precontact scatter	No Evaluation Listed
13LN83	Precontact	Precontact scatter	No Evaluation Listed
13LN84	Precontact	Precontact scatter	No Evaluation Listed
13LN877	Historic Euro-American	Historic farm/residence – stagecoach stop	No Evaluation Listed
13LN879	Historic Euro-American	Historic farm/residence – log cabin site	No Evaluation Listed
13LN880	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN881	Historic Euro-American	Road/trail – stage and post road	No Evaluation Listed
13LN884	Historic Euro-American	Road/trail – stagecoach road	No Evaluation Listed
13LN885	Precontact	Precontact scatter	No Evaluation Listed
13LN886	Precontact	Precontact scatter	No Evaluation Listed
13LN887	Precontact	Precontact scatter	No Evaluation Listed
13LN89	Precontact	Conical mounds	No Evaluation Listed
13LN892	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN9	Middle and Late Woodland	Precontact scatter, seasonal occupation	No Evaluation Listed

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 14 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN90	Precontact	Precontact scatter	No Evaluation Listed
13LN91	Precontact	Precontact scatter – Habitation or Work Site	No Evaluation Listed
13LN910	Middle Archaic, Historic Euro-American	Historic farm/residence, Precontact scatter	No Evaluation Listed
13LN911	Precontact, Historic Euro-American	Historic farm/residence, Precontact scatter	No Evaluation Listed
13LN92	Precontact	Precontact scatter	No Evaluation Listed
13LN924	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN925	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN926	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN927	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN93	Precontact	Nideh Mound Group	No Evaluation Listed
13LN932	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN933	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN934	Historic Euro-American	Industrial	No Evaluation Listed
13LN938	Historic Euro-American	Historic farm/residence	No Evaluation Listed
13LN94	Precontact	Precontact scatter	No Evaluation Listed
13LN95	Precontact	Precontact scatter	No Evaluation Listed
13LN96	Precontact	Precontact scatter, seasonal occupation	No Evaluation Listed
13LN97	Precontact	Lithic scatter	No Evaluation Listed
13LN98	Precontact	Precontact scatter	No Evaluation Listed
13LN99	Precontact	Precontact scatter	No Evaluation Listed
13LN27	Precontact	Open habitation	Unevaluated
13LN31	Late Woodland	Open habitation	Unevaluated

Table 3.6-4 Archaeological Sites within the 6-Mile Radius of DAEC (Sheet 15 of 15)

Site ID (NRHP ID)	Time Period	Site Type	SHPO NRHP Determination
13LN519	Woodland, Historic Euro-American	Woodland open habitation, possible resource procurement site	Unevaluated
13LN823	Precontact	Lithic scatter	Unevaluated
13LN824	Precontact	Lithic scatter	Unevaluated
13LN825	Precontact	Lithic scatter	Unevaluated
13LN826	Precontact	Lithic scatter	Unevaluated
13LN827	Precontact	Lithic scatter	Unevaluated

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 PM_{10}, coarse particulates), ozone, and sulfur dioxide (SO_2).

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 and has a maintenance plan requirement under Section 110(a)(1) of the CAA. (EPA 2025b; EPA 2025c; EPA 2025d)

As stated in the SEIS, there are no mandatory Class I Federal areas, as designated in 40 CFR (81)(D), in the State of Iowa or within 62 miles (100 km) of DAEC. The closest Class I areas are the Boundary Waters National Wilderness Area and Voyageurs National Park in Minnesota, Badlands National Wilderness Area in North Dakota, and Hercules-Glades National Wilderness Area and Mingo National Wilderness Area in Missouri. Given the distances involved and the nature of the stationary air pollutant sources at DAEC, no adverse impacts on Class I areas are anticipated from continued DAEC operation. (NRC 2010b) DAEC falls within the Northeast Iowa Intrastate Air Quality Control Region (40 CFR 81.256). The AQCR contains 12 counties in the State of Iowa.

As of May 31, 2025, one county in the 62-mile area, Muscatine County, Iowa, is designated nonattainment for 1-hour SO_2 (2010). Muscatine County is also a maintenance area for the 1971 SO_2 NAAQS. The other counties in the 62-mile radius are designated attainment/ unclassifiable for NAAQS. (EPA 2025b)

The 2010 SEIS notes that DAEC qualifies as a minor source under the Title V program and is, therefore, not required to obtain a Title V permit. In the SEIS, eight stationary pollutant sources at DAEC operated under air emissions permits issued by the LCHD. These sources include four emergency generators, one auxiliary boiler, one sulfuric acid tank, and two diesel fuel USTs.

The new cooling towers are not subject to federal emission standards under New Source Performance Standards or National Emission Standards for Hazardous Air Pollutants and therefore are exempt from major Title V permitting but require a local Linn County permit. NEDA expects the new towers to be built using good engineering practices and are expected to have similar flows as the previous towers.

DAEC held air permits for the following equipment: auxiliary boiler (DAEC 4863), 1G21 standby diesel generator (DAEC 4864), 1G31 standby diesel generator (DAEC 4865), diesel fire pump (DAEC 4866), TSC diesel (DAEC 4867), sulfuric acid tank (DAEC 4868), 1T34 UST (DAEC 4869), and 1T35 UST (DAEC 4670). The four air permits for the diesel engines and the air permit for the auxiliary boiler were allowed to expire without renewal in 2022. Permits DAEC 4868, 4869, and 4870 remain active, but the tanks covered by these permits have been exempted by the LCHD. NEDA does not expect to renew the three remaining tank permits once they expire.

Table 3.7-1 includes estimated emissions since 2020. No emission information is available after 2022 because the units were not operated.

There have been no notices of violation or noncompliance associated with DAEC air emissions in 2020 through 2024. No ozone or nitrogen oxides (NO_x) emissions tests have been completed on DAEC transmission lines.

Estimated emissions from potential direct GHG sources are determined from fuel usage rates during operation. GHG data for mobile sources are not compiled or reported. Direct GHG emissions from DAEC are included in Table 3.7-2, and indirect GHG emissions from the use of purchased electricity at DAEC are included in Table 3.7-3.

As listed in Table 3.7-2, DAEC's reported direct emissions are due to stationary combustion sources. No hydrofluorocarbon/perfluorocarbon (HFC/PFC), refrigerant, or sulfur hexafluoride (SF_6) information is available. The results listed in the tables are consistent with the August 2020 plant shutdown. The decreases in indirect GHG emissions were due to the shutdown activities required during those years.

Table 3.7-1 DAEC Annual Emissions (Tons Per Year)

Emission (Tons)	Permit Limits	2020	2021	2022
NO_x	100	10.7	0.2	0.1
SO_x	100	0.7	0.0	0.0
CO	100	0.2	0.0	0.0
PM_{10}	100	0.2	0.0	0.0
VOCs	50	0.9	0.0	0.0
HAPs	25/10	0.9	0.0	0.0

Note: HAPs emissions are conservatively estimated by assuming that reported VOCs are HAPs.
SO_x: Sulfur oxide
VOCs: Volatile organic compounds
HAPs: Hazardous air pollutants

Table 3.7-2 DAEC Annual GHG Emissions (CO_2e in Metric Tons Per Year)

CO_2e (Metric Tons)	2020	2021	2022
Stationary Combustion Sources	1,321	7.7	2.5
SF_6	NA	NA	NA
HFC/PFC/ODC Refrigerants	NA	NA	NA

CO_2e: Carbon dioxide equivalent
ODC: Ozone-depleting chemical

Table 3.7-3 DAEC Annual Indirect GHG Emissions (CO_2e in Metric Tons Per Year)

CO_2e (Metric Tons)	2020	2021	2022	2023	2024
Indirect GHG emissions from Purchased Electricity	6,033	8,357	5,331	1,881	1,403

3.8 Human Health

3.8.1 Nonradiological Health

3.8.1.1 Chemical Hazards

Work at DAEC is governed by a comprehensive industrial safety program that complies with the Occupational Safety and Health Administration (OSHA) standards in 29 CFR Parts 1910 and 1926 (where applicable), and National Fire Protection Association standards for electrical safety in the workplace set in National Fire Protection Association 70E. This program includes, but is not limited to, occupational noise exposure/hearing protection, respiratory protection, working over or near water, fall protection, chemical controls, and electrical safety.

The effectiveness of the industrial safety program is indicated by the low number of injuries and illnesses experienced by DAEC's employees. DAEC's OSHA Form 300A submittals report the number of recordable injuries and illnesses for hazards experienced by DAEC workers in a given year; submittals for the years 2020 and 2022 through 2024 were reviewed. The submittal for the year 2021 is not available for review. These submittals do not specify the cause of reported injuries/illness; however, they are useful in showing the overall rate of injury/illness. DAEC's recordable injury and illness incident rate per 100 equivalent full-time employees for 2020 and 2022 through 2024 is 0.07, which is less than that of the nuclear electric power generation industry's rate of 0.2 for 2023 (BLS 2024)

3.8.1.2 Microbiological Hazards

In the GEIS, the NRC evaluated health risks from disease-causing microorganisms (etiological agents) to both the public and nuclear plant workers. Key concerns include enteric pathogens (e.g., *Pseudomonas aeruginosa*), thermophilic fungi and bacteria (e.g., *Legionella* spp., *Vibrio* spp.), free-living amoebae (e.g., *Naegleria fowleri*, *Acanthamoeba* spp.), and toxin-producing organisms (e.g., *Karenia brevis*, blue-green algae). These organisms may be found in elevated numbers in unheated and heated water systems, cooling systems, source and receiving waters, and sewage treatment facilities (NRC 2024a).

The primary public health concern is the enhancement of thermophilic microorganisms in publicly available surface waters due to thermal discharges from nuclear plants. The public can be exposed to thermophilic microorganisms during swimming, boating, or other recreational uses of freshwater. Generally, these organisms grow best between 104–122°F, with some tolerating temperatures up to 158°F. Scientific studies vary in the optimum growth temperatures for the class of thermophiles organisms. NRC considered an optimal growth temperature range for thermophiles of 104–122°F. (NRC 2024a)

Legionella, naturally present in freshwater in lower numbers, becomes a concern when it proliferates in human-made systems like cooling towers. It grows optimally in stagnant waters with biofilms or slimes ranging in temperature of 77–113°F and is mainly transmitted through inhalation of aerosolized water. Indoor or enclosed environments pose a higher risk of exposure (CDC 2024a; CDC 2024b). DAEC cooling water intake operations were terminated on August

11, 2020. DAEC no longer has cooling towers, which were removed in the fall of 2020. Because DAEC is in SAFSTOR, no heated effluent is currently discharged to the environment. NEDA is not aware of, nor has NEDA been contacted by state or local agencies concerning, *legionella* outbreaks near DAEC.

Cyanobacteria, commonly known as blue-green algae, are single-celled bacterial organisms classified as phytoplankton that can cause harmful algal blooms. Dinoflagellates, another type of phytoplankton, specifically cause the recurring Red Tide bloom. These microorganisms thrive in slow-moving, warm, and nutrient-rich waters, leading to blooms that concentrate toxins. Their toxins pose no threat in low amounts, but during blooms, toxin concentrations can become hazardous. Exposure to these toxins can occur through skin contact, ingestion, or inhalation, posing health risks to humans. (NRC 2024a) NEDA is not aware of, nor has NEDA been contacted by state or local agencies concerning, algal blooms on the Cedar River in DAEC's area. The IDPH works collaboratively with the DNR and Centers for Disease Control and Prevention to track and report human illnesses related to harmful algal blooms (IHHS 2025). The DNR maintains a network of sites to monitor ambient water quality in the state. The DNR AQuIA system was reviewed, and information was only available for lakes near DAEC. There are no current ambient stream or river monitoring sites near DAEC.

Public recreation on the Cedar River and Pleasant Creek Reservoir within the vicinity of DAEC includes boating, fishing, hunting, camping, hiking, picnicking, and swimming (FPL 2008). There is public access to the discharge structure where it interfaces with the Cedar River, however, further access to the discharge canal is blocked by the surrounding metal/concrete barriers and the discharge structure itself. DAEC does not withdraw or consume surface water in its current shutdown state. DAEC utilizes groundwater for noncontact cooling and dilution.

DAEC maintains NPDES Permit No. 5700104, which includes effluent limits for E. coli and nitrogen for Outfall 002. Chlorine is added to effluent prior to discharge from the sewage treatment plant. It is also added to the circulating water system daily during the summer, and three times a week in the winter, when biological activity is lower.

The Center for Disease Control and Prevention's National Outbreak Reporting System collects data from state, local, and territorial public health agencies concerning multiple types of disease outbreaks. No cases of waterborne illness outbreaks in untreated recreational water in 2020 through 2023 were reported in Iowa. (CDC 2025)

3.8.1.3 Physical Hazards (Including Electric Shock Hazards)

Physical hazards can include those associated with maintenance activities, confined spaces, electrical systems, noise, and heat stress. DAEC's industrial safety program maintains procedures regarding electrical safety and electrical shock hazards, which include completion of a job hazard analysis prior to commencing work on electrical systems.

