Environmental Report

Crane Clean Energy Center

September 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
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practices
BTA	best technology available
BWST	borated water storage tank
CCEC	Crane Clean Energy Center
CEG	Constellation Energy Generation, LLC
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CRMP	cultural resources management plan
CWA	Clean Water Act
CWS	circulating water system
DCS	dry cask storage
DOT	U.S. Department of Transportation
EASDA	Environmental Assessment for Specific Decommissioning Activities
EDSB	east dike settling basin
EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
ESA	Endangered Species Act
Exelon	Exelon Generation Company, LLC
FERC	Federal Energy Regulatory Commission
GEIS	Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437
GHG	greenhouse gas
gpd	gallons per day
gpm	gallons per minute
HAB	harmful algal bloom

HAP	hazardous air pollutant
HFC	hydrofluorocarbon
ISFSI	independent spent fuel storage installation
kV	kilovolts
LAR	License Amendment Request
LLD	lower limit of detection
LLMW	low-level mixed waste
LLRW	low-level radioactive waste
LR	license renewal
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
mgd	million gallons per day
mrem/yr	millirem per year
MSL	mean sea level
MWt	megawatts thermal
NDCT	natural draft cooling tower
NEPA	National Environmental Policy Act
NLF	nature-like fishway
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOV	notice of violation
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
ODC	ozone depleting chemical
ODCM	Offsite Dose Calculation Manual
OL	operating license
OSF	operations support facility
OSHA	Occupational Safety and Health Administration
PA	protected area
PA DEP	Pennsylvania Department of Environmental Protection
PA-SHARE	Pennsylvania’s State Historic and Archaeological Resource Exchange
pCi/L	picocuries per liter
PFC	perfluorocarbon
PGC	Pennsylvania Game Commission

pH	potential of hydrogen
PHMC	Pennsylvania Historical and Museum Commission
PIP	Pollution Incident Prevention
PM	particulate matter
PNDI	Pennsylvania Natural Diversity Inventory
PPE	personal protective equipment
PSDAR	Post-Shutdown Decommissioning Activities Report
REMP	Radiological Environmental Monitoring Program
RFL	Renewed Facility License
RFOL	Renewed Facility Operating License
RGPP	radiological groundwater protection program
ROW	right-of-way
SAFSTOR	safe storage, one of three NRC decommissioning strategies
SAMA	severe accident mitigation alternative
SEIS	Supplemental Environmental Impact Statement
SFP	spent fuel pool
SLR	subsequent license renewal
SPCC	spill prevention, control, and countermeasure
SQG	small quantity generator
SRBC	Susquehanna River Basin Commission
SSC	systems, structures, and components
SWPPP	stormwater pollution prevention plan
SWS	service water system
TMI-1	Three Mile Island Unit 1
TMI-2	Three Mile Island Unit 2
U.S.	United States
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WHC	Wildlife Habitat Council
48S	building 48

1.0 INTRODUCTION

Constellation Energy Generation, LLC (CEG), is seeking to resume power operations at the Christopher M. Crane Clean Energy Center (CCEC), formerly known as Three Mile Island Unit 1 (TMI-1). Specifically, CEG is requesting an exemption from 10 Code of Federal Regulations (CFR) 50.82, Termination of License, paragraph (a), subparagraph (2) to allow for a one-time rescission of the docketed 10 CFR 50.82(a)(1) certifications submitted on June 20, 2017, and September 26, 2019. This proposed exemption, if approved, allows for the removal of the restrictions that prohibit operation of the CCEC reactor or emplacement or retention of fuel into the CCEC reactor vessel. CEG is also submitting License Amendment Requests (LARs) that, in combination with the exemption request and rescission of the docketed 10 CFR 50.82(a)(1) certifications, will allow CEG to reinstate the CCEC Renewed Facility Operating License (RFOL) and operating reactor licensing basis and subsequently resume power operations at CCEC. The RFOL was supported by the United States (U.S.) Nuclear Regulatory Commission's (NRC) National Environmental Policy Act (NEPA) review that assessed the environmental impacts of operations through April 19, 2034 (NRC 2009a). The NEPA review for the RFOL was preceded by an additional NEPA review by the U.S. Atomic Energy Commission in 1972 (AEC 1972). Through these two NEPA reviews, the NRC has already considered the environmental impacts of licensed operations through April 19, 2034. CEG prepared this Environmental Report (ER) to support NRC's consideration of this licensing action. Once resumption of power operations is approved, CCEC plans to transition from a facility in decommissioning back to an operating power plant for the remainder of the operating term granted in the 2009 RFOL (i.e., until April 19, 2034). (CEG 2024a)

1.1 Proposed Action

As presented in Section 1.0, CEG is requesting an exemption from 10 CFR 50.8(a)(2). This exemption is expected to allow CEG to resume power operations at CCEC after plant restoration activities necessary to reinstate the CCEC RFOL. Thus, the proposed federal action is to grant CEG's exemption, which is anticipated to authorize CEG's proposed action to conduct restart activities and resume power operations at CCEC.

CEG is also submitting LARs that, in combination with the exemption request and rescission of the docketed 10 CFR 50.82(a)(1) certifications, will allow CEG to reinstate the CCEC RFOL and operating reactor licensing basis and subsequently resume power operations at CCEC.

1.2 Purpose of and Need for Proposed Action

The purpose and need for the proposed action is to provide 837 megawatts electric of baseload clean energy power generation capability to the Pennsylvania, New Jersey, Maryland Interconnection grid from approval of the 50.82(a)(2) exemption request through the current expiration date of the CCEC RFOL. The material circumstances that existed at the time CCEC was shut down in 2019 are undeniably different from the circumstances that exist today. The economic environment that existed at the time of the shutdown did not allow further operation of the plant, thus compelling CEG to shut the unit down. However, CEG has now signed a 20-year

Power Purchase Agreement, which supports the economic viability of restarting CCEC and its ability to supply clean baseload power to the Pennsylvania, New Jersey, Maryland Interconnection grid. (CEG 2024b; Utility Dive 2024)

1.3 Alternatives

As presented in Section 1.1, the proposed federal action is to grant CEG's request for exemption from 10 CFR 50.8(a)(2) and approve the LARs to reinstate the CCEC RFOL and operating reactor licensing basis. Thus, the no-action alternative is to not grant the exemption or approve the LARs, which results in CCEC remaining in decommissioning. CEG would decommission CCEC as planned in the Three Mile Island Unit 1 Post-Shutdown Decommissioning Activities Report (PSDAR) (EGC 2019a).

A reasonably foreseeable consequence of the no action alternative is anticipated to be the pursuit of other options to provide the sought after power. NRC assessed a range of alternatives, generation and non-generation alternatives, to power generation operations at an existing nuclear power plant in the license renewal (LR) Generic Environmental Impact Statement (GEIS) (NRC 2024a). New baseload generation (which would involve construction of new power facilities and potentially new transmission lines) is very unlikely to be available at commercial scale on or before the date the NRC approves CEG's 50.82(a)(2) exemption request; thus, replacement using a new generation source would not be a reasonable alternative. The GEIS also considered delayed retirement or reactivation of, and purchased power from, existing generating facilities. However, the NRC observed that fossil-fuel plants were the most likely sources of large quantities of baseload energy, which would not provide clean power generation. (NRC 2024a) The GEIS examined the potential for conservation and energy efficiency programs, a non-generation alternative, to replace an operational nuclear power plant. However, the NRC identified no demand-side management programs capable of offsetting 837 megawatts electric of baseload electrical power. (NRC 2024a) None of those are reasonable alternatives because they do not meet the purpose and need of the proposed action. Furthermore, none of those options presents an environmentally preferable alternative to resuming power operations at CCEC.