The electric field created by high-voltage lines can extend from the energized conductors on the lines to other conducting objects, such as the ground, vegetation, buildings, vehicles, and persons if appropriate clearances are not maintained, posing a shock hazard for workers. To

minimize the shock that could be experienced by someone touching an object that is capacitively charged, the clearance between the power lines and the object must limit the induced current to a low-enough electrical charge.

The in-scope transmission lines at DAEC were removed during the transition to SAFSTOR. There are no transmission lines connecting the generating unit to the onsite switchyard at DAEC. The onsite switchyard remains energized and the existing 161 kV and 345 kV transmission tie-ins remain in place.

Occupational hazards at DAEC are managed according to OSHA requirements. DAEC's recordable injury and illness incidents were low for the last year of operations and subsequent shutdown (which is anticipated to include electrical hazards, in case an incident occurred), as previously mentioned in Section 3.8.1.1.

3.8.2 Radiological Health

3.8.2.1 Public Exposure

As required in 10 CFR 20.1101, Radiation Protection Programs, NEDA 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 DAEC.

NRC regulations require that gaseous and liquid radioactive releases from nuclear power plants meet radiation dose-based limits specified in 10 CFR Part 20, Standards for Protection Against Radiation, and the as low as 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's radioactive effluent.

DAEC uses its DODAM, which specifies the methods and parameters to calculate doses resulting from liquid and gaseous radioactive effluents. These methods ensure that radioactive material discharges from DAEC meet NRC and EPA regulatory dose standards. DAEC's annual radiological material release reports contain a detailed presentation of the releases from DAEC and the resultant calculated doses. DAEC operations in 2020 through 2024 were well within federal limits. There were no abnormal gaseous releases in 2020 through 2024. Liquid effluent releases in the form of service water from the facility were continuous in 2020 through June 2022. Batch releases of liquids from the plant radwaste system also occurred during this period. After June 2022, the continuous service water effluents ceased and there were only batch releases from the facility. (NEDA 2021c; NEDA 2022b; NEDA 2023c; NEDA 2024a; NEDA 2025d) These liquid effluent releases are not considered unplanned releases, as they were controlled and within the design basis of the plant.

In 2024, DAEC operations met regulatory standards with no regulatory effluent limit exceedances. The resultant calculated maximum annual total body dose to a member of the

public from the uranium fuel cycle was approximately 0.15 millirem, which is less than one percent of the regulatory limit of 25 millirem/year. (NEDA 2025d)

DAEC'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 by sampling the following: airborne particulates, surface water, groundwater (potable and non-potable), broadleaf vegetation/crops, fish, and bottom and shoreline sediments. (NEDA 2025e) The REMP results for 2023 and 2024 are presented in Table 3.8-1 (NEDA 2024b; NEDA 2025e).

Occupational exposure at operating nuclear power plants is monitored by the NRC. The data reported by the NRC for 2020–2022 does not include DAEC due to its closure on October 12, 2020 (NRC 2024b).

3.8.2.2 Occupational Exposure

As previously mentioned, occupational radiological exposure at DAEC is managed under the facility's Radiation Protection Program, implemented in accordance with 10 CFR Part 20 and ALARA principles.

The NRC evaluated occupational exposure to workers during decommissioning in the 2002 decommissioning GEIS (NUREG-0586) and determined that the impact is anticipated to be SMALL. Occupational doses to individual workers during decommissioning activities are estimated to average approximately 5 percent of the regulatory dose limits in 10 CFR Part 20, and to be similar to, or lower than, the doses experienced by workers in operating facilities. (NRC 2002)

Since DAEC ceased power operations in 2020, no site-specific occupational dose data is available for the period following shutdown.

Table 3.8-1 REMP Sample Results

Media	Parameter	2023 Results	2024 Results
Air Particulates (pCi/m^3)	Gross Beta	Indicator: 0.030 Control: Sampling discontinued	Indicator: 0.024 Control: Sampling discontinued
	Gamma-emitting nuclides	No reactor by-product radionuclides were identified.	No reactor by-product radionuclides were identified.
Ambient Radiation (Thermoluminescent Dosimeters) (mR/quarter)	Gamma-emitting nuclides	14.5 to 18.6[a]	14.2 to 16.6[a]
Groundwater (Potable Water)	Tritium	None detected	None detected
	Gamma-emitting nuclides	No reactor by-product radionuclides were identified.	No reactor by-product radionuclides were identified.
Groundwater (Non-potable Water) (pCi/L)	Tritium	>157 to 964	>174 to 386
Vegetation	Iodine-131	None detected	None detected
	Potassium-40	Range: 3.40-5.86[b]	Range: 4.07-7.19[b]
Surface Water	Tritium	None detected	None detected
	Gamma-emitting nuclides	None detected	None detected
Fish (pCi/g)	Gamma-emitting nuclides	No reactor by-product radionuclides were identified	No reactor by-product radionuclides were identified
	Potassium-40	Indicator: 3.92[b] Control: 3.96[b]	Indicator: 3.67[b] Control: 3.81[b]
Sediment (pCi/g)	Potassium-40	Indicator: 7.73-10.18[b] Control: 7.21 and 9.97[b]	Indicator: 9.38-11.30[b] Control: 8.32 and 8.91[b]

(NEDA 2024b; NEDA 2025e)

pCi/g: picocuries per gram
pCi/m^3: picocuries per cubic meter

a. The average thermoluminescent dosimeter readings indicate that the ambient gamma radiation levels were similar to the estimated average natural background radiation.

b. Potassium-40 values were detected at naturally occurring levels.

3.9 Waste Management

3.9.1 Radioactive Waste Management

Section 2.1.2 includes a brief discussion of the status of DAEC's liquid, gaseous, and solid radioactive waste systems.

The dismantling and decontamination period at DAEC included activities such as the disposition of incidental waste that may be present and is ready to ship prior to the start of the dormancy period. Waste generated at DAEC during the transition to SAFSTOR was transported offsite by approved carriers and disposed of at approved LLRW facilities. (NEDA 2020b)

The type and quantity of radiological waste shipped offsite in 2020 through 2022 is presented in Table 3.9-1 (NEDA 2021c; NEDA 2022b; NEDA 2023c; NEDA 2024a; NEDA 2025d).

Currently there is no LLRW stored onsite. Approved storage locations for LLRW onsite are the low level radwaste building and the LLRPSF.

LLMW has not been generated at DAEC in the past 5 years and no LLMW has been shipped offsite. DAEC has dedicated storage areas for LLMW in the low level radwaste building. Processing and disposal of LLMW is expected to be handled by an approved vendor, as needed.

DAEC does not have onsite LLRW or LLMW disposal facilities. 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 RCRA of 1976.

3.9.2 Nonradioactive Waste Management

The DNR and Environmental Protection Commission oversees solid and hazardous waste programs, including waste disposal, transportation, and storage. Types of nonradioactive waste produced at DAEC include office trash, break room waste, and packaging waste as well as industrial solid waste such as uncontaminated used equipment and maintenance waste. DAEC also collects certain materials for recycling such as batteries, oil, and cardboard. These waste streams are collected and shipped offsite for recycling or disposal in local landfills. (FPL 2008)

DAEC is classified by the EPA as a VSQG of non-acute hazardous waste and operates under the EPA ID No. IAD984566133. NEDA has detailed procedures for hazardous waste, universal waste, chemicals, waste oil, and waste minimization, which cover characterization, storage, and shipping of the various types of nonradioactive waste generated onsite. DAEC has designated onsite storage areas for hazardous and universal waste, which are inspected per NEDA procedure. These storage areas have been cleaned out. NEDA maintains a list of approved waste vendors used to manage and dispose of universal, hazardous, and nonhazardous waste. These vendors undergo an audit process that assesses their capabilities, management systems, compliance with federal, state, and local regulations, and financial stability before being contracted by NEDA.

Table 3.9-1 Solid Radioactive Waste Shipped Offsite (Total Cubic Meters by Year)

Type of Waste	2020	2021	2022	2023	2024
Spent Resin	18.68	0	0	N/A*	N/A*
Dry Active Waste	7.75	273	61.2	N/A*	N/A*

(NEDA 2021c; NEDA 2022b; NEDA 2023c; NEDA 2024a; NEDA 2025d)

*No radioactive waste was shipped offsite in 2023 or 2024.

4.0 ENVIRONMENTAL IMPACTS

The following subsections address impacts to environmental resource areas associated with preparation for and resumption of power operations at DAEC. In this chapter, applicable environmental resource areas include relevant discussion to assess potential impacts related to the activities for preparations for the resumption of power operations, resumption of power operations, and cumulative effects resulting from the effects of the proposed action when added to the effects of other past, present, and reasonably foreseeable actions on a particular resource area.

4.1 Land Use and Visual Resources

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

Section 3.1 describes current onsite land use conditions and proposed projects associated with the resumption of power operations. Projects associated with the preparation of DAEC for power operations are expected to occur in previously disturbed areas of the site, and there are no planned DAEC projects that are expected to change existing land uses. Therefore, impacts related to preparation for the resumption of DAEC power operations to land use are anticipated to be NOT SIGNIFICANT.

Visual appearance of DAEC has been well established; small changes are expected from the preparations for the resumption of power operations. The predominant visual features are the off-gas stack and the reactor building, at 328 and 153 feet tall, respectively. During preparations, NEDA anticipates having a crane onsite that surpasses the height of the reactor building. Given that the site is industrial in nature, the appearance of a crane is not expected to significantly alter the existing visual appearance of the site. Therefore, impacts related to the preparation for resumption of power operations on visual resources are expected to be NOT SIGNIFICANT.

4.1.2 Environmental Impacts from the Resumption of Power Operations

Environmental impacts from the resumption of power operations are anticipated to result only from activities at or in immediate proximity to existing facilities on previously disturbed land within the industrial area of DAEC. NEDA has no plans for developing DAEC facilities offsite. Offsite land use is also anticipated to be influenced by plant-related changes, such as changes to onsite land use, plant operations, or plant workforce. No changes to onsite land use due to the resumption of DAEC operations are planned. DAEC's workforce is expected to return to pre-shutdown levels; therefore, impacts to offsite land use are expected to be similar to pre-shutdown conditions.

The resumption of power operations and subsequent operation of the cooling towers is expected to result in the reappearance of water vapor plumes. The visibility of these plumes depends on multiple factors, including (but not limited to) weather conditions, time of day, and

air quality. These plumes are expected to be nearly identical to plumes produced during previous operations (FPL 2008). There is no planned demolition or construction associated with operation activities expected to significantly change the overall plant aesthetic or land use. Therefore, impacts related to the resumption of DAEC power operations to land use and visual resources are expected to be NOT SIGNIFICANT.

4.2 Water Resources

4.2.1 Groundwater Resources

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

Planned activities in support of potential restart are described in Section 2.2.1. Preparation activities are anticipated to restore DAEC to its previous OL condition in 2020 prior to shutting down. Preparation activities for resumption of power operations are expected to include upgrades, maintenance, and some new buildings.

As discussed in Section 2.2.1, planned ground disturbances for the preparations for the resumption of operations are expected to occur in previously disturbed areas, reducing impact to soil. As listed under authorized activity in Table 2.2-2, planned construction activities include installation of cooling towers, roadway improvements, building construction, and potentially adding UV treatment to the sewage treatment facility. Impacts to soil and water resources are anticipated to be mitigated with stormwater construction permits, associated construction SWPPPs with BMPs to manage runoff and control erosion, and adherence to internal procedures related to ground disturbance. Potential release of pollutants during ground disturbance are anticipated to be mitigated through DAEC's SPCC plan, SWPPP, associated BMPs, and internal procedures related to management of hazardous, nonhazardous, and radiological materials. Further, as indicated in Table 2.2-2, DAEC plans to apply for authorizations and to comply with permit requirements for these activities.

Groundwater is expected to be used for industrial purposes for restart activities. As discussed in Section 4.2.2.1, surface water from the Cedar River is anticipated to be used to test the circulating water pumps and cooling towers. As presented in Section 3.2, the DNR issued Water Use Permit 3046-R7, effective July 1, 2022, and expiring on June 30, 2032, authorizing groundwater withdrawals at DAEC up to 1,575 MGY at a maximum total rate of 3,000 gpm from four water supply wells (Well A, Well B, Well C, and Well D) for cooling, construction, potable, and sanitary purposes. This permit supports groundwater use during preparations for and resumption of power operations. There are no groundwater uses for preparations for resumption of power operations that are not anticipated to be continued during resumption of power operations, and there are no expected changes in groundwater use during resumption of power operations from prior operations. During operation, approximately 1,500 gpm of groundwater was withdrawn for industrial and potable use. In the 2010 SEIS, the NRC concluded that the impact of groundwater use at DAEC was SMALL. (NRC 2010b)

As discussed in Section 3.4, preparation for resumption of power operations is expected to require a workforce similar to that needed during prior planned outages. The temporary increase in staffing is expected to cause increased potable groundwater use. As discussed in Section 3.2.1.1, during operation, potable water was provided to the site from four water supply wells (Wells A through D) under a PWS registration, which was declassified and removed from the DNR's water supply inventory in December 2022. Groundwater withdrawals from these wells for potable use is authorized under Water Use Permit 3046-R7. A water supply well (Well Construction Permit Number 58665) was installed in 2022 to provide potable and sanitary water for employees onsite. This well is not associated with the water use permit or a PWS registration, and withdrawals from this well are not tabulated or reported because, as described in Section 3.2.1.1, the facility potable water system no longer serves at least 25 people for 60 or more days per year. There are no plans to install additional water supply wells at DAEC. DAEC plans to restore the potable water system and install temporary potable water treatment systems to serve individual buildings until the former potable water system is restored.