2.0 PLANT DESCRIPTION AND SUMMARY OF RESTART ACTIVITIES

2.1 Plant Description

2.1.1 Site Location and Description of Crane Clean Energy Center

CCEC is a single-unit pressurized water reactor located on Three Mile Island in the Susquehanna River, Londonderry Township, Dauphin County, Pennsylvania. The facility lies approximately 10 miles southeast of Harrisburg, Pennsylvania (EGC 2019b; NRC 2024b). The CCEC site encompasses approximately 400 acres across multiple parcels on Three Mile Island. Of this total, approximately 200 acres include the CCEC operational facilities. This acreage does not include undeveloped areas or land associated with Three Mile Island Unit 2 (TMI-2).

The general location of CCEC in relation to surrounding communities and features is shown in Figure 2.1-1.

As presented in Section 1.0, TMI-1 was renamed in 2024 to honor Christopher M. Crane, former CEO of Exelon Generation Company, LLC (Exelon), and to reflect CEG's commitment to carbon-free generation (CEG 2024b). At that time, CCEC was named "Three Mile Island Nuclear Station, Unit 1". NRC approved Amendment No. 306 to the Renewed Facility License (RFL) to reflect the name change to "Christopher M. Crane Clean Energy Center" on May 13, 2025 (NRC 2025). While some actions or events referred to in this ER occurred under the name of "Three Mile Island Nuclear Station, Unit 1 or TMI-1" for clarity, CCEC will be used as the name of the facility.

Table 2.1-1 provides a summary of key characteristic information for CCEC, including reactor type, license information, and rated thermal capacity. This overview serves as a reference for more detailed descriptions provided in the subsections of Section 2.1.

CCEC is located on the northern portion of Three Mile Island, which lies within a broad floodplain of the Susquehanna River. The terrain at the site is generally flat, with elevations ranging from approximately 295 to 300 feet above mean sea level (MSL). Most of the island is low-lying and level, with slight grading to support plant infrastructure and drainage. The surrounding landscape consists of the river channel and gently rolling terrain on the mainland. The site's flat topography and elevation have remained consistent since the original facility was constructed and are described in the 2009 Supplemental Environmental Impact Statement (SEIS) for CCEC (NRC 2009a).

CCEC operated under Facility Operating License No. DPR-50 from 1974 to 2019, when it ceased operations for economic reasons. The NRC issued the current renewed license in 2009 with an expiration date of April 19, 2034 (NRC 2009a). CEG has announced its intent to restore full power operation under the existing license, without expanding the developed area associated with CCEC or constructing new reactors. The restart is intended to restore power generation at the plant's licensed thermal power output of 2,568 megawatts thermal (MWt) (CEG 2024b; EGC 2019b; NRC 2009b).

The principal structures of CCEC include the reactor building, turbine generator building, fuel handling building, intake pump and screenhouse structure, FLEX storage facility, two natural draft cooling towers (NDCTs), circulating water pump houses, waste storage and handling buildings, the long-term steam generator storage building, desilting basins, and administrative buildings (EGC 2019a). Figure 2.1-2 provides an aerial overview of the primary plant facilities and support structures described above, including labeled locations of buildings, cooling towers, storage areas, and key infrastructures. The plant is accessible via two causeways, which are bounded by the Susquehanna River on all sides.

The site lies within a 2,000-foot minimum exclusion area boundary and a 2-mile radius low population zone, consistent with NRC siting regulations (EGC 2019b; CEG 2024c). It is underlain by sound bedrock and exhibits favorable hydrologic and meteorological conditions

(EGC 2019b). No changes to site boundaries or land use have occurred since the 2009 SEIS (NRC 2009a). The proposed restart project is not expected to alter the developed area associated with CCEC or expand site boundaries.

2.1.2 Reactor Design and Plant Systems

CCEC is located in Londonderry Township, Dauphin County, Pennsylvania. CCEC is owned by CEG. Operations for CCEC were ceased in September 2019 and transitioned to a defueled status. The proposed action involves restarting operations at the facility following restoration of applicable systems, structures, and components (SSCs). The current plant condition reflects the decommissioned status of the plant as described in the Defueled Safety Analysis Report Revision 2 (CEG 2024c).

Under current licensing and regulatory status, plant systems and equipment fall into three general categories: (1) systems and components necessary for safe storage of spent nuclear fuel; (2) systems supporting ongoing maintenance and monitoring; and (3) systems retained to support potential future use.

All spent fuel has been transferred to the independent spent fuel storage installation (ISFSI) and is stored in dry cask storage (DCS) in accordance with 10 CFR 72 requirements (CEG 2024c).

The turbine building and main condenser system remain in place, including the turbine-generator set, condenser tubes, and steam extraction systems. While the turbine system is no longer in operation, it has not been dismantled. The circulating water system (CWS), including intake and discharge structures located along the east bank of the Susquehanna River, also remains in place. These structures were originally designed to support condenser cooling and service water functions. (CEG 2024c)

The auxiliary building and fuel handling building contain systems that were originally designed to support spent fuel management functions and residual plant monitoring activities. These include radiation monitoring instrumentation, lighting, ventilation systems, and fire protection systems that have been retained in accordance with regulatory requirements (CEG 2024c).

The spent fuel at the ISFSI is stored in the NAC International MAGNASTOR DCS system. The ISFSI storage pad is located within the ISFSI Protected Area (PA) south of TMI-2. The ISFSI storage pad has a capacity for 49 casks, which can include spent fuel or Greater Than Class C waste. Use of the ISFSI for spent nuclear fuel is authorized by compliance with the conditions of the General License issued under 10 CFR 72, Subpart K and the conditions contained in the MAGNASTOR Certificate of Compliance 1031 Amendment 9, Revision 1 (CEG 2024c).

The radwaste building remains intact and is expected to support restoration of radwaste processing and release capability comparable to normal operations, in accordance with regulatory requirements.

The site’s electrical systems – including switchgear, onsite distribution panels, the 13.8 kilovolts (kV) and 4 kV buses, and the main transformer yard – remain in place. Electrical systems at

CCEC are designed to support safe storage (SAFSTOR) conditions without reliance on active safety features. Power sources needed to support emergency planning functions and protection of public health and safety remain available in accordance with the site's Emergency Plan. (CEG 2024c)

The intake structure and screenhouse, which historically supported the CWS and service water systems (SWS), remain physically intact and will be utilized for future operation.

Supporting infrastructure such as the control room, fire detection and suppression systems, radiological monitoring equipment, heating and ventilation systems, and site security systems remain functional where required for spent fuel storage and regulatory compliance. The primary access control and monitoring functions are housed in retained structures and monitored per the CCEC Radiological Protection Program.

2.1.3 Licensing History

CCEC commenced commercial operation in 1974 and was issued a renewed license in 2009 to extend the operating license (OL) until April 19, 2034.

On June 20, 2017, in accordance with 10 CFR 50.82(a)(1)(i), CEG submitted a letter certifying the company's decision to permanently cease power operations at CCEC.

On September 20, 2019, the CCEC reactor was shut down as communicated in the 10 CFR 50.82(a)(1)(i) certification letter.

On September 26, 2019, in accordance with 10 CFR 50.82(a)(1)(ii), CEG submitted a letter certifying that all fuel had been permanently removed from the CCEC reactor vessel and placed in the spent fuel pool (SFP). Per 10 CFR 50.82(a)(2), upon docketing the certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel, operation of the reactor or emplacement or retention of fuel into the reactor vessel was no longer authorized by the 10 CFR Part 50 license. In 2022, ownership and operating responsibility for CCEC transferred from Exelon Generation Company, LLC, to CEG.

On July 27, 2022, CCEC certified that all spent fuel had been removed from the SFPs and placed in storage in the ISFSI.

On September 20, 2024, CEG announced its intention to restore CCEC to commercial service. Under the RFOL issued in 2009, before CCEC was retired prematurely for economic reasons in 2019, the plant had a generating capacity of 2,568 MWt of clean, reliable, carbon-free electricity. (CEG 2024b) On November 4, 2024, CEG submitted its approach for a regulatory path to reauthorize power operations at CCEC (CEG 2024d). On November 19, 2024, CEG submitted its request for exemption from 10 CFR 50.82(a)(2), officially notifying NRC of CEG's intention to return CCEC to power operation (CEG 2024a). As mentioned previously in Section 2.1.1, on January 13, 2025, CEG submitted an LAR for a facility name change for TMI-1 to CCEC and NRC approved that name change on May 13, 2025 (CEG 2025a; NRC 2025).

CEG's licensing action requesting an exemption from 10 CFR Section (§) 50.82(a)(2) is anticipated to allow for a one-time rescission of the docketed 10 CFR § 50.82(a)(1) certifications submitted on June 20, 2017, and September 26, 2019 (CEG 2024a). CEG is also submitting LARs that, in combination with the exemption request and rescission of the docketed 10 CFR 50.82(a)(1) certifications, will allow CEG to reinstate the CCEC RFOL and operating reactor licensing basis and subsequently resume power operations at CCEC (CEG 2024d; CEG 2025b).

Table 2.1-1 Facility Overview Summary

Plant Name	Christopher M. Crane Clean Energy Center
License Number	DPR-50
Reactor Type	Pressurized Water Reactor (Babcock & Wilcox)
Licensed Thermal Output	2,568 MWt

Figure 2.1-1 CCEC Vicinity

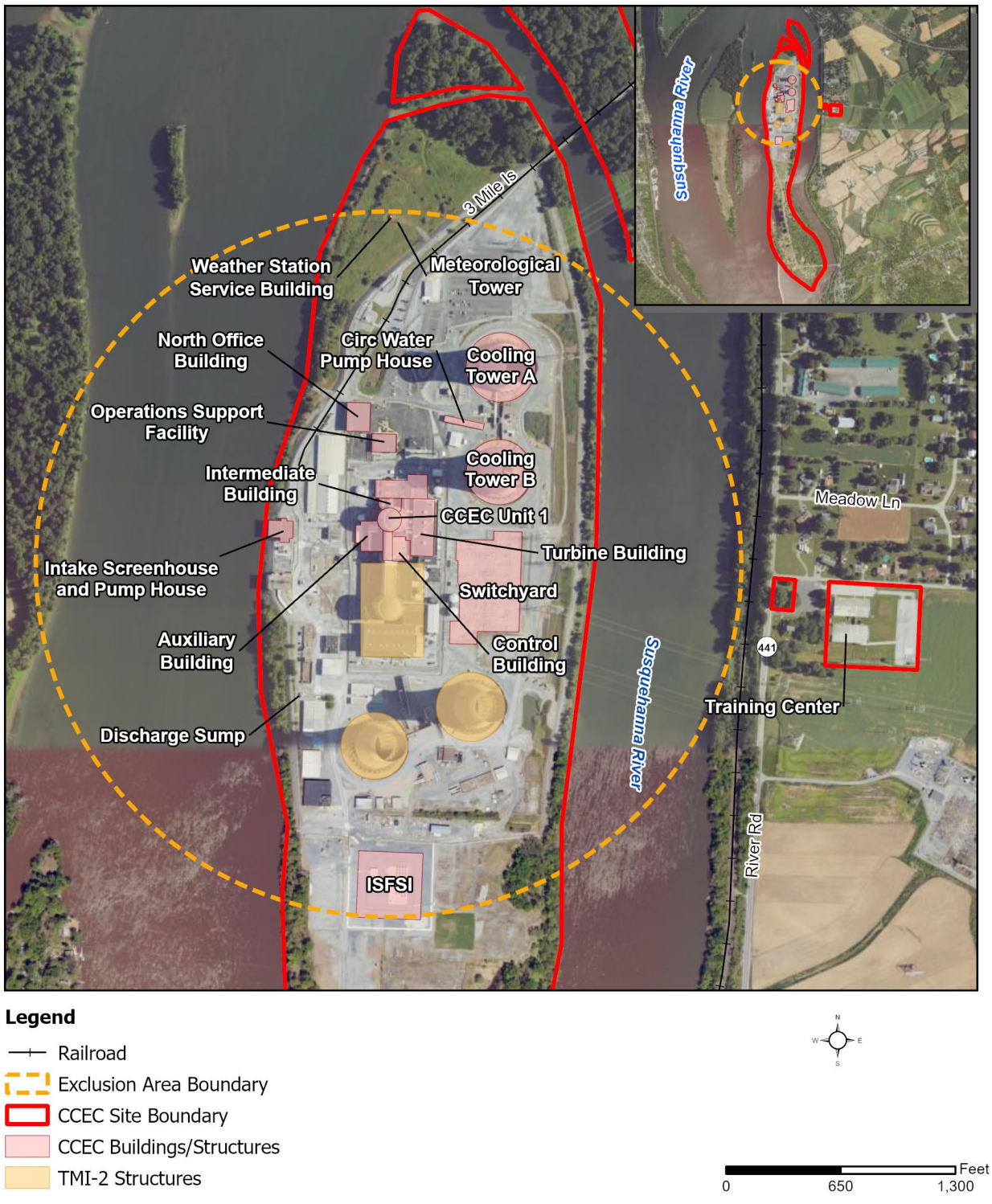

Figure 2.1-2 CCEC Site Layout

2.2 Summary of Restart Activities

2.2.1 Preparation for Resumption of Power Operations

Initial decommissioning activities performed after plant shutdown to prepare the facility for a period of SAFSTOR included defueling the reactor and transferring the fuel into the SFP, draining fluids from and de-energizing systems that are no longer required to be operational in the decommissioning plant condition, reconfiguring the electrical distribution, ventilation, heating, and fire protection systems, and minor deconstruction activities.