As described in Section 3.2.1.2, there are three extraction wells onsite within the shallow aquifer permitted by Linn County to withdraw up to 25,000 gallons per day per well (75,000 gallons per day or 52 gpm total). The extraction well system was installed to treat tritium in groundwater, and the system ceased operation and was secured in June 2022 after tritium concentrations in groundwater monitoring wells were below the environmental LLD of 2,000 pCi/L. There are no plans to restart the extraction well system because the source of tritium was identified, the leak was repaired, and tritium in groundwater has declined steadily and remained below 2,000 pCi/L in groundwater monitoring wells.

Impacts to groundwater resources during the period of preparations for resumption of power operations are expected to be NOT SIGNIFICANT.

4.2.1.2 Environmental Impacts from the Resumption of Power Operations

As discussed in Section 4.2.1.1, groundwater use is expected to be similar to conditions prior to shutting down in 2020. During operation, groundwater was supplied for industrial and potable purposes from four water supply wells on a schedule that involved pumping one or two wells at a time. Approximately 1,400 gpm was sent to an air-cooling system, 100 gpm was used for demineralizer makeup, and less than 10 gpm was used for potable supply. (NRC 2010b) Water Use Permit 3046-R7 authorizes groundwater withdrawals at DAEC up to 1,575 MGY at a maximum total rate of 3,000 gpm from four water supply wells (Well A, Well B, inactive Well C, and Well D) for cooling, construction, potable, and sanitary purposes. This permit supports groundwater use during resumption of power operations.

The water use permit requires monthly recording and annual reporting of water use. The permit also requires measuring depths to water at least once per year for active water supply wells under non-pumping and pumping conditions. Records of pumping rates and depths to water must be submitted annually. In the 2010 SEIS, the NRC determined that the impact of groundwater use and quality at DAEC is SMALL (NRC 2010b).

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 2013 GEIS to evaluate the potential contamination of groundwater from the release of radioactive liquids from plant systems to the environment. As this was a new issue introduced since the 2010 SEIS, the NRC did not evaluate impacts from potential inadvertent radionuclide releases to groundwater.

NEDA monitors onsite groundwater in accordance with DAEC's GWPP, as discussed in Section 3.2.1.2, and groundwater monitoring results are reported in AREORs. Tritium is the only byproduct identified in groundwater samples. The maximum detected tritium concentrations in the last 5 years have steadily decreased from 51,271 pCi/L in MW-08A in 2020 to 386 pCi/L in MW-22A in 2024. Maximum tritium concentrations in groundwater have been below the EPA MCL of 20,000 pCi/L since 2022. As discussed in Section 3.2.1, groundwater gradient in aquifers underlying DAEC is southeast toward the Cedar River. Tritium was not detected above the LLD in 2020 through 2024 in monitoring well MW-33A, which is located farthest down-gradient to the boundary of the owner-controlled area and the Cedar River, indicating tritium is not migrating offsite.

The 31 site monitoring wells included in DAEC's GWPP were selected based on the SSCs with the highest risks to groundwater, which are located on the south side of the power block. These SSCs are the condensate pump pits, the condensate storage tanks and associated underground piping, and various radwaste sumps. These 31 sentinel wells provide early detection of an underground leak within the protected area and outside of the protected area.

- Four pairs of monitoring wells and six single monitoring wells are located within the protected area downgradient of the power block/reactor building and near high-risk systems. These wells include MW-07A/B, MW-08A/B, MW-09A/B, MW-14A/B, MW-18A, MW-19A, MW-20A, MW-21A, MW-22A, and MW-23A.

- Six pairs of monitoring wells and five single monitoring wells are located outside and downgradient of the protected area near the offgas stack. These wells include MW-11A/B, MW-12A/B, MW-28A/B, MW-29A/B, MW-30A/B, MW-32A/B, MW-24A, MW-26A, MW-33A, MW-34A, and MW-35A.

NEDA ensures that characterization of site geology and hydrology is performed and that the site conceptual model is updated as necessary to reflect conditions based on current site design and environmental factors. Based on risk assessments of SSCs and the site conceptual model, new sampling locations may be established. If an inadvertent radiological release occurred that could impact groundwater, DAEC anticipates following internal procedures related to remedial actions, notification, reporting, and investigation, and documentation is expected to be included in the 10 CFR 50.75(g) file. As described in Section 3.2.1.2, additional groundwater samples are collected at offsite locations as part of DAEC's REMP.

Groundwater is monitored via DAEC's GWPP and REMP. Impacts to groundwater resources during resumption of power operations are expected to be NOT SIGNIFICANT due to

adherence to water use permit limits and internal procedures related to management of hazardous, nonhazardous, and radiological materials.

4.2.2 Surface Water Resources

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

As discussed in Section 2.2.1, cooling towers were removed and the SFP was drained. Prior to resumption of power operations, DAEC plans to install cooling towers and add water to the cooling systems. The total fuel storage pool, well, and pit volume is 572,600 gallons (76,548 cubic feet) (NEDA 2021a). The circulating water system contains about 2,400,000 gallons of water stored in the cooling tower basins, pump house, condenser, and associated piping (NEDA 2019a). This volume is insignificant compared to water availability in the Cedar River. As described in Section 4.2.1.1, Water Use Permit 3046-R7 supports surface water withdrawals during preparations for and resumption of power operations.

As discussed in Section 4.2.1.1, preparations for resumption of power operations are anticipated to restore DAEC to its previous operating conditions. Potential impact to surface water from construction activities is likely to be localized and of short duration. Internal procedures related to ground disturbance, stormwater management, and chemical management and adherence to stormwater construction permit is expected to mitigate potential impact to surface water quality. Planned activities are expected to occur in previously disturbed areas, reducing potential impact to surface water quality. There are no planned land disturbance activities in undeveloped floodplains.

As discussed in Section 3.2.2.2, NPDES Permit No. 5700104 authorizes discharges to the Cedar River during shutdown. The NPDES permit does not include cooling tower blowdown or low-volume wastewater discharges. As listed in Table 2.2-2, NEDA plans to apply for a permit modification to include discharges from cooling towers and low-volume wastewater flows that were previously routed to Outfall #005.

Municipal water and sewer services are not currently supplied to the site and there are no plans to connect to municipal utilities. The onsite sewage treatment facility is out of service and may be modified prior to resuming operations. NEDA plans to apply for a sewage treatment system construction permit if NEDA decides to add UV treatment to the existing domestic wastewater treatment plant.

The current shutdown site does not have industrial activity exposed to stormwater. Prior to resuming operations, NEDA plans to submit a notice of intent for coverage under Iowa NPDES General Permit No. 1 for stormwater discharges associated with industrial activity.

Dredging of river sediment and debris at the intake structure is planned prior to resumption of power operations. Dredging was conducted periodically during normal operations to realign the river flow directly toward the intake structure (NEDA 2019a). Dredging was conducted using excavators to remove sediment and place it into dump trucks. Maintenance dredging in the

Cedar River is completed when there is a risk of sediment impacting the intake structure or river water supply pumps. NEDA determines permit requirements and conducts maintenance dredging in accordance with internal procedures. Dredging permits issued by the USACE, DNR, and Linn County have expired and NEDA plans to apply for permits prior to dredging. Dredging spoils are managed outside of the floodplain in accordance with regulatory requirements and internal BMPs. The NRC concluded in the GEIS that the impact of dredging on water quality is anticipated to be SMALL during the initial LR and SLR terms for all nuclear plants (NRC 2024a).

Impacts to surface water resources during preparations for resumption of power operations are expected to be NOT SIGNIFICANT because NEDA expects to comply with permit requirements and to continue to follow internal procedures.

4.2.2.2 Environmental Impacts from the Resumption of Power Operations

During operation, surface water from the Cedar River water was used to provide water for plant cooling requirements and to provide flow to meet emergency plant requirements for cooling (NEDA 2019a).

Water Use Permit 3046-R7 authorizes surface water withdrawals at DAEC up to 12,575 MGY from the Cedar River. Including authorized groundwater withdrawals, the combined maximum water use limit is 14,150 MGY at a maximum rate of 27,000 gpm. This permit supports groundwater use during resumption of power operations.

Under normal operation, cooling water was withdrawn from cooling tower basins, circulated through the main condensers, and returned to the cooling towers at a rate of 310,000 gpm (FPL 2008). A maximum of 11,200 gpm (5,887 MGY) of cooling tower makeup water was withdrawn from the Cedar River and transferred to the cooling towers. Of the water transferred to the cooling towers, 8,100 gpm was for evaporative dissipation, and 3,100 gpm was returned to the Cedar River as cooling tower blowdown. (NRC 2010b) Cooling tower procedures and guidelines are anticipated to be similar to the prior documents. NEDA expects surface water use and cooling tower consumption at DAEC during resumption of power operations to be similar to prior operations. In the SEIS, the NRC concluded that the impact on surface water due to the use of river makeup water, even during periods of low flow, is SMALL (NRC 2010b).

As part of the original DAEC construction, the Pleasant Creek Recreational Reservoir was constructed about 2 miles northwest of DAEC to supply water to the Cedar River during low-flow conditions (NRC 2010b). The DNR issued Water Use Permit 3533-R4 authorizing release of water from the reservoir for low-flow augmentation purposes at a rate equal to the consumptive use at DAEC. Water was never released from the reservoir, and the permit was allowed to expire.

Potential spills at DAEC could discharge to the Cedar River through overland flow or conveyance. Runoff from the majority of the site generally flows eastward into two ditches that discharge into the Cedar River. During resumption of power operations, impacts to surface water quality from plant discharges are anticipated to be regulated under a modified NPDES permit and stormwater discharges are expected to be regulated under the state general permit

for stormwater discharges associated with industrial activity (General Permit No. 1), under which DAEC is expected to maintain a SWPPP for managing stormwater discharge to the Cedar River. Inadvertent releases of nonradioactive materials are expected to be managed with DAEC's SPCC plan and internal procedures. As described in Section 4.2.2.1, sanitary waste is expected to be treated at the onsite sewage treatment facility. As discussed in Section 3.2.2.2, surface water sampling is conducted as part of DAEC's REMP, and sampling results are reported in AREORs. In the SEIS, the NRC concluded that plant operations had a SMALL impact on surface water quality (NRC 2010b).

Based on the analysis above, impacts to surface water from resumption of power operations are expected to be NOT SIGNIFICANT.

4.3 Ecological Resources

4.3.1 Terrestrial Ecology

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

Activities related to preparations for the resumption of power operations, including herbicide and pesticide use and equipment and vehicle traffic, are anticipated to be limited to already developed or previously disturbed areas. As such, these activities are unlikely to alter patterns of wildlife use and migration across the site. Because the increased vehicular use is expected to only be temporary and is anticipated to use previously established roadways, increased noise and traffic impacts to wildlife are expected to be minor. In addition, administrative procedures and protocols, BMPs, and the acquisition of applicable permits from federal, state, and local agencies are anticipated to minimize impacts to terrestrial resources. Therefore, impacts related to the preparations for the resumption of DAEC power operations on terrestrial ecology are expected to be NOT SIGNIFICANT.

4.3.1.2 Environmental Impacts from the Resumption of Power Operations

In the 2010 SEIS, the NRC evaluated DAEC operational impacts on terrestrial resources using the 1996 GEIS. Since the 2010 SEIS was published, terrestrial issues have been reorganized and updated in the 2024 GEIS.

The 2024 GEIS includes two terrestrial resource issues applicable to DAEC that were not previously analyzed in the 2010 SEIS: (1) non-cooling system impacts on terrestrial resources, and (2) exposure of terrestrial organisms to radionuclides.

Non-cooling System Impacts on Terrestrial Resources

Site-specific programs (e.g., SPCC, SWPPP, NPDES) described in Section 3.2.2.2 are expected to continue to be utilized at the site to decrease environmental effects and reduce the occurrence of inadvertent releases of non-radiological contaminants. Further, administrative procedures described in Section 3.3.1.4, including those related to vegetation management,

excavation, trenching and ground disturbance controls, and environmental review and evaluations, are anticipated to help minimize impacts on terrestrial resources. Therefore, non-cooling system impacts related to the resumption of DAEC power operations on terrestrial resources are expected to be NOT SIGNIFICANT.