No major plant components have been removed. Regarding major systems, the reactor coolant system was drained and vented, the reactor vessel was filled with water covering internals and the reactor vessel head was installed, the steam generators and main generator were placed in long-term layup, spent fuel was transferred from the SFP to the onsite ISFSI and the SFP was drained and covered, and the external fill structure of Cooling Tower B was removed. These draining, de-energizing, and reconfiguring activities need to be reversed to return the systems to operational status rather than abandoned status. Rather than replacing the external fill structure, Cooling Tower B is expected to be fitted with an internal fill structure similar to the existing Cooling Tower A.

To facilitate plant restoration, CEG created a process to systematically group SSCs, evaluate their condition, and identify what is needed to restore them to operational status. These evaluations ensure a systematic approach is used to identify the activities required to restore plant SSCs from the decommissioning condition to a condition supporting safe and reliable plant operation. The output of the evaluation process is the Restoration System Group Evaluation Report that identifies the specific work activities required to return the SSCs to service. (CEG 2024d)

In addition to the creation of the evaluation process, CEG has performed material condition reviews of plant equipment to ensure the feasibility of plant restoration. Equipment such as the NDCTs, steam generators, main generator, main transformers, aboveground storage tanks, and the plant simulator have been reviewed. Reviews performed to date have identified that either the material condition of the equipment is satisfactory for restoration, or a suitable equipment replacement plan has been identified. (CEG 2024d) CEG's 2024 inspection of the steam generators indicates that neither repair nor replacement is needed to support resumption of power operations (CEG 2024d; CEG 2024e).

With the decision in 2024 to pursue resumption of power operations at CCEC, CEG initiated hiring and continues its evaluation process, which involves conducting various tests and inspections to determine status of SSCs that did not serve a function for dormancy. As discussed in Section 2.1.3, CEG also initiated licensing activities in 2024.

The preparation activities are expected to restore the plant to the previous OL condition in 2019 prior to shutdown. No major demolition activities are anticipated and no new construction on undeveloped land is planned. Any new construction, if needed, is expected to be on previously

disturbed land and is expected to follow existing site procedures and environmental screening processes. Planned activities in support of potential resumption of power operations include, but are not limited to, the following:

- Reconfiguration and modification of site structures and facilities, as needed.
- Restoration of SSCs required for plant operation.
- Restoration of radwaste processing and release capability comparable to normal power operations in accordance with regulatory limits and requirements.
- Reestablishing operating procedures and regulatory-required programs necessary to support power operations.
- Obtaining state-level permits and approvals, as needed.

As the evaluation process continues, CEG is expected to identify specific tasks, replacements, and modifications needed to restore CCEC to operational status. However, CEG does not expect these upgrades to involve ground disturbance beyond the already developed and disturbed areas shown in Figure 2.2-1. CEG expects to also utilize the offsite training center located east of Three Mile Island on the mainland to support preparation activities, also shown and labeled in Figure 2.1-2.

CEG initiated staffing increases in 2024, and by first calendar quarter of 2025, more than 200 full-time employees had been hired. Additional hiring was to continue in 2025. For outage periods, CEG expects to need a similar number of employees as was needed during previous outages, which was around 1,200 employees.

The types and volumes of waste generated by preparation activities are expected to be similar to an outage year during operations. CEG maintained the procedures for radwaste, non-radwaste, and mixed waste used during previous operations and anticipates continued use of these procedures for preparation activities and resumed operations.

The traffic due to workers commuting, 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 or rail transportation via the north and south access bridges. The north and south entrance roads are shown on Figure 2.2-1. The rail spur to CCEC from the mainline rail is embedded in the north entrance road.

For consideration of environmental impacts, the timeframe of preparation activities is 2024 to resumption of power operations. This timeframe takes into account the increased staffing for plant restoration planning and inspections that occurred in 2024 through the implementation of the specific work activities required to return SSCs to service, and any activities necessary to support NRC-approved amended licensing basis up to resumption of power operation.

2.2.2 Resumption of Power Operations

The operations term for this proposed action is through the expiration date of the RFOL, April 19, 2034. CEG proposes to operate CCEC as the plant was operated prior to its shutdown in 2019, having restored it to previous OL condition and any NRC-approved amended license

conditions. (CEG 2024b) There are no expected changes to environmental interfaces, new sources or environmental emissions/effluents, or significant changes in volumes/mass of environmental emissions or effluents compared to plant operations prior to the September 2019 shutdown.

2.2.3 Environmental Interfaces

Environmental systems being restored include the condenser cooling system, chemical treatment systems, stormwater controls, and wastewater systems. CCEC's condenser cooling system uses closed-cycle cooling supported by NDCTs. This system significantly reduces environmental impacts by decreasing condenser cooling water withdrawal by approximately 97 percent, and total water withdrawal by approximately 94 percent, compared to once-through cooling systems.

Makeup and service water are withdrawn from the Susquehanna River via a screened intake structure. The intake includes trash racks and traveling screens. The through-rack velocity is approximately 0.6 feet per second, and the through-screen velocity is approximately 0.3 feet per second under normal conditions. These low velocities are designed to minimize impingement and entrainment of aquatic organisms. (EGC 2019b) Effluent discharges occur approximately 600 feet downstream of the river water intake structure into the west channel of the Susquehanna River. Batch releases are controlled and require a minimum dilution flow of 5,000 gallons per minute (gpm) (EGC 2019b). Water withdrawals from the Susquehanna River remain authorized by the Susquehanna River Basin Commission (SRBC); however, the current SRBC docket (Docket No. 20221203) only permits withdrawals at levels suitable for supporting decommissioning activities, not full power operation. Specifically, the docket authorizes up to 0.099 million gallons per day (mgd) of groundwater (combined from Wells A, B, and C) and up to 44 mgd of surface water withdrawal, with consumptive use up to 6 mgd, solely to support decommissioning operations (SRBC 2022). A revised SRBC application is being pursued to authorize water withdrawals necessary for plant restart and sustained operation.

All discharges are analyzed to ensure compliance with 10 CFR Part 20, Appendix B (EGC 2019b). Primary radionuclides in liquid waste include tritium. Gaseous waste, primarily krypton-85 and tritium, is routed through delay tanks and filters before monitored stack release (EGC 2019b).

The liquid waste disposal, gaseous waste treatment, and solid waste management systems remain in place and have been maintained in a preserved condition. The systems are located within shielded structures, primarily in the auxiliary building, and are arranged to support resumed operation. These systems collect and process waste via evaporation, filtration, and demineralization, with batch sampling and release controls in accordance with 10 CFR Part 20 and site procedures. Laundry and shower waste is routed to the miscellaneous waste evaporator for processing. Concentrated liquid waste, spent resin, and pre-coat filter materials may be packaged for offsite shipment, or sent to licensed processors for volume reduction prior to disposal (EGC 2019b).

CCEC continues to adhere to the administratively extended 2009 National Pollutant Discharge Elimination System (NPDES) permit, which remains active while the Pennsylvania Department of Environmental Protection (PA DEP) reviews the 2025 renewal application. The permit includes authorized outfalls and stormwater discharges, which are managed under the facility's Pollution Prevention Control Plan.

Vegetation management for the transmission line right-of-way (ROW) is conducted by FirstEnergy, which owns and maintains the lines connected to the CCEC 230 kV switchyard. No changes to these practices have been identified.

All restart and operational activities are expected to occur on previously disturbed land, including within the operational area and Training Center. While no new site expansion is anticipated, limited land disturbance on previously disturbed areas may occur to support necessary facility upgrades or system restoration activities.

2.2.4 Permits, Authorizations, and Other Considerations

A summary of the authorizations currently held for CCEC is provided in Table 2.2-1. Authorizations in this context include permits, licenses, or other approvals that are expected to continue to be in place, as appropriate, for power operations. CEG has established control measures in place to ensure compliance with the authorizations listed in Table 2.2-1, including monitoring, reporting, and operating within specified limits. CCEC environmental compliance staff are primarily responsible for monitoring and ensuring that the site complies with its environmental permits and applicable regulations. Monitoring and sampling results associated with environmental programs are submitted to the appropriate agencies as specified in the permits and/or governing regulations.

Activities planned in preparation for resumption of power operations are described in Section 2.2.1, and a description of planned activities during resumption of power operations is provided in Section 2.2.2. CEG 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.

The following considerations are relevant to concluding that CCEC's activities during preparations for resumption of power operations or the resumption of power operations will not result in significant environmental impacts.

- Continued compliance with radiological release and dose regulatory limits and adherence to plant procedures for monitoring.
- Continued site access control to minimize or eliminate radiation release pathways to the public.
- Transport of radioactive waste in accordance with plant procedures, applicable Federal regulations, and the requirements of the receiving facility.

- Continued compliance with applicable regulations and permit conditions.
- Continued storage of spent fuel in accordance with license conditions and plant procedures.

Impacts associated with activities during preparation for resumption of power operations and resumption of power operations are addressed in Chapter 4.

Table 2.2-1 Current Environmental Authorizations for CCEC (Sheet 1 of 3)

Agency	Authority	Requirement	Number	Issue / Expiration Date	Activity Covered
NRC	Atomic Energy Act (42 USC 2011, et seq.), 10 CFR 50.10	License to operate	Docket 50-289	Issued:4/19/74 Renewed: 10/22/09 Expires: 4/19/34	Operation of CCEC. The current RFL is effective until the Commission notifies the licensee in writing that the license is terminated.
Susquehanna River Basin Commission	Susquehanna River Basin Compact, P.L. 91-575, Article 3, Section 3.10, P.L. 91-575, and Commission Regulation 803.61	Consumptive water use and groundwater withdrawal permit	Docket 20221203	Issued: 12/15/22 Expires: 4/19/34	Surface water withdrawal (peak day) of up to 44 mgd from the Susquehanna River. Groundwater withdrawals (30-day average) of 0.072 mgd from Well A, 0.044 mgd from Well B, and 0.045 mgd from Well C. Combined groundwater withdrawal limit (30-day average) of 0.099 mgd from Wells A, B, and C. Consumptive use (peak day) of up to 6 mgd from Wells A, B, and C, and the Susquehanna River.

Table 2.2-1 Current Environmental Authorizations for CCEC (Sheet 2 of 3)

Agency	Authority	Requirement	Number	Issue / Expiration Date	Activity Covered
PA DEP	Clean Water Act (CWA), 33 U.S.C. Section 1251 et seq. and Pennsylvania's Clean Streams Law, as amended, 35 P.S. Section 691.1 et seq.	NPDES permit	PA 0009920	Issued: 10/30/07 Expired: 10/31/12 Administratively extended pending new permit issuance, see Table 2.2-2	Authorization to discharge into the Susquehanna River.
PA DEP	P.L. 555, as amended	Maintenance dredging permit	21275724	Issued: 01/13/76 Expires: No date listed on permit	Maintenance dredging of the intake bay in the Susquehanna River.
PA DEP	Pennsylvania Safe Drinking Water Act (P.L. 206, No. 43)	Public water supply permit	22296501-T2	Issued: 08/07/09 Expires: No date listed on permit	Operation of plant site drinking water system. Note: this permit superseded Permit No. 2296501-T1 issued 12/26/00.
U.S. Environmental Protection Agency (EPA)	Resource Conservation and Recovery Act Section 310	Acknowledgement of notification of regulated waste activity	PAR 000037861	Issued: 3/22/99 Expires: No date listed on permit	Generation and transportation of hazardous waste.
PA DEP	Pennsylvania Storage Tank and Spill Prevention Act and 25 PA Code 245	Storage tank registration/permit certificate	22-60170	Issued: 6/4/25 Expires: 6/4/26 (annual renewal)	Registration of storage tanks. There is one aboveground storage tank registered for CCEC.

Table 2.2-1 Current Environmental Authorizations for CCEC (Sheet 3 of 3)

Agency	Authority	Requirement	Number	Issue / Expiration Date	Activity Covered
U.S. Department of Transportation (DOT)	49 CFR Part 107, Subpart G and 49 U.S.C. 5108	Hazardous materials certificate of registration	051022550113EG	Issued: 7/1/25 Expires: 6/30/28	Hazardous materials transportation.
PA DEP	Londonderry Township	Sewage disposal system permit modification	C179678 and C21434	Issued: 1/1/95 Expires: No date listed on permit	Approval of additional flows to visitor's center and training center elevated sand mounds.
PA DEP	Water Quality Management Division	Sewage sludge disposal agreement	Letter Agreement	Issued: 6/20/00 Expires: No date listed on permit	Disposal of sewage sludge.
PA DEP	Bureau of Laboratory Certification	Environmental laboratory accreditation certification	Reg. No. 22-00649	Renewed annually	Site chemistry laboratory certification to perform accredited analyses for NPDES reporting.
PA DEP	Londonderry Township	On-lot sewage disposal system permit	U003282	Issued: 08/10/07 Expires: No date listed on permit	New sand mound system for training center. The training center sewage disposal system is inactive, see Table 2.2-2.
Tennessee Department of Environment and Conservation	TDEC Rule 0400-20-10-.32	License to ship radioactive material	T-PA007-L25	Renews annually	Shipment of radioactive material to a licensed disposal/processing facility in Tennessee.

(NRC 2009b; NRC 2019; SRBC 2022; CEG 2025c; USACE 2021)

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

Agency	Authority	Requirement	Authorized Activity
Susquehanna River Basin Commission	Susquehanna River Basin Compact, P.L. 91-575, Article 3, Section 3.10, P.L. 91-575, and Commission Regulation 803.61	Surface water withdrawal, groundwater withdrawal, and consumptive water use permit	Surface water and groundwater withdrawal and consumptive use permit. An application for a docket renewal with modification was submitted in August 2025 to increase withdrawal and consumptive use allowances from Docket 20221203. The previous docket (20110610 issued 6/23/2011 and expired 12/31/2022) authorized surface water withdrawal of up to 122.8 mgd, groundwater withdrawal of up to 225,000 gallons per day (gpd) (30-day average) for industrial use, and consumptive water use of up to 19.2 mgd.
PA DEP	Air Pollution Control Act, P.L. 2119 and 25 Pa. Code Chapter 127	Synthetic minor operating permit	All air emission sources at CCEC. The previous permit (22-05029, issued 10/13/17 and expired 10/31/22) was no longer needed after decommissioning due to removal of most of the air emissions sources. A new air permit application is planned for submittal in third quarter of 2025 for new emission sources during resumption of power operations.
U.S. Army Corps of Engineers (USACE)	Pennsylvania Public Laws 834, 204, 851, 1987, etc.	Maintenance dredging permit	Maintenance dredging of the intake bay in the Susquehanna River. The previous permit (CENAB-OPR-P-2016-00128-P04 issued 3/31/17 and expired 6/30/21) authorized maintenance dredging of the CCEC intake bay. A new permit may be required if sedimentation has accumulated near intake structure and the plant determines sediment removal is required.