Exposure of Terrestrial Organisms to Radionuclides

DAEC's REMP was established prior to the station becoming operational to provide information on background radiation present in the area. The goal of the REMP is to evaluate the impact of the station on the environment. Environmental samples from different media are monitored as part of the program in accordance with specifications detailed in the ODCM and DAEC Technical Specifications. The program compares data from indicator locations near the plant to control locations farther away from the site to assess operation impacts. (NEDA 2025e) Historical DAEC REMP data is described in the 2010 SEIS (NRC 2010b).

The AREOR provides REMP data obtained through analyses of environmental samples collected at DAEC. Based on the results of the REMP and the doses calculated from measured effluents, DAEC operations from 2020 to 2024 did not have adverse effects on the health of the public or on the environment. (NEDA 2021b; NEDA 2022a; NEDA 2023b; NEDA 2024b; NEDA 2025e) Therefore, exposure of terrestrial organisms to radionuclides for the resumption of power operations of DAEC is expected to be NOT SIGNIFICANT.

4.3.2 Aquatic Ecology

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

Activities related to preparations for the resumption of power operations are anticipated to be limited to already developed or previously disturbed areas. Therefore, the only potential impacts to aquatic ecology during the proposed preparation activities are expected to result from stormwater runoff and sedimentation. Planned stormwater drainage management based on site-specific programs (e.g., SPCC, SWPPP, NPDES) are expected to continue to follow BMPs with monitoring of outfalls to prevent pollutants from entering stormwater. Therefore, impacts related to the preparations for the resumption of DAEC power operations on aquatic ecology are anticipated to be NOT SIGNIFICANT.

4.3.2.2 Environmental Impacts from the Resumption of Power Operations

The impacts from the resumption of DAEC operations are anticipated to be similar to those described in the 2010 SEIS (NRC 2010b). Since the 2010 SEIS was published, aquatic issues have been reorganized and updated in the 2024 GEIS.

The 2024 GEIS includes three aquatic resource issues applicable to DAEC that were not previously analyzed in the 2010 SEIS: (1) exposure of aquatic organisms to radionuclides, (2) effects of dredging on aquatic organisms, and (3) impacts of transmission line right-of-way (ROW) management on aquatic resources.

Exposure of Aquatic Organisms to Radionuclides

As described in Section 4.3.1.2, DAEC operates in compliance with NRC effluents standards and reports them annually to the NRC as part of its REMP in the AREOR. Based on the results of the REMP and the doses calculated from measured effluents, DAEC operations from 2020 to 2024 did not have adverse effects on the health of the public or on the environment. (NEDA 2021b; NEDA 2022a; NEDA 2023b; NEDA 2024b; NEDA 2025e) Continued compliance with NRC radiological effluent limits and implementation of the REMP is expected to ensure that aquatic organisms' exposure to radionuclides are well within guidelines. Therefore, exposure of aquatic organisms to radionuclides for the resumption of power operations of DAEC is anticipated to be NOT SIGNIFICANT.

Effects of Dredging on Aquatic Organisms

Permits from Linn County, DNR, and USACE related to maintenance dredging at DAEC have expired. NEDA anticipates renewing the required permits to perform maintenance dredging around the intake structure prior to the resumption of power operations. Though plans and details for maintenance dredging for DAEC resumption of power operations have not yet been established, once these permits are renewed, DAEC is expected to comply with the conditions listed in their maintenance dredging permit. Therefore, the effects of dredging on aquatic organisms for the resumption of power operations of DAEC is anticipated to be NOT SIGNIFICANT.

Impacts of Transmission Line ROW Management on Aquatic Resources

Vegetation management practices described in the 2008 LR ER and in Phase I of the solar project remain valid (FPL 2008). No land disturbance activities are planned at DAEC, and activities related to the proposed resumption of power operations are anticipated to be limited to previously disturbed areas. As mentioned in Section 3.3.2.4, DAEC maintained individual pollution prevention and spill response programs including the SPCC Plan, SWPPP, and other related BMPs prior to plant shutdown. These programs are expected to be restored on resumption of operations at the site. Similarly, DAEC administrative procedures including those for pesticides and herbicides management, environmental review, and environmental evaluations that are anticipated to help minimize impacts are expected to be restored. ROW management is expected to maintain aquatic communities and resources in their current condition, and the implementation of BMPs and adherence to vegetation management protocols is expected to ensure minimal impact on aquatic resources from ROW management and maintenance. Therefore, impacts of transmission line ROW management on aquatic resources with the resumption of power operations at DAEC is anticipated to be NOT SIGNIFICANT.

4.3.3 Special Status Species and Habitats

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

Activities related to preparations for the resumption of power operations are expected to be limited to already developed or previously disturbed areas. As such, these activities are unlikely to alter patterns of wildlife use and migration across the site. Because the increased vehicular use may only be temporary and is anticipated to use previously established roadways, increased noise and traffic impacts to wildlife are expected to be minor. In addition, administrative procedures and protocols, BMPs, and the acquisition of applicable permits from federal, state, and local agencies are anticipated to minimize impacts to special status species and habitats. Therefore, impacts related to the preparations for the resumption of DAEC power operations on special status species and habitats are anticipated to be NOT SIGNIFICANT.

4.3.3.2 Environmental Impacts from the Resumption of Power Operations

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

Federally Listed Species

As discussed in Section 3.3.3, the current known ranges of four species listed, or proposed for listing, under the ESA overlap with DAEC's action area: the northern long-eared bat (endangered), western regal fritillary (proposed threatened), monarch butterfly (proposed threatened), and eastern prairie fringed orchid (threatened). The potential impacts of resuming DAEC power operations on each of these species are discussed below.

Northern Long-eared Bat

Northern long-eared bats have not been observed in DAEC's action area. However, northern long-eared bats could potentially occur in adjacent floodplain forest areas that support silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), box elder (*Acer negundo*), hawthorn (*Crataegus mollis*), oaks (*Quercus* spp.) and hickories (*Carya* spp.). Further, these species could potentially transit DAEC's action area when foraging or migrating.

Potential impacts to bats from the continued resumption of DAEC power operations are discussed below:

- *Mortality or injury from collisions with plant structures*: Bat collisions with 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 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, plant operations are expected to be confined to previously disturbed areas,

and no tree or vegetation clearing is proposed during the resumption of power operations that is anticipated to potentially impact the habitat for bats. NEDA conducts environmental reviews for engineering-related activities, including ground disturbance, prior to project activities.

- *Behavioral changes from construction activities*: As mentioned in Section 2.2.1, activities for the resumption of power operations are expected to include construction of new buildings, restoration of existing buildings, equipment upgrades, and maintenance within already disturbed areas. Bats, if present at DAEC's action area, 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 adjacent to the action area likely provide more suitable habitat, and it is unlikely that bats are to establish colonies in the man-made structures at DAEC. As such, behavioral changes to bats from construction activities during the resumption of power operations at DAEC is unlikely.

When applicable, DAEC consults with the USFWS to ensure compliance with ESA. Compliance with regulatory requirements associated with the federally listed species is anticipated to continue to be an administrative control practiced by NEDA for the life of the facility. Therefore, NEDA concludes that the resumption of DAEC power operations MAY AFFECT, BUT IS NOT LIKELY TO ADVERSELY AFFECT, the northern long-eared bat. This determination is supported by the USFWS Northern Long-eared Bat and Tricolored Bat Range-wide Determination Key provided via the USFWS Information for Planning and Consultation tool (USFWS 2025a).

Monarch Butterfly and Western Regal Fritillary

As described in Section 3.3.3.1.2, suitable habitat for the monarch butterfly and the western regal fritillary butterfly may be present in undeveloped portions (e.g., herbaceous grasslands) of the site that are not maintained by mowing. DAEC does not have specific requirements to track or maintain monarch or western regal fritillary habitat at the site. Monarchs require milkweed as their host plants, and milkweed populations are likely to be present in undeveloped/unmaintained (grassland) areas of the site. The larval stage of the western regal fritillary relies solely on violets as host plants, but no records or observations of violets have been made on the site. Plant operations are anticipated to be located in previously disturbed areas, and no additional vegetation clearing is proposed that is expected to potentially impact habitat for the monarch butterfly or western regal fritillary. An activity associated with general operations and maintenance is anticipated to undergo environmental compliance reviews that include an evaluation of potential impacts on protected species prior to the start of the activity. Existing regulatory programs the site is subject to, including management of herbicide applications, ensure that terrestrial habitat is protected. As such, NEDA concludes that the resumption of DAEC power operations MAY AFFECT, BUT IS NOT LIKELY TO ADVERSELY AFFECT, the monarch butterfly, and is anticipated to have NO EFFECT on the western regal fritillary butterfly.

Eastern Prairie Fringed Orchid

The eastern prairie fringed orchid occurs in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, and bogs. The primary threat to this species is habitat destruction (e.g., land use change, habitat fragmentation). This plant is known to occur in Linn County, and there is potential habitat for this species within the action area. However, there have been no recorded occurrences of this species within DAEC's action area. The resumption of operations at DAEC does not involve land-clearing activities or modifications to existing terrestrial or aquatic vegetation. An activity associated with general operations and maintenance is anticipated to undergo environmental compliance reviews that include an evaluation of potential impacts on protected species prior to the start of the activity. Existing regulatory programs the site is subject to, including management of herbicide applications, ensure that terrestrial habitat is protected. As such, NEDA concludes that the resumption of DAEC power operations is anticipated to have NO EFFECT on the eastern prairie fringed orchid.

State-Listed Species

As mentioned in Section 3.3.3.4, the DNR's Natural Areas Inventory identifies 50 state-listed species that potentially occur in Linn County. A habitat assessment field survey conducted in 2021 for the solar project concluded that, while six of these state-listed species (Higgin's eye, eastern prairie fringed orchid, prairie bush clover, western prairie fringed orchid, northern long-eared bat, monarch butterfly) may have ranges that overlap, none are likely to occur at the site due to the lack of suitable habitat within areas of the solar project. The DNR's environmental review for this solar project also determined that state threatened, endangered, or special concern species are absent from the area. However, forest, herbaceous grassland, and riverine areas adjacent to the site might contain suitable habitat for some of these species. DAEC's existing procedures and regulatory programs (such as management of herbicide applications, environmental reviews prior to ground disturbance, SWPPP, etc.) ensure that terrestrial and aquatic habitats are protected. Further, resumption of power operations at DAEC is expected to be confined to the existing site and facilities. As such, NEDA concludes that impacts to state-listed species from the resumption of DAEC power operations are anticipated to be NOT SIGNIFICANT.

Migratory Birds, Bald Eagles, and Golden Eagles

As described in Section 3.3.3.1.2, the current known ranges of seven birds of conservation concern overlap with DAEC's action area. Migratory movements or local flight patterns may result in the occurrence of these birds at DAEC's action area. 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 resumption of DAEC power operations that are expected to impact potential habitat for birds of conservation concern. Further, various administrative controls, permits, and BMPs are in place at DAEC that is anticipated to ensure protection of the species and their associated habitats. When necessary, consultation with responsible agencies is expected to be conducted to maintain compliance with existing regulations to protect birds of

conservation concern. Therefore, NEDA concludes that the impacts from resumption of DAEC power operations on birds of conservation concern (including bald eagles, golden, eagles, and other migratory birds) are anticipated to be NOT SIGNIFICANT.

Essential Fish Habitat

As described in Section 3.3.3.2, no EFH occurs in DAEC's action area, nor are EFH areas protected from fishing. As habitat areas of particular concern are derived from EFH, there were also no habitat areas of particular concern located within DAEC's action area. Therefore, this issue is not relevant to the resumption of DAEC power operations.

Sanctuary Resources

As described in Section 3.3.3.3, there are no national marine sanctuaries located in DAEC's action area. Therefore, this issue is not relevant to the resumption of DAEC power operations.

4.4 Socioeconomics

4.4.1 Environmental Impacts from the Preparations for Resumption of Power Operations

During preparations for resumption of power operations, impacts to socioeconomics areas, including transportation and housing, are expected to be similar to impacts during prior outages, as the number of employees onsite at DAEC is expected to be similar. NEDA anticipates approximately 1,000 additional workers onsite during these preparations, which are expected to last from the beginning of 2025 to Q4 2028, with the assumption that these staff are to be split into shifts. (NRC 2010b) These staff are expected to stay in similar accommodations in the surrounding region, follow the same transportation routes and use the same entrances to DAEC as past outage workers. Impacts to housing or transportation are expected to be NOT SIGNIFICANT during preparations for resumption of power operations.

Tax payments to local jurisdictions have decreased since transitioning to SAFSTOR. NEDA expects to continue paying property taxes throughout preparations for resumption of power operations at roughly the same levels as paid in the years following shutdown (discussed in Section 3.4). NEDA does not expect to pay other taxes, aside from sales taxes on equipment, during this period. Thus, impacts of tax payments to local jurisdictions during the period of preparations for resumption of power operations are expected to be NOT SIGNIFICANT.

4.4.2 Environmental Impacts from the Resumption of Power Operations

In 2019, prior to shutdown, DAEC employed approximately 386 full-time staff, over 91 percent of which hailed from the Iowa counties of Linn and Benton. After resumption of power operations, DAEC is expected to employ roughly the same number of full-time, permanent staff as were employed prior to shutdown. These workers are expected to hail from the same counties as pre-shutdown workers.

NEDA anticipates a resumption of a generation tax payment on behalf of DAEC to the state of Iowa, in lieu of property tax, beginning at the time of resumption of power operations (Q4 2028). The amount of tax allocated by the state to local jurisdictions is expected to be approximately $3,000,000 annually, in line with pre-shutdown payments.

Lastly, operating expenditures for nuclear plants are largely based off plant staffing levels and yearly tax payments. Because both DAEC's workforce and its anticipated yearly tax payments are expected to return to roughly pre-shutdown numbers, as discussed above, operating expenditures are expected to level out as well.

4.5 Reserved

4.6 Historic and Cultural Resources

As presented in Section 3.6, a review of previously recorded cultural resources conducted on June 13, 2025, found three known archaeological sites (13LN362, 13LN363, and 13LN365) within DAEC's operational area and 434 previously identified cultural resources within a 6-mile radius of DAEC. While no SHPO NRHP eligibility determination was found for the three sites within DAEC, two (13LN363 and 13LN365) of the three were recommended as potentially eligible. The third site (13LN362) was recommended as not eligible. Review of the 6-mile radius surrounding DAEC found 10 NRHP-listed properties and 38 resources where eligibility or potential eligibility was either determined by the SHPO. An additional two archaeological sites (13LN877 and 13LN879) were recommended as contributing to the eligible Sugar Grove Farmstead Historic District (57-07220). Of the remaining cultural resources, 150 were recommended and/or determined not eligible for the NRHP while 209 resources were not evaluated or had no status available.

4.6.1 Environmental Impacts from the Preparation of Resumption of Power Operations

As described in Section 2.2.1, DAEC underwent initial activities to transition the facility into SAFSTOR following the cessation of power operations in 2020. NEDA has therefore begun a comprehensive evaluation to assess the status of plant systems. Activities for the resumption of power operations are expected to be limited to restoration, upgrades, and maintenance only. Additionally, due to past construction and the long-term industrial use of the site, much of the property has been previously disturbed. By limiting restart activities to previously disturbed areas and maintaining the visual context of the property, the resumption of power operations is not expected to affect known historic properties.

DAEC currently utilizes a Cultural Resources Protection Plan (CRPP) which was finalized and implemented in 2009 after consultation with the NRC and SHPO. The CRPP provides guidance for the management of archaeological sites and historic properties within DAEC. The CRPP also states that in the event of an inadvertent discovery of cultural resources, ground-disturbing activity must be stopped and the appropriate actions taken to determine the significance and appropriate treatment of the resources. The CRPP is supplemented by the control procedures

for excavation, trenching, and ground disturbance. These procedures identify in greater detail the steps for protecting cultural resources contained in the CRPP.

Therefore, by limiting restart activities to previously disturbed areas, preparations for the resumption of power operations are not expected to affect known historic properties within DAEC or within a 6-mile radius of DAEC.

Impacts to historic and cultural resources as a result of preparations to resume power operations are expected to be NOT SIGNIFICANT.

4.6.2 Environmental Impacts from the Resumption of Power Operations

As discussed in Section 2.2.2, DAEC is projected to return to operations in 2028. NEDA proposes to operate DAEC as the plant was operated prior to the 2020 shutdown once DAEC has been restored to its previous OL condition with NRC-approved amended license conditions. Additionally, the CRPP provides guidance for managing cultural resources with the potential to be affected by DAEC operations. Therefore, the resumption of power operations is not expected to affect known historic properties within DAEC or within a 6-mile radius of DAEC.

Impacts to historic and cultural resources as a result of the resumption of power operations are expected to be NOT SIGNIFICANT.

4.7 Air Quality

4.7.1 Environmental Impacts from the Preparations for Resumption of Power Operations

The restart activities are presented in Section 2.2. Some additional mobile sources of emissions may be required for restart activities or the resumption of operations. These units are anticipated to be exempt from permitting per Linn County Code 10-58(K)(3). Emissions expected during restart activities include those from mobile equipment required for the completion of emission unit maintenance and required endurance testing prior to restart.

During preparations for resumption of power operations, impacts to air quality are expected to be NOT SIGNIFICANT for the duration of the project. Emissions, including GHG emissions, are expected to be similar to the 2020 through 2022 levels shown in Tables 3.7-1 and 3.7-2 because those years accounted for post-shutdown activities, such as the absence of diesel generator emissions. As preparations are made, emissions are expected to increase as the units listed in Table 2.2-2 are brought back online. Emissions expected during preparation activities include those from mobile equipment required for the completion of emission unit maintenance and required endurance testing prior to restart. Because the emissions due to the preparations for the resumption of power operations are expected to be less than the emissions due to operations, the environmental impacts of air emissions are expected to be NOT SIGNIFICANT.

4.7.2 Environmental Impacts from the Resumption of Power Operations

Following the resumption of power operations, air emissions, including GHG emissions, are expected to be similar to the emissions generated during prior operations because the same or similar equipment that produced emissions for those years is expected to be brought back online. The SEIS does not include emissions data during prior operations. Emissions generated for operational years 2015 through 2019 are listed in Tables 4.7-1 and 4.7-2. As stated in the GEIS, impacts to air quality are SMALL for all plants, including DAEC once operations are resumed. DAEC contributes small quantities of GHG from minor air emission sources during operation and is expected to remain similar to the years prior to shut down upon restart.

New air permits are anticipated for resumption of power operations. Table 2.2-2 lists the emission units that are expected to be included in a new air permit application. The emission units listed in Table 2.2-2 are the same units listed in the previous air permit; therefore, emissions are expected to be similar to the emissions for years 2015 through 2019 as shown in Tables 4.7-1 and 4.7-2.

NRC's consideration of climate change looks at (1) the impact of GHG emissions and (2) the impact of continued operations to incrementally affect environmental resource areas that are also affected by climate change (NRC 2024b). Regarding the first item, the potential for GHG emissions as a result of plant operations during the LR term to affect climate change was assessed in the GEIS and determined to be SMALL for all plants. NEDA is not aware of new and significant information that affects this GEIS conclusion. Regarding the second item, Regulatory Guidance 4.2 states, "climate change impact analysis should focus on those environmental resource areas that could be incrementally affected by the proposed action including consideration of any observed and projected changes in climate on environmental resource areas." (NRC 2024b) Climate change impacts when combined with the potential impacts of an operating reactor on environmental resources could result in an incremental new, additive, or increased physical effect or impact on an environmental resource or environmental condition beyond what is already occurring (NRC 2024a).

The operation of DAEC is expected to avoid thousands of tons of potential GHG and criteria pollutant emissions compared to a fossil fuel-fired alternative. As described in Section 2.2, the proposed operation of DAEC during the RFOL term is anticipated to be a continuation of current operations. Therefore, no additional impacts to air quality are anticipated, and continued operation is anticipated to result in only negligible emissions of criteria air pollutants and GHGs from insignificant sources.

For DAEC, two environmental resource areas may experience incremental impacts of climate change and the continued operation of the plant beyond baseline conditions. These environmental resource areas are air quality and surface water resources. Other environmental resource areas are not expected to experience combined impacts of plant operations and climate change. Section 2.2 includes a summary of restart activities that are planned prior to resumption of power operations. There are no new means of affecting water temperatures. Continued compliance with the NPDES permit limits are anticipated to mitigate DAEC's impact

to water temperature and water quality. Environmental impacts from the resumption of power are expected to be NOT SIGNIFICANT.

Intake temperature data from plant monitoring equipment was not available. Data from a U.S. Geological Survey monitoring station in Waverly, Iowa, of Cedar River surface water temperature were used as a surrogate for plant intake water temperature trends. This monitoring station is located upriver about 60 miles northwest of DAEC. Data are available for October 2011 through June 2025. Time series figures of the monthly average temperatures at this station for the available period of record are provided in Figures 4.7-1 and 4.7-2. No discernible trends were identified. (USGS 2025)

Table 4.7-1 DAEC Annual Emissions (Tons Per Year)

Emission (Tons)	Permit Limits	2015	2016	2017	2018	2019
NO_x	100	6.7	7.9	6.9	7.5	4.8
SO_x	100	0.4	0.5	0.5	0.5	0.3
CO	100	0.1	0.2	0.1	0.2	0.1
PM_{10}	100	0.2	0.2	0.2	0.2	0.1
VOCs	50	0.5	0.6	0.6	0.6	0.4
HAPs	25/10	0.5	0.6	0.6	0.6	0.4

Note: HAPs emissions are conservatively estimated by assuming that reported VOCs are HAPs.

Table 4.7-2 DAEC Annual GHG Emissions (CO_2e in Metric Tons Per Year)

CO_2e (Metric Tons)	2015	2016	2017	2018	2019
Stationary Combustion Sources	226	265	235	252	187
SF_6	NA	NA	NA	NA	NA
HFC/PFC/ODC Refrigerants	NA	NA	NA	NA	NA
Total Direct Emissions	226	265.4	235	252	187
Onsite Electricity Usage	NA	NA	NA	NA	NA