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

Agency	Authority	Requirement	Authorized Activity
PA DEP	Pennsylvania Safe Drinking Water Act (P.L. 206, No. 43)	Public water supply permit	Operation of the training center drinking water system. This system is operational but has not been used to provide drinking water since decommissioning. CEG is working with the PA DEP to restore the public water supply permit (22295502-T1 issued 01/20/00 with no expiration date).
PA DEP	Pennsylvania Storage Tank and Spill Prevention Act and 25 PA Code 245	Storage Tank Registration/Permit Certificate	Registration of storage tanks. New tank registration applications are anticipated to be submitted as tanks are brought onsite.
PA DEP	CWA, 33 U.S.C. Section 1251 et seq. and Pennsylvania's Clean Streams Law, as amended, 35 P.S. Section 691.1 et seq.	NPDES permit	Authorization to discharge into the Susquehanna River. A permit renewal application was submitted in March 2025 to support resumption of power operations.
EPA, PA DEP	CWA Section 401 [33 USC 1341]	Certification of water quality standards	Water quality certification application to be submitted to the PA DEP.
Utah Department of Environmental Quality	Utah Administrative Code R313-26	General site access permit for radioactive waste disposal	Delivery of radioactive waste to a land disposal facility in Utah. The station permit with the State of Utah expired; CEG has started the permit renewal process.

(SRBC 2011)

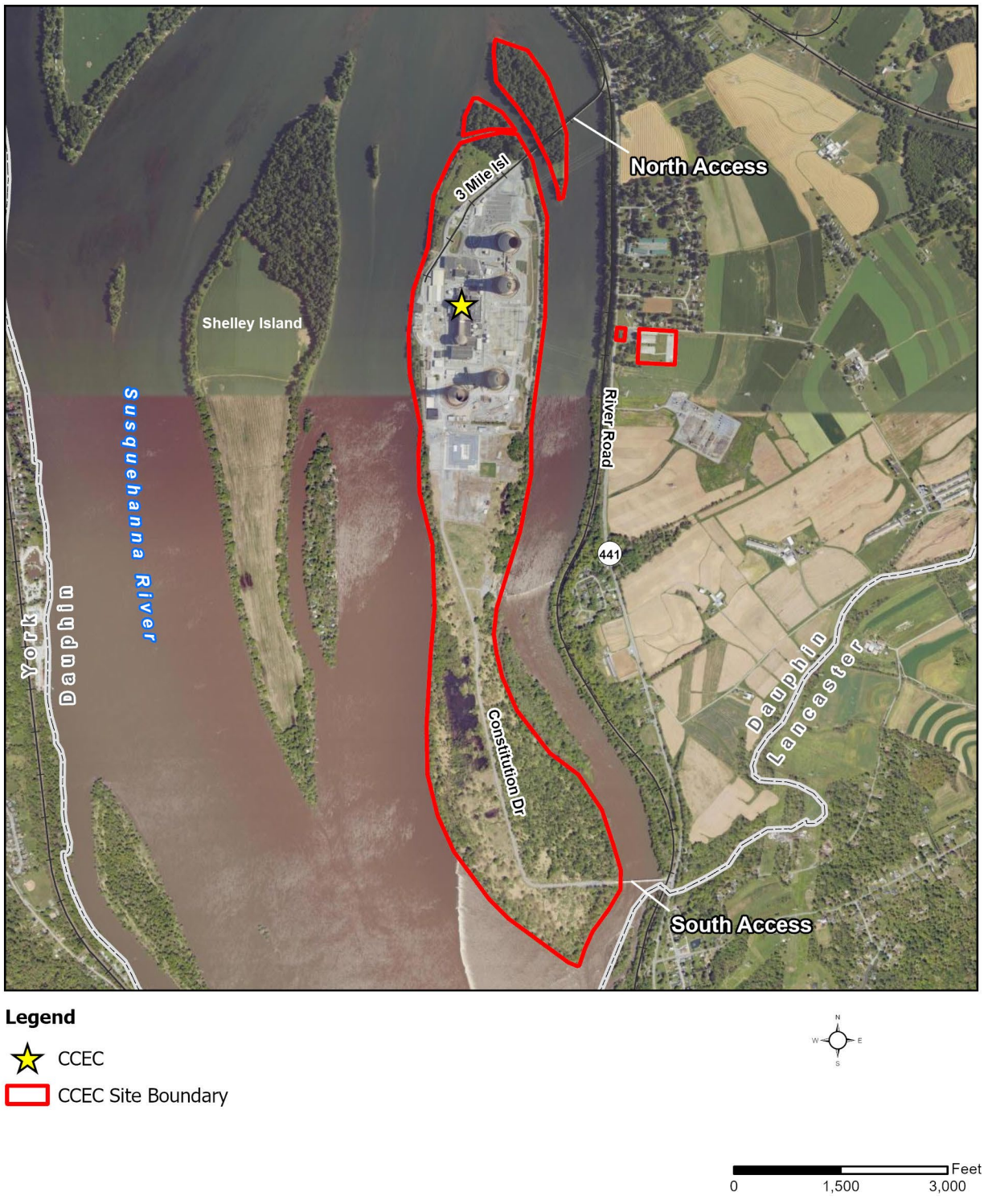

Figure 2.2-1 Three Mile Island Developed Areas and Access Roads

3.0 AFFECTED ENVIRONMENT

The affected environment for the potential reauthorization of power operations of CCEC is the current decommissioning state at CCEC prior to implementing any of the activities related to the preparation for the resumption of power operations. The affected environment is defined for each resource area given this temporal baseline.

CCEC is situated on the northern end of Three Mile Island, an approximately 11,000-foot-long, 1,700-foot-wide island aligned north to south in the Susquehanna River. The site is in Londonderry Township in Dauphin County, Pennsylvania. The area surrounding CCEC is generally characterized as agricultural with rural development and communities interspersed (EGC 2019b). The borough of Middletown, Pennsylvania, is approximately 3 miles north of CCEC, and the nearest community, the borough of Goldsboro, is approximately 1.25 miles west. The nearest major metropolitan area is the City of Harrisburg, Pennsylvania, approximately 10 miles northwest of CCEC.

3.1 Land Use

The CCEC site encompasses approximately 400 acres and includes all of Three Mile Island, St. John's and Evergreen Islands (also referred to as Sand Beach Island), and approximately 6 acres of land east of Three Mile Island along State Highway 441 on the eastern shores of the Susquehanna River. Figure 2.1-2 depicts the site's features and associated boundaries. The site is relatively the same since the shutdown of CCEC in 2019. Approximately 200 acres include the CCEC operational facilities. This acreage does not include undeveloped areas or land associated with TMI-2. Since 2019, an ISFSI built to store spent fuel from CCEC was completed in 2022. The ISFSI is located south of TMI-2 in an area previously occupied by the site's transportation facility. (NRC 2024c) CEG does not anticipate changes to existing land use associated with preparations for resumption of power operations or the resumption of power operations. The York Haven Hydroelectric Power Company has an easement at the southern end of Three Mile Island for building a nature-like fishway (NLF) associated with the York Haven Dam per an agreement with the Federal Energy Regulatory Commission (FERC). The project is unrelated to CCEC and is not anticipated to impact restart activities or resumption of plant operations. Any land use changes associated with the NLF project is anticipated to primarily be confined to the far southern tip of Three Mile Island.

Figure 2.1-1 depicts CCEC in relation to communities and features within the vicinity (6-mile radius). The area surrounding CCEC is a mixture of small communities and agriculture. Since 2019, the general character of the surrounding area has remained largely the same. A review of available aerial imagery from the time of the CCEC shutdown in 2019 to 2024 showed no major changes have occurred to offsite land use near CCEC. (Google 2025)

3.2 Water Resources

The CCEC CWS and the SWS both draw water from, and discharge to, the Susquehanna River. Onsite groundwater wells also supply water for cooling water makeup, domestic water consumption, and other industrial uses. (NRC 2009a)

3.2.1 Groundwater

Stratigraphy at CCEC consists of overburden soil consisting of fill materials and weathered bedrock consisting of silt and clay underlain by bedrock composed of sandstone and shale of the Gettysburg Formation. The thickness of the overburden ranges from approximately 15 to 30 feet. There is 1 to 3 feet of weathered rock at the overburden-bedrock interface. The weathered rock consists of hard silty clay derived from the Gettysburg Formation. The bedrock underlying CCEC is composed of shales, sandstones, and siltstones belonging to the Triassic Gettysburg Formation (EGC 2019b).

The saturated thickness of the overburden water-bearing unit ranges from zero to greater than 6 feet. Although most of the overburden contains some groundwater, there are isolated areas that are unsaturated and generally coincide with bedrock topographic highs. Where saturated, the overburden materials in the region have low hydraulic conductivity and low transmissivity and are not a major source of water. Although of limited saturated thickness, the overburden forms a continuous flow zone. Primary sources of water to the overburden include recharge from precipitation and lateral flow from the backfill around the foundation footprint.

The bedrock surface of the Gettysburg Formation underlying CCEC has minimal relief and lies at approximately 277 feet MSL. Gettysburg Formation lithology varies from red-to-brown, interbedded, fine- to medium-grained sandstone, shaley-siltstone, and shaley-claystone that range from medium-hard to hard. A wide range in yields occurs within the Gettysburg Formation, with the sandstone facies normally being the best aquifers. However, in closely jointed or fractured shales, relatively high yields can occur. (EGC 2019b) The Gettysburg Formation has relatively low primary porosity. Groundwater is stored and transmitted through secondary fractures and joints. The water-bearing characteristics of the Gettysburg Formation shale have been described as a “tabular aquifer”, with some beds having the ability to transmit water, while other beds have little to no capacity to transmit water. The difference in transmissivity principally lies in the number and width of the secondary openings (fractures, joints, and bedding planes) where, in general, unfractured rock has negligible capacity to store or transmit water. The tabular aquifer beds are further described as being overlapping and discontinuous in every direction but may extend laterally (generally east-west) up to several thousand feet and are strongly anisotropic (i.e., not the same in all directions). Groundwater in the bedrock occurs under artesian conditions. The natural groundwater flow within the bedrock is expected to be upward along secondary features and then laterally along the strike of the bedding with discharge to the Susquehanna River. The sources of water to the bedrock include downward recharge from the saturated overburden at the subcrop, the saturated backfill around the foundation footprint, or groundwater flowing vertically upward from deeper rock.

The water table reaches its maximum elevation at the highest topographic point in the center of the island and falls off toward both the east and west shores. A variation of only about 5 feet occurs from either side to the center producing a gradient of approximately 0.6 percent toward the river. (EGC 2019b) The water level of the Susquehanna River controls Three Mile Island groundwater levels. Because a positive head exists on the island, any movement of groundwater from the site is anticipated to be toward either channel of the river, which acts as a natural boundary. River flow to the rock of the Gettysburg shale (i.e., the water bearing unit underlying the water table) on either bank of the river is unlikely due to the lower flow characteristics of the Gettysburg shale when compared to those of the alluvial materials and the higher groundwater levels on either shore with hydraulic gradients toward the river. For groundwater to move from the island to the mainland, it is expected to be necessary to reverse the hydraulic gradient on the mainland, which is expected to require partial dewatering of the Susquehanna River. (EGC 2019a)

Potentiometric surface maps for both overburden and bedrock aquifers from groundwater elevation data collected in May 2024 are depicted in Figures 3.2-1 and 3.2-2. In the overburden, the center of the island serves as a recharge point with radial groundwater flow from the center of CCEC toward the Susquehanna River. Groundwater flow in the bedrock is outward from the center of CCEC along strike toward the northeast and southwest with discharge to the Susquehanna River. The groundwater captured by these pumping wells is primarily along strike (northeast-southwest) within the pumped interval. However, most of the water that is pumped from these wells is derived from the Susquehanna River. Groundwater does not migrate beneath the river from the island to the mainland or other nearby islands due to the opposing flow of groundwater from higher land on both sides of the river.

3.2.1.1 Groundwater Use

There are eight water supply wells associated with CCEC: six are located on Three Mile Island and two are located off the island at the visitor’s center and the training center/simulator building, as shown in Figure 3.2-1. The water supply wells were installed in the lower bedrock aquifer (CEG 2025d).

The well that supplies potable water to the visitor’s center is installed to a depth of 121 feet and has a maximum design yield of about 10 gpm. The well that provides potable water to the training center/simulator building is installed to a depth of 100 feet and has a maximum design yield of 30 gpm. (NRC 2009a)

Two water supply wells supply the plant’s drinking water system: the operations support facility/north office building (OSF) well and the building 48 (48S) well. They are installed to depths of 775 feet and 996 feet, respectively, and have maximum pump capacities of 40 gpm and 30 gpm, respectively. (NRC 2009a)

In August 2021, the ISFSI pad well was drilled to 300 feet. This well is not used for drinking water; it is used for dishwashing and restroom functions. The pump rate is not measured in this well.

CCEC currently uses three industrial water supply wells (Wells A, B, and C). These three wells supply industrial makeup water (including fire service, makeup to the demineralized water system, bearing lubrication for the screen house pumps, and service for other buildings and equipment) and are installed to depths of 400 feet, 500 feet, and 400 feet, respectively.

The SRBC manages a subset of the overall groundwater use in the Susquehanna River Basin. The SRBC's Comprehensive Plan provides a framework for the SRBC to manage the Susquehanna River Basin's water resources. The Comprehensive Plan was issued in 2021 and is expected to be updated in 2031. (SRBC 2021a)

The SRBC Docket No. 20221203 (effective January 1, 2023–April 19, 2034) includes limits for groundwater withdrawals and consumptive use from three onsite wells (Wells A, B, and C). It is specified in SRBC Docket No. 20221203 that the current approved groundwater withdrawal and consumptive use rate limits were reduced because electric generation discontinued in September 2019; therefore, the facility water demand decreased. SRBC Docket No. 20221203 authorizes a total groundwater withdrawal of up to 0.099 mgd, or 99,000 gpd, from Wells A, B, and C. The docket also includes limits per well, including 30-day average withdrawal rates, maximum instantaneous withdrawal rates, and peak day withdrawal rates. Groundwater withdrawals are recorded daily and reported quarterly to the SRBC. The non-industrial water supply wells at CCEC are not subject to SRBC regulation. (SRBC 2022)

In 2020 through 2024, the average withdrawal rate per year for the three industrial wells ranged from 13,578 gpd in 2023 to 33,230 gpd in 2021, which is significantly less than CCEC's approved groundwater withdrawal limit of 99,000 gpd, with no reported exceedances. Drinking water wells OSF and 48S typically withdraw groundwater at 500 gpd.

In 2019, groundwater withdrawals in the Susquehanna River Basin for electric generation were 6.1 mgd, which was about 2 percent of the total groundwater withdrawals of 285.1 mgd. Public water supply was the largest groundwater user at 138.3 mgd. Projected groundwater withdrawals for electric generation in the river basin in 2040 are 5.7 mgd, which is about 2 percent of the total projected 291.1 mgd groundwater withdrawals. Public water supply is projected to be the largest groundwater user in the river basin at 148.7 mgd. (SRBC 2021a)

Based on a well survey conducted in July 2024, there are 64 water supply wells within 1 mile of the center of CCEC. Most of the identified offsite wells are used for domestic water supply and are completed as open boreholes within the upper bedrock (less than 100 feet below ground surface); however, the depths of some wells extend to 775 feet below ground surface.

3.2.1.2 Groundwater Quality

A potential release to the subsurface could initially migrate downward to the water table then migrate with groundwater beneath CCEC, which flows radially outward from the center of the island with discharge to the Susquehanna River. Following use in various plant systems, water from the three industrial water supply wells is discharged via monitored outfalls and the industrial wastewater treatment system, which is described in Section 3.2.2.2.

Groundwater sampling is routinely performed at CCEC per the radiological groundwater protection program (RGPP), which incorporates guidance as detailed in Nuclear Energy Institute 07-07 (NEI 2007; NEI 2019). The RGPP includes 49 monitoring wells designated as background (1 well), source (13 wells), perimeter (16 wells), long-term shutdown (7 wells), and mid-field (12 wells). The RGPP monitoring well designations, and screened aquifers (overburden, upper bedrock, and lower bedrock aquifers), and groundwater monitoring results are reported in Annual Radiological Environmental Operating Reports (AREORs). (CEG 2025d; CEG 2024f) Mid-field RGPP wells MW-TMI-6I and MW-TMI-6D were abandoned in 2024 due to their location in relation to ongoing decommissioning activities. (CEG 2025d)

In 2020 through 2024, the maximum tritium concentrations were detected in monitoring wells set within the upper bedrock aquifer. Tritium was detected at a maximum concentration of 2,770 picocuries per liter (pCi/L) in MW-TMI-21D in 2020. The maximum tritium concentration decreased each year. In 2024, tritium was detected at a maximum of 1,280 pCi/L in MW-TMI-22D. (EGC 2020a; EGC 2021a; CEG 2022a; CEG 2023a; CEG 2025d) These tritium detections are far below the EPA drinking water maximum contaminant level (MCL) of 20,000 pCi/L. These groundwater monitoring wells (MW-TMI-21D and MW-TMI-22D) are located near the Unit 1 borated water storage tank (BWST). In 2012, there was a leak from the CCEC BWST flange. Eight monitoring wells were installed in 2013 to identify potential tritium sources and to improve the groundwater monitoring program. Pumping of the industrial water supply wells caused the plume to migrate vertically downward and captured tritiated groundwater from the plume. Elevated tritium concentrations in these wells are attributed to residual tritium from the 2012 BWST flange leak.

In the lower bedrock aquifer, in which CCEC water supply wells are installed, the maximum tritium concentration detected in 2020 through 2024 was 553 pCi/L in Well C in 2020 (EGC 2020a; EGC 2021a; CEG 2022a; CEG 2023a; CEG 2024f; CEG 2025d). Drinking water wells OSF and 48S are monitored for tritium as part of CCEC's RGPP. The maximum tritium concentration detected in these drinking water wells was 934 pCi/L in the OSF well in November 2005. Tritium has been detected in industrial and drinking water supply wells at concentrations far below the MCL.

Gamma radionuclides have not been detected in monitoring wells at concentrations above their respective lower limits of detection (LLDs) since 2006; therefore, in 2020, gamma radionuclide analysis frequency was reduced from annual to every 2 years. Gamma radionuclides were not detected above their LLDs in RGPP wells in 2020, 2022, and 2024. (EGC 2021a; CEG 2022a; CEG 2023a; CEG 2024f; CEG 2025d)

Strontium 89/90 and hard-to-detect radionuclides Fe-55 and Ni-63 were not detected above their respective LLDs in 2020 through 2024 (EGC 2021a; CEG 2022a; CEG 2023a; CEG 2024f; CEG 2025d).

The results of the radiological environmental monitoring program (REMP) are reported in AREORs. Drinking water samples are collected from three offsite municipal treatment plants located 13 to 88 miles from CCEC. In 2020 through 2024, tritium was not detected in drinking

water REMP sampling locations above the LLD of 200 pCi/L. (EGC 2021a; CEG 2022a; CEG 2023a; CEG 2024f)

CEG maintains an environmental emergency response plan establishing preventive and emergency response programs. The requirements of the stormwater pollution prevention plan (SWPPP) and spill prevention, control, and countermeasures (SPCC) plan are consolidated into a single facility plan. CCEC uses best management practices (BMPs) to prevent pollutants from entering stormwater, to direct the flow of stormwater, or to treat stormwater.

3.2.2 Surface Water

The major surface water feature in the region is the Susquehanna River, with Three Mile Island located in the Lower Susquehanna River. The drainage area of the Susquehanna River begins at Otsego Lake in Cooperstown, New York, crosses the States of Pennsylvania and Maryland, and ends in the Chesapeake Bay, a distance of 444 miles. The total watershed area is approximately 27,500 square miles. (SRBC 2025) The U.S. Geological Survey operates gauge station 01570500 on the Susquehanna River at Harrisburg, Pennsylvania, approximately 11 miles upstream of CCEC. The average annual mean stream flow for 2007 through 2024 at this station is 38,213 cubic feet per second.

The major tributaries contributing to the Susquehanna River near Three Mile Island are the Swatara and Conewago Creeks (USGS 2023). The river and streams near Three Mile Island are used for water supply, power generation, boating, fishing, and recreation. Three Mile Island is in a channel of the river referred to interchangeably as either York Haven Pond, Lake Frederick, or the Pond, which was formed by the York Haven Dam. The Pond is approximately 1.5 miles wide at CCEC. The orientation of the river channel changes from northwest/southeast to north/south a short distance north of Three Mile Island where the stream cuts through a diabase dike (an erosion-resistant geologic formation) crossing the river near Hill Island. The