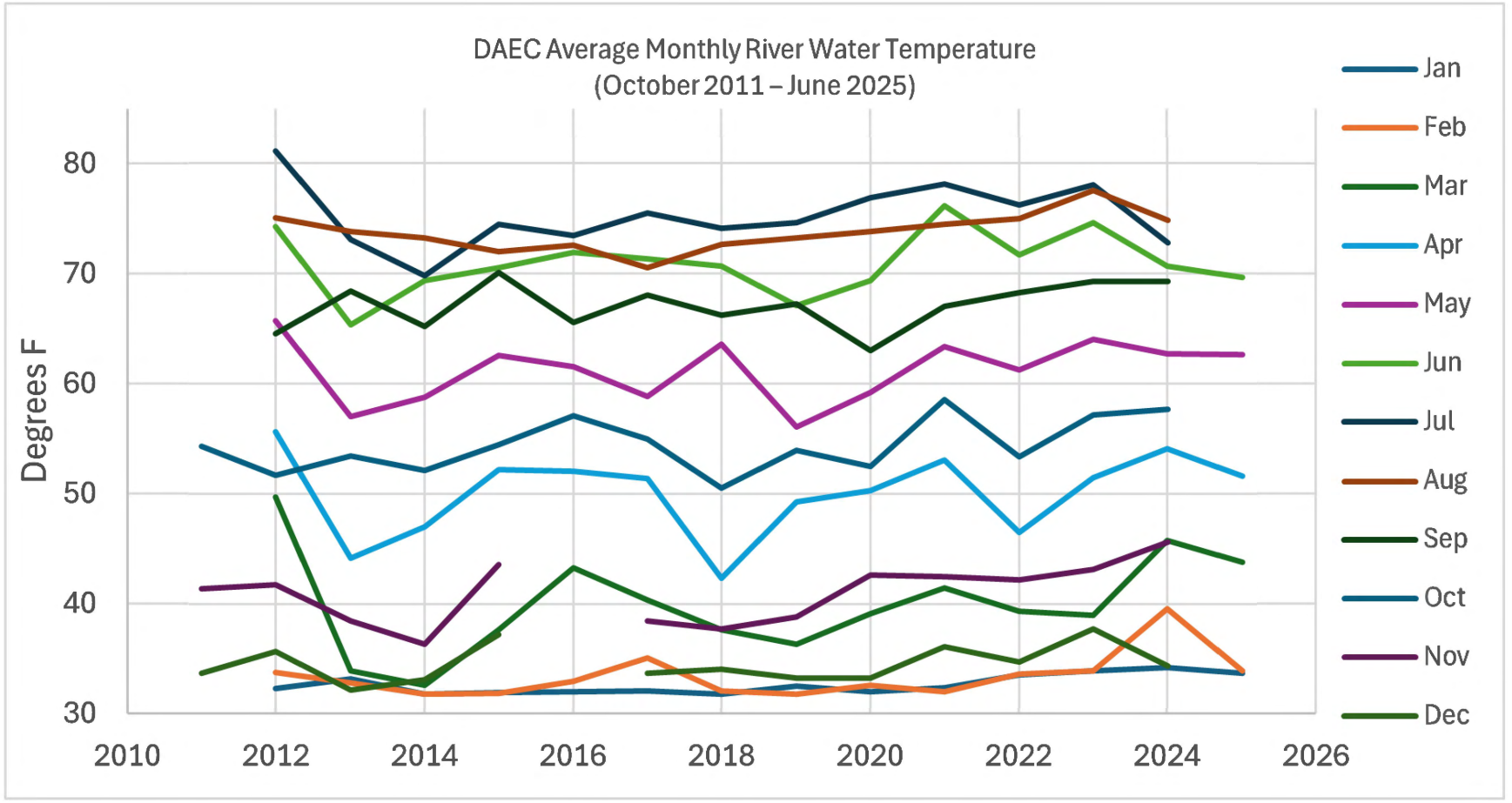

Figure 4.7-1 DAEC Average Monthly River Water Temperature

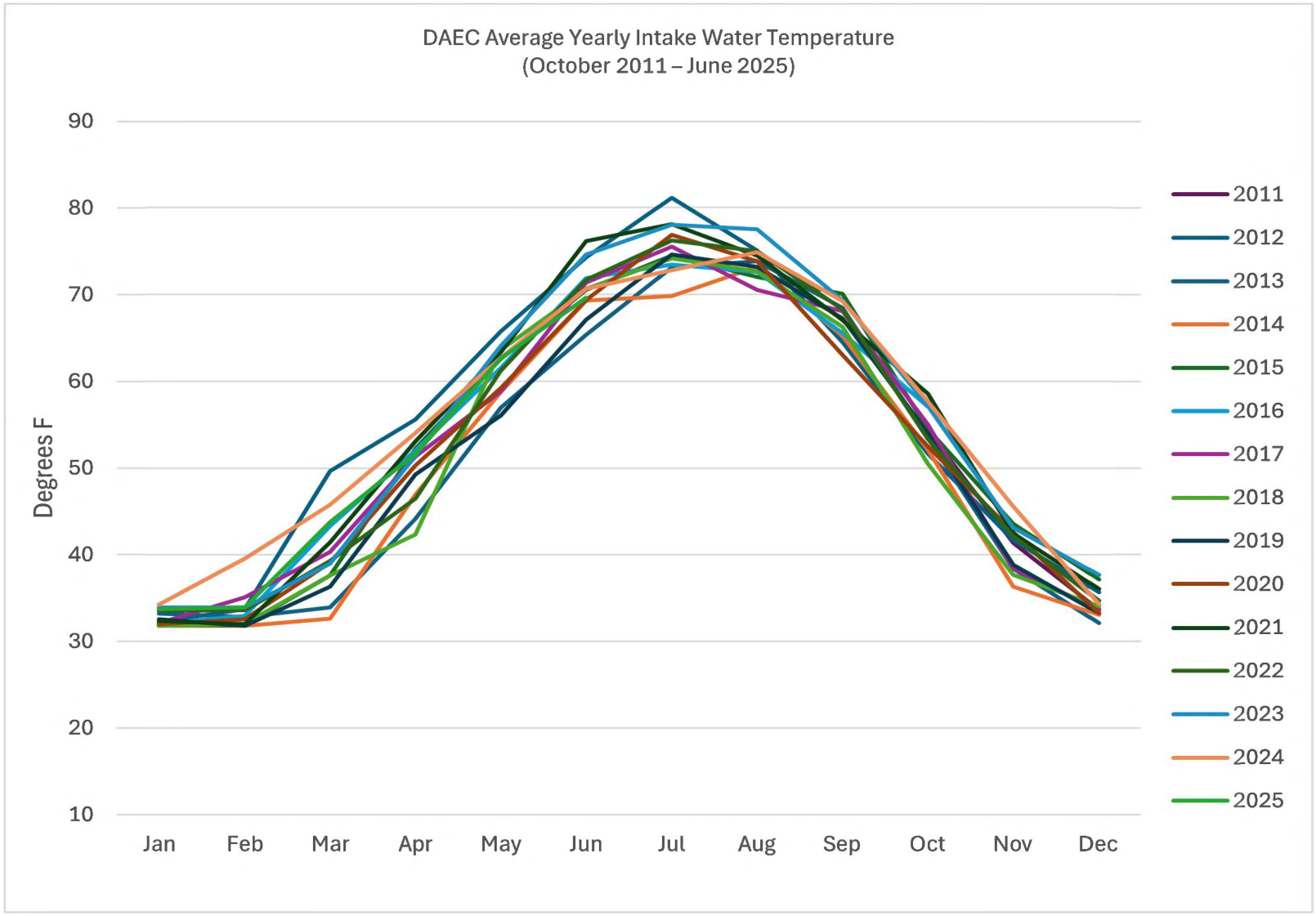

Figure 4.7-2 DAEC Average Yearly Intake Water Temperature

4.8 Human Health

4.8.1 Environmental Impacts from Preparations for Resumption of Power Operations

Preparations for resumption of power operations at DAEC are expected to involve upgrades, maintenance, inspections, system testing, and other activities necessary to restore the facility to operational readiness. The nonradiological and radiological effects of these activities regarding human health are expected to be NOT SIGNIFICANT, based on the continuation of existing programs and historical monitoring data.

4.8.1.1 Nonradiological Impacts

4.8.1.1.1 Chemical Hazards

As discussed in Section 3.8.1.1, DAEC is governed by a comprehensive industrial safety program which includes procedures for chemical control, usage, storage, and disposal. During the preparation for the resumption of power operations, the use of chemicals is expected to be conducted under established industrial safety procedures.

4.8.1.1.2 Microbiological

As discussed in Section 3.8.1.2, the circulating water system and cooling towers are currently deactivated. Restart activities for the preparation for resumption of power operations are anticipated to primarily rely on groundwater; however, water from the Cedar River is expected to be used to test the cooling tower pumps and system.

The replacement cooling tower design is not yet finalized but is anticipated to be similar to the cooling towers used during prior operations. Prior to shutdown, DAEC's cooling tower system consisted of two mechanical draft cooling towers and the associated condensers, basins, and circulating water pumps (FPL 2010).

The potential for microbiological hazards, such as *Legionella*, during preparations is expected to be low, as the cooling towers are to be inspected, tested, and maintained (through chlorination, as required), instead of actively used, which reduces the potential for exposure as there is not expected to be thermal input from the plant during maintenance/testing. As previously mentioned in Section 3.8.1.2, *Legionella* and other microbial organisms thrive in warm water.

4.8.1.1.3 Physical Hazards (Including Electric Shock Hazards)

Physical hazards during the preparation of the resumption of power operations can include those associated with restoration and maintenance activities, confined spaces, electrical systems, noise, and heat stress. During preparations for resumption of power operations, DAEC expects to continue to be governed by a comprehensive industrial safety program that complies with the OSHA standards in 29 CFR Parts 1910 and 1926 (where applicable).

As discussed in Section 3.8.1.3, the power output lines and main power transformer at DAEC were removed as part of cessation of power operations. The onsite switchyard remains energized and the existing 161 kV and 345 kV transmission tie-ins remain in place. During the preparation for the resumption of power operations, the in-scope transmission lines are expected to be restored.

The same switchyard infrastructure, located to the west of the generating unit, is planned for reuse to support preparations for resumption of power operations and resumption of power operations. There is an ongoing discussion with Midcontinent Independent System Operator as to what voltage is expected to be accepted within the substation. The final voltage is anticipated to be determined by a load study and is anticipated to be either 161 kV or 345 kV.

When construction is complete, the in-scope transmission lines are expected to cross the main access road to the facility (DAEC Road), which is publicly accessible. The design of the in-scope transmission lines is anticipated to adhere to applicable NESC electrical safety requirements. Design criteria for nuclear power plants that limit hazards from steady-state currents are based on the NESC, adherence to which requires that power companies design transmission lines so that the short-circuit current to ground produced from the largest anticipated vehicle or object is limited to less than 5 milliamperes (NRC 2024a). As discussed in Section 3.8.1.1, DAEC's recordable injury and illness incidents were low for the last year of operations and the period following shutdown. DAEC expects a similarly low rate of recordable injury and illness incidents during preparations for the resumption of power operations.

Based on the continuation of these established programs, nonradiological human health impacts from preparations for resumption of power operations are expected to be NOT SIGNIFICANT.

4.8.1.2 Radiological Impacts

Radiological work during preparations for the resumption of power operations is expected to include activities such as system inspections, maintenance, management of radioactive materials under existing controls, and other activities necessary to restore the radwaste system. Activities are expected to be conducted in accordance with 10 CFR Part 20 and the ALARA principle, as described in Section 3.8.

Given that DAEC public doses during operations were well within the NRC-established public dose limits, it is reasonable to expect public doses during restart activities to be well within such limits. Annual reports of environmental monitoring at DAEC for the years from 2020 through 2024 demonstrate that radioactivity levels in the offsite environment are not measurably increasing, and controls on potential radiological releases are expected to continue to be applied during restart activities.

Overall, radiological human health impacts from preparations for resumption of power operations are expected to be NOT SIGNIFICANT.

4.8.2 Environmental Impacts from Resumption of Power Operations

Following preparation activities, power operations are expected to resume. Based on historical operations and environmental data presented in Section 3.8, human health impacts from resumption of operations are expected to be NOT SIGNIFICANT and consistent with regulatory limits and site-specific trends.

4.8.2.1 Nonradiological Impacts

4.8.2.1.1 Chemical Hazards

During the resumption of power operations, DAEC anticipates continuing work under an industrial safety program. The industrial safety program also includes a chemical control program managed by a chemical control coordinator. Chemical treatment, such as the use of biocides, during the resumption of power operations is expected to continue to be used in accordance with plant and fleet procedures.

Occupational safety risks from ongoing maintenance and chemical usage are expected to be addressed through continuation of the site's OSHA-compliant industrial safety program. Overall, chemical hazard impacts from the resumption of power operations are anticipated to be NOT SIGNIFICANT.

4.8.2.1.2 Microbiological

Restarting the cooling towers has the potential to reintroduce microbiological hazards, such as *Legionella*. As previously done during operations, DAEC plans to implement a microbiological and macrobiological fouling control program which includes monitoring and use of biocide treatments. During the resumption of power operations, DAEC expects to continue to add chlorine to the circulating water system 7 days per week in the summer and 3 days per week in the winter, when there is less biological activity. Historical monitoring data indicates that no *Legionella* was detected at concentrations requiring further action.

The resumption of DAEC's thermal discharge is not expected to significantly increase the public health risk posed by thermophilic microorganisms. The public health risk posed by thermophilic microorganisms is expected to remain NOT SIGNIFICANT.

4.8.2.1.3 Physical Hazards (Including Electric Shock Hazards)

Work at DAEC during the resumption of power operations is expected to continue to be governed by a comprehensive industrial safety program that incorporates detailed task-specific procedures. These procedures are anticipated to adhere to OSHA standards in 29 CFR Parts 1910 and 1926 (where applicable). As previously mentioned in Section 4.8.1.1.3, DAEC experienced a low rate of recordable injury and illness incidents during the final year of operations and since shutdown, and DAEC expects to maintain this low rate during the resumption of power operations.

As discussed in Section 4.8.1.1.3, the in-scope transmission lines are expected to be restored. The installed in-scope transmission lines are anticipated to be compliant with the NESC

clearance standards, which includes the requirement that the potential induced current be less than 5 milliamperes.

Work on the in-scope transmission lines and switchyards is expected to be conducted under DAEC's electrical safety procedures. DAEC anticipates ensuring strict adherence to the U.S. OSHA standards for electric power generation, transmission, and distribution set in 29 CFR 1910.269.

Given the information provided above, NEDA finds that the human health impact associated with electric shock hazards during the resumption of power operations is expected to remain NOT SIGNIFICANT.

4.8.2.2 Radiological Impacts

DAEC's REMP provides additional assurance that there are no significant dose or radiological environmental impacts due to DAEC. Based on the doses calculated from measured effluents for 2015 through 2019, DAEC operations did not have adverse effects on the health of the public or on the environment. (NEDA 2016; NEDA 2017; NEDA 2018; NEDA 2019b; NEDA 2020c)

It is reasonable to expect the potential radiological impacts from the resumption of power operations to be consistent with those identified in previous NRC operational assessments. As such, NRC assessment of historical data on radioactive releases from DAEC and the resultant dose calculations demonstrate that the amount of radiation received to a hypothetical maximally exposed individual in the vicinity of DAEC is expected to be a small fraction of the specified dose limits. Similarly, the NRC's assessment of previous REMP reports revealed no unusual trends in the data and showed no measurable impact from the operations at DAEC on the environment. (NRC 2010b)

The NRC previously reviewed and assessed DAEC's radioactive waste system's performance in controlling radioactive effluents and the resultant doses to members of the public in conformance with the ALARA criteria. It found the radiological effluent data for DAEC to be consistent, with reasonable variation attributable to operating conditions and outages, with the 5-year historical radiological effluent releases and resultant doses. (NRC 2010b)

Two years prior to resumption of power operations, DAEC plans to restart REMP sampling using the same procedure and sampling program as was used in 2020 prior to shutdown. This includes additional sampling locations and analyses, as compared to sampling completed during shutdown.

To support expectations for dose levels upon restart, occupational exposure trends from similar BWRs are used. These trends, along with continued implementation of the facility's ALARA program, support the conclusion that worker doses are expected to remain below regulatory thresholds during future operations. Personal dosimetry, ALARA reviews, radiation work permits, and controlled area access procedures are anticipated to continue to be used upon restart to maintain occupational doses within acceptable levels. There are no proposed

substantive changes or upgrades to the Radiation Protection Program for the proposed resumption of power operations.

Based upon the controls in place, and review of available data, radiological human health impacts from resumption of power operations are expected to be NOT SIGNIFICANT.

4.8.2.3 Postulated Accidents

The environmental impacts of Design-Basis Accidents and Severe Accidents are considered for all nuclear power plants, including DAEC. The effects of postulated accidents and consideration of severe accident mitigation alternatives (SAMAs) are discussed in Section 4.9.1.2 of the GEIS Volume 1 and in further detail in Appendix E in Volume 3 of the GEIS (NRC 2024a). For DAEC to restart, the plant design basis must be maintained. The restarted DAEC is not expected to be materially or operationally different from prior plant operations except for age-related replacements and completion of commitments made prior to transitioning to SAFSTOR and relaxed upon approval of 10 CFR 50.82(a) decommissioning plan. Therefore, NEDA expects to maintain DAEC's design basis for the plant restart.

A plant-specific analysis of the environmental impacts of postulated accidents, including consideration of SAMAs, was performed for DAEC as documented in Appendix F of the 2010 SEIS (NRC 2010b). Since the license renewal, DAEC implemented several risk beneficial initiatives. When DAEC ceased operation, the plant was in compliance with the orders related to the Fukushima Daiichi accident and mitigation strategies for beyond-basis accidents (NRC 2020), as well as commitments made for the risk-informed performance-based fire-protection program, NFPA-805, in accordance with 10 CFR 50.48(c) (NRC 2013).

On September 9, 2019, the Mitigation of Beyond-Design-Basis Events rule, 10 CFR 50.155, became effective. This rule primarily addresses mitigation strategies for a wide range of potential external events, including seismic events, fire, flooding, and other natural phenomena, requiring nuclear power plants to have plans in place to maintain core cooling, containment integrity, and SFP cooling even when facing events beyond their design basis. Prior to restart of DAEC, NEDA is required to comply with 10 CFR 50.155.

As a result of the NRC's ongoing safety oversight, risk-informed initiatives, and updates to NRC regulatory requirements, the overall risk of severe accidents has been reduced, including the risk profile of DAEC since the NEDA SAMA analysis in 2010 for license renewal. The assumptions and conclusions of the 2010 DAEC SEIS (NRC 2010b) are valid for the remaining license renewal period after restart. This is further supported by the GEIS conclusions and Table E.3-1 with an overall reduction in population dose at DAEC by a factor of 11 over the 1996 GEIS 95 percent upper-confidence bound population dose, confirming impacts from severe accidents are SMALL for the remaining license renewal period after restart. Because these measures have provided additional severe accident mitigation and have reduced the risk profile of operating reactors, further SAMA analyses are unlikely to find cost-effective significant plant improvements, as discussed in the GEIS.

Impacts from postulated accidents for the resumption of power are expected to be NOT SIGNIFICANT.

4.9 Waste Management

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

During the preparation for the resumption of power operations, the radwaste system is expected to be restored. Upon completion of restoration activities, the radwaste system is expected to be prepared to operate in the same fashion as prior to shutdown. There are no large-scale restart projects that are expected to generate a significant amount of radwaste. DAEC has procedures in place for the management, classification, handling, storage, and shipping of hazardous, non-hazardous, and universal waste. Established radioactive waste, nonradioactive waste, and mixed waste procedures and processes are expected to remain in place for restart activities. Waste generated during preparation for resumption of power operations is NOT SIGNIFICANT.

4.9.2 Environmental Impacts from the Resumption of Power Operations

4.9.2.1 Low Level Waste Storage and Disposal

DAEC plans to continue to manage LLRW onsite in accordance with NRC regulations and dispose of LLRW at approved treatment and disposal facilities. In addition, DAEC anticipates continuing to use the established radiological waste programs in place, which outline the procedures for processing, sampling, characterization, packaging, storage, and shipment of LLRW in accordance with local, state, and federal requirements. Upon resumption of power operations, approved transportation, treatment, and disposal vendors and facilities are expected to continue to be used. NEDA does not anticipate a significant increase in generation of LLRW upon resumption of power operations from prior operations.

There are no planned modifications to DAEC's radioactive waste management system that could increase the amount of radioactive waste generated in relation to the amount generated prior to ceasing operations. LLRW is expected to continue to be stored at the low level radwaste building and the LLRPSF awaiting shipment during the resumption of power, as is discussed in Section 3.9.1.

As per the GEIS, the NRC believes that the comprehensive regulatory controls that are in place and the low public doses being achieved at reactors ensure that the radiological impacts on the environment from LLRW storage and disposal are expected to remain SMALL during the term of a renewed license. (NRC 2024a)

As the generation rate and management of LLRW is expected to remain the same as during previous operations, in accordance with the NRC's findings, DAEC's compliance with comprehensive regulatory controls and the use of permitted treatment and disposal facilities ensures that impacts from the storage and disposal of LLRW upon the resumption of power operations are NOT SIGNIFICANT.

4.9.2.2 Mixed Waste Storage and Disposal

During previous operations, the generation of LLMW at DAEC was uncommon and are expected to continue to be so upon the resumption of power operations. DAEC anticipates continuing to use the established radiological waste programs, which include procedures specifically for LLMW management. Upon resumption of power operations DAEC expects to continue to store LLMW at the low level radwaste building, as discussed in Section 3.9.1. As stated above, DAEC manages waste in accordance with NRC regulations and utilizes only approved waste treatment and disposal facilities. Approved vendors for LLMW are anticipated to continue to be used upon resumption of power operations. No LLMW has been generated by DAEC in the past 5 years. LLMW generation is not expected to increase during resumption of power operations from prior operations. There are no planned modifications to DAEC radioactive waste management system that are anticipated to increase the amount of LLMW generated.

As per the GEIS, the NRC concluded continued operations would increase the small but continuing risk to human health and the environment posed by LLMW at all plants. The radiological and nonradiological environmental impacts from the long-term disposal of LLMW from any individual plant at licensed sites are considered SMALL for all sites. (NRC 2024a)

As the generation rate and management of LLMW is expected to remain the same as during previous operations, in accordance with the NRC's findings, DAEC's compliance with comprehensive regulatory controls and the use of licensed treatment and disposal facilities are expected to ensure that impacts from the storage and disposal of LLMW upon the resumption of power operations are NOT SIGNIFICANT.

4.9.2.3 Nonradioactive Waste Storage and Disposal

DAEC's management of its nonradioactive waste streams, including hazardous, nonhazardous, and universal, is discussed in Section 3.9.2. DAEC uses approved waste vendors for nonradioactive waste disposal and does not anticipate an increase in nonradioactive waste generation for the resumption of power operations. DAEC is a VSQG of hazardous waste and is expected to be a small quantity generator upon resumption of power operations. DAEC anticipates continuing to manage nonradioactive waste in accordance with EPA and state regulations and continuing to utilize internal procedures for waste management, which include waste minimization strategies. DAEC does not expect an increase in its hazardous waste generation rate for the resumption of power operations from prior operations.

In the GEIS, the NRC concluded that the environmental impacts associated with nonradioactive waste storage and disposal due to the continued operation of nuclear power plants would be SMALL for all plants. This conclusion is based on the anticipation that changes in nonradioactive waste generation rates are not expected, and that existing systems and procedures for proper handling and disposal of these wastes would remain in place. (NRC 2024a)

As the generation rate and management of nonradiological waste is expected to remain the same as during previous operations, in accordance with the NRC's findings, DAEC's compliance with comprehensive regulatory controls and the use of approved vendors and disposal facilities ensures that the impact of nonradioactive waste storage and disposal during the resumption of power operations are NOT SIGNIFICANT.

4.10 Fuel Cycle

4.10.1 Environmental Impacts from Preparations for Resumption of Power Operations

Preparations for resumption of power operations at DAEC are expected to involve activities associated with the receipt, handling, and storage of new nuclear fuel assemblies. DAEC does not plan to perform uranium mining, milling, or fuel fabrication onsite. Instead, fuel is expected to be procured from commercial vendors licensed by the NRC and fabricated offsite using uranium mined and processed at separate facilities.

NEDA expects to procure fresh fuel assemblies, consistent with previous DAEC fuel supply arrangements. The fresh fuel assemblies are expected to be transported by truck in accordance with applicable NRC and DOT regulations, including 10 CFR Part 71 and DOT hazardous materials regulations. NRC-certified transportation packages and licensed carriers are expected to be used to ensure compliance with safety and security requirements.

Fuel handling and inspection activities are planned to occur within existing plant structures under established radiation protection and industrial safety programs, as described in Section 3.8. Preparations associated with new fuel handling are not expected to result in significant environmental impacts. Accordingly, environmental impacts from preparations for resumption of power operations related to the fuel cycle are expected to be NOT SIGNIFICANT.

LLRW generated preparation activities are expected to be managed in accordance with waste management procedures. LLWR are anticipated to be packaged and transported for disposal at a licensed offsite facility. The volume and composition of LLRW are expected to remain within the bounds of historical operations, as no large-scale activities that generate significant waste are planned and existing procedures for LLRW handling remain applicable. Because the receiving disposal facility is licensed to accept LLRW and the transportation is conducted in accordance with NRC and DOT regulations, environmental impacts associated with LLRW disposal are expected to be NOT SIGNIFICANT.

4.10.2 Environmental Impacts from Resumption of Power Operations

DAEC plans to resume steady-state operations using low-enriched uranium fuel enriched to no more than 4.9 percent uranium-235 by weight, consistent with the final core design prior to permanent shutdown and consistent with historical licensing and technical specifications. The peak rod burnup limit for planned usage is 62,000 megawatt days per metric ton of uranium (MWd/MTU). However, there is an active industry initiative for increased enrichment and

increased burnup. Prior to changing enrichment of the fuel or burnup, NEDA expects to seek authorization from NRC. NRC reviewed the environmental impacts of accident tolerant fuel (ATF) with increased enrichment fuel and increased burnup (NRC 2024c). NRC concluded that enrichments of up to 8 percent and 10 percent and burnup to 80,000 MWd/MTU are bound by previous environmental impact assesses. The impact assessment for transportation in Table S-4 of 10 CFR 51.52 still bounds the environmental impacts from normal conditions and accidents for the transportation of LLRW, unirradiated ATF, and spent ATF for up to 8 percent by weight of uranium-235 and at burnup levels up to 80,000 MWd/MTU. For the uranium fuel cycle, which includes storage of spent nuclear fuel onsite at nuclear power plants, NRC's prior analyses related to Table S-3 of 10 CFR 51.51(b), the Continued Storage GEIS, and the Decommissioning GEIS are still bounding.

Fuel fabrication activities, including uranium mining, milling, and enrichment, are expected to continue to occur offsite and remain bounded by the NRC's prior evaluations presented in the GEIS and associated references. Environmental impacts associated with fuel fabrication are expected to be NOT SIGNIFICANT.

Periodic fresh fuel deliveries may occur during plant operations. Although specific transport details are not yet confirmed, such deliveries are expected to follow established protocols and be conducted using licensed carriers and NRC-certified containers. Environmental impacts from routine fuel transport are expected to be NOT SIGNIFICANT.

During operations, LLRW is expected to be generated primarily through maintenance, component replacement, and routine operational activities. LLRW is anticipated to be managed onsite and disposed of offsite in accordance with NRC regulations (10 CFR Part 20, Subpart K; 10 CFR Part 61) and shipped to licensed waste facilities, as necessary. Waste generation rates and handling procedures are expected to remain consistent with prior operations, as no-large scale activities expected to generate significant waste are planned, and existing procedures and infrastructure remain in place. Because DAEC is being restored to its previous licensed operating condition prior to the 2020 shutdown, no major changes to in-plant systems or fuel handling procedures are planned.

Spent nuclear fuel generated following restart is expected to be stored in the existing SFP, which has capacity for 2,411 assemblies and is currently empty. The 3,648 previously used assemblies have been transferred to dry storage. The ISFSI has sufficient space to accommodate additional pad installations if needed; however, no expansion of the ISFSI footprint is planned. Vertical casks may be used to supplement additional storage capacity if necessary. Environmental impacts associated with spent fuel storage are expected to be NOT SIGNIFICANT.

4.11 Cumulative Effects

In DAEC's SEIS, the NRC staff considered the potential impacts resulting from continued operation of the plant during the LR term, as well as the potential for cumulative impacts from past, present, and reasonably foreseeable future actions in the vicinity of the site. The NRC

concluded that cumulative impacts from DAEC operations during the LR term would be SMALL for all resource areas except Historic and Archaeological Resources, for which impacts could be MODERATE (NRC 2010b).

Changes to the site and surrounding area were evaluated to identify potential cumulative effects associated with restart activities and resumption of power operations. As described in Section 3.1, DAEC is a rural, agricultural portion of Linn County, Iowa. The surrounding area has remained largely unchanged since DAEC shutdown in 2020. A review of aerial imagery from 2020 to 2024 confirmed that no major offsite land use changes or new development have occurred.

The site encompasses approximately 500 acres and is owned by NEDA. Of this, approximately 158 acres are occupied by the existing DAEC facility, and approximately 40 acres are leased to Alliant Energy for operation of Pleasant Creek Solar. Infrastructure reinstatement activities associated with DAEC's restart, including reconstruction of the access road, parking lots, and security barrier, are expected to occur on previously disturbed land and within the existing site boundary. Based on available site information, no additional offsite land is required for the restart effort.

No reasonably foreseeable offsite energy, commercial, residential, or infrastructure projects have been identified that are anticipated to overlap with DAEC restart activities or future plant operations. The only foreseeable future project previously identified by the licensee was the potential expansion of offsite solar development. However, this expansion is currently on indefinite hold and is not expected to proceed unless DAEC does not restart. No regionally significant infrastructure or environmental projects were identified during the remainder of DAEC's RFOL.

The adjacent substation is owned by the Midcontinent Independent System Operator and is not expected to contribute to cumulative impacts. The Pleasant Creek Solar facilities operate independently on leased land, are spatially separated from DAEC infrastructure, and do not share operational systems or effluent pathways with DAEC. As described in Section 2.2.2, the applicant projects that power operations are expected to resume in Q4 2028 following completion of plant system reactivation, infrastructure restoration, and receipt of necessary NRC approvals. Supporting licensing activities include planned submittals of LARs to restore the OL, technical specifications, and security and emergency preparedness programs necessary for restart.

Therefore, the cumulative effects of DAEC's restart and resumption of operations, when considered in combination with other past, present, and reasonably foreseeable actions, are expected to be NOT SIGNIFICANT for the resource areas.

5.0 SUMMARY OF IMPACTS AND MITIGATING ACTIONS

As described in Chapter 1, NEDA is seeking authorization to resume power operations at DAEC. NEDA prepared this ER to provide the NRC information to support an EA to fulfill its obligations under the NEPA. DAEC is in a shutdown state following the cessation of power operations in 2020. The proposed action supporting refueling and reauthorizing power operations at DAEC is described in Chapter 1, and a summary of preparation activities for resumption of power operations is provided in Section 2.2. The environmental baseline, or affected environment, for DAEC is the current shutdown state. In Chapter 3, each resource area is described using the current shutdown state as the environmental baseline. The impacts of and mitigating actions for preparations for resumption of power operations and resumption of power operations are analyzed and described in Chapter 4. The impacts and mitigating actions are also summarized in Table 5.0-1.

5.1 Preparations for Resumption of Power Operations

Activities related to preparations for the resumption of power operations are summarized in Section 2.2.1. Plans for preparation for resumption of power operations are underway and advancing; this ER is limited to impacts of DAEC restart activities. Impacts from these activities to resource areas are summarized in Chapter 4. Resource-specific impacts from these activities are analyzed based on the extent of the impact, the mitigation measures used to minimize the impacts, and comparison to the NRC's findings in the GEIS where applicable.

5.2 Resumption of Power Operations

As described in Section 2.2.2, NEDA plans to resume operational activities using the same management practices in use prior to shutdown. In the evaluation of environmental impacts for resumption of power operations, NEDA referenced the previous NEPA analyses summarized in the 2010 SEIS and other relevant environmental review documents.

5.3 Conclusions

As discussed in Chapter 4, updated information, analyses, and site-specific assessments provided in this ER indicate that preparations for resumption of operations and resumption of power operations on each resource area are NOT SIGNIFICANT or found to have NO ADVERSE EFFECT. Table 5.0-1 includes a summary of environmental impacts on each resource area from preparations for the resumption of power operations and resumption of power operations and mitigating actions to reduce impacts to each resource area.

As described in Section 1.3, NEDA concludes that the environmental impacts under the no-action alternative are not anticipated to be substantially different from those identified in the GEIS and do not represent an environmentally preferable alternative to resumption of power operations at DAEC.

Table 5.0-1 Summary of Environmental Impacts from, and Mitigating Actions for, Preparations for Resumption of Power Operations and Resumption of Power Operations at DAEC (Sheet 1 of 5)

Resource Area	ER Section	Summary of Impact	Significance of Impact
Land Use	4.1	Preparation activities for resumption of power operations are expected to occur on previously disturbed areas of the site and there are no planned projects that are anticipated to change current land use. A crane that surpasses the height of the reactor building is expected to be used onsite during preparation activities for resuming power operations, but the temporary appearance of a construction crane is not expected to significantly alter the visual appearance of the site. No permanent changes to the visual appearance or land use are anticipated for resumption of DAEC power operations.	NOT SIGNIFICANT
Water Resources	4.2	Ground-disturbing activities associated with preparations for, and resumption of power operations are expected to occur on previously disturbed areas onsite. Impacts to water resources and soil from ground disturbance activities are expected to be mitigated with existing internal procedures, including use of BMPs, and by complying with applicable federal, state, and local permit requirements.	NOT SIGNIFICANT
Groundwater Resources	4.2.1	During preparation activities for resumption of DAEC power operations, increases in onsite potable groundwater use due to increased staffing is expected to be less than 100 gpm. Groundwater use for industrial purposes is expected to be within water use permit limits. There are no plans to resume operation of the extraction well system. DAEC's GWPP includes sampling 31 monitoring wells screened within the shallow water table aquifer and the intermediate weathered bedrock aquifer. Tritium detections in the water table aquifer from a historical inadvertent radiological release continue to be far below the MCL and tritium is not migrating offsite. DAEC expects to continue to monitor groundwater during resumed power operations in accordance with its GWPP. There is low potential for inadvertent releases of radiological or nonradiological materials. Should a release occur, it is not anticipated to impact groundwater users as the groundwater gradient is toward the Cedar River.	NOT SIGNIFICANT

Table 5.0-1 Summary of Environmental Impacts from, and Mitigating Actions for, Preparations for Resumption of Power Operations and Resumption of Power Operations at DAEC (Sheet 2 of 5)

Resource Area	ER Section	Summary of Impact	Significance of Impact
Surface Water Resources	4.2.2	Surface water use during preparation activities for resumption of power operations includes filling cooling tower basins, SFPs, the reactor vessel, and piping. The volume of surface water is expected to be within permit limits and minimal compared to the volume of the Cedar River. Surface water use during resumed power operations is expected to be comparable to surface water use during prior operations. DAEC expects to comply with water use permit limits during resumed power operations. DAEC expects to dredge the intake canal prior to resumption of power operations and periodic maintenance dredging is expected to be required after resumption of power operations. NEDA plans to apply for federal, state, and local permits prior to dredging, and dredging and spoils management activities are expected to be conducted in accordance with regulatory requirements and internal procedures. Discharges from DAEC to the Cedar River during the shutdown state are authorized under the NPDES permit. NEDA plans to apply for a NPDES permit modification to support resuming power operations to include cooling tower blowdown and low-volume wastewater discharges. Discharges are expected to comply with NPDES permit limits during resumed power operations. DAEC expects stormwater discharges to be covered under the state general permit for stormwater discharges associated with industrial activity. Potential spills are expected to be mitigated using existing internal procedures and BMPs. DAEC expects to continue surface water monitoring for potential radiological impact under the REMP.	NOT SIGNIFICANT

Table 5.0-1 Summary of Environmental Impacts from, and Mitigating Actions for, Preparations for Resumption of Power Operations and Resumption of Power Operations at DAEC (Sheet 3 of 5)

Resource Area	ER Section	Summary of Impact	Significance of Impact
Ecological Resources	4.3	Preparation activities for resumption of power operations are expected to be limited to previously disturbed areas and are, therefore, unlikely to alter patterns of wildlife use and migration across the site. Impacts to wildlife from increased noise and traffic are expected to be temporary and minor. Potential impacts to wildlife are minimized through existing internal procedures and BMPs related to erosion control and use and management of chemicals, and by complying with applicable permits from federal, state, and local agencies, including the NPDES permit, which regulates effluent to the Cedar River, including thermal and wastewater discharges. NEDA anticipates receiving applicable federal, state, and local permits prior to undertaking dredging at the intake structure. Potential impacts to aquatic organisms during planned dredging activities are expected to be mitigated by complying with federal, state, and local permit requirements. DAEC plans to continue evaluating the radiological impact of station operations on ecological resources in accordance with the ODCM and REMP. Impacts of resumption of power operations on federally and state-listed species are anticipated to be NOT SIGNIFICANT.	NOT SIGNIFICANT
Socioeconomics	4.4	The number of workers at DAEC is expected to peak during preparation activities for resumption of power operations and to be similar to the number of workers during a pre-shutdown outage. Consequently, impacts to housing and transportation are expected to be similar. Tax payments are expected to be consistent with the amounts paid during shutdown. During resumed power operations, the number of workers is expected to be similar to that during prior operations. NEDA expects to pay a generation tax in lieu of property tax to the State of Iowa once power operations are resumed during Q4 2028, as was done prior to shutdown.	NOT SIGNIFICANT

Table 5.0-1 Summary of Environmental Impacts from, and Mitigating Actions for, Preparations for Resumption of Power Operations and Resumption of Power Operations at DAEC (Sheet 4 of 5)

Resource Area	ER Section	Summary of Impact	Significance of Impact
Historic and Cultural Resources	4.6	Ground disturbance activities associated with preparations for and resumption of power operations are planned to be limited to already developed and previously disturbed areas. Historic sites and cultural resources were identified onsite and in the vicinity of DAEC, some of which are NRHP-listed, eligible, or potentially eligible, and others are either not eligible or have not been evaluated for eligibility. Potential impacts to historic and cultural resources are planned to be mitigated by DAEC's CRPP and by maintaining the visual context of the site.	NO ADVERSE EFFECT
Air Quality	4.7	Emissions, including GHGs, during preparation activities for resumption of power operations are expected from mobile equipment and from required endurance testing. Emissions during preparations for resumption of power operations are expected to be lower than during power operations. Following resumption of power operations, air emissions, including GHGs, are expected to be similar to pre-shutdown levels once equipment is brought online. No additional impacts to air quality are expected, and continued operation is expected to result in negligible emissions of criteria air pollutants and GHGs from insignificant sources. NEDA is preparing an air permit application to support resuming power operations, and DAEC expects to comply with permit requirements.	NOT SIGNIFICANT
Human Health	4.8	During preparation activities for and resumption of power operations, radiological releases, doses to the public, and occupational doses are expected to be within limits established for protection of human health and the environment in 10 CFR Part 20 and 40 CFR Part 190. Regarding nonradiological impacts to human health, DAEC plans to use existing internal safety programs that address the use of chemicals and applicable OSHA standards during preparation activities for and resumption of power operations. No human-health impacts are expected from in-scope transmission lines due to compliance with applicable standards and NEDA procedures.	NOT SIGNIFICANT

Table 5.0-1 Summary of Environmental Impacts from, and Mitigating Actions for, Preparations for Resumption of Power Operations and Resumption of Power Operations at DAEC (Sheet 5 of 5)

Resource Area	ER Section	Summary of Impact	Significance of Impact
Waste Management	4.9	During preparation activities for resumption of power operations, no large-scale projects are planned that are expected to generate a significant amount of radwaste. NEDA plans to restore the radwaste system to operate as it did prior to shutdown. During resumed power operations, waste generation volumes are expected to be similar to those during prior operations. DAEC plans to continue to manage and dispose of waste in accordance with internal procedures and federal, state, and local regulations during preparation activities for and resumption of power operations.	NOT SIGNIFICANT
Fuel Cycle	4.10	During preparation activities for resumption of power operations, fresh fuel assemblies are expected to be transported to DAEC by truck in accordance with applicable NRC and DOT regulations, including 10 CFR Part 71 and DOT hazardous materials regulations. The volume of LLRW generated is expected to remain within the bounds of prior operations. DAEC plans to manage LLRW in accordance with NRC regulations (10 CFR Part 20 and 10 CFR Part 61) and LLRW is expected to be shipped offsite to licensed facilities during preparation activities for and resumption of power operations. Waste generation rates during resumed power operations are expected to be similar to prior operations.	NOT SIGNIFICANT
Cumulative Effects	4.11	No reasonably foreseeable offsite energy, commercial, residential, or infrastructure projects were identified that are anticipated to overlap with preparation activities for or resumption of power operations, as the potential offsite solar development expansion project is on indefinite hold and is expected to proceed only if DAEC does not resume power operations. Operation of the adjacent substation and the onsite Pleasant Creek Solar facilities do not share operational systems or effluent pathways with DAEC and are not expected to contribute to cumulative impacts.	NOT SIGNIFICANT

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6.1 Figure References

No.	Title	In-Text Citation
2.1-1	DAEC Vicinity Map	(ESRI 2024; USCB 2024)
2.1-2	DAEC Site Layout Map	(ESRI 2024)
2.1-3a	DAEC Transmission Lines (Option 1)	(ESRI 2024)
2.1-3b	DAEC Transmission Lines (Option 2)	(ESRI 2024)
3.1-1	Proposed DAEC Site Plan for Restart	
3.2-1	Well Locations at DAEC	(ESRI 2024)
3.3-1	DAEC Action Area	(ESRI 2024; FPL 2008)
4.7-1	DAEC Average Monthly River Water Temperature	(USGS 2025)
4.7-2	DAEC Average Yearly Intake Water Temperature	(USGS 2025)

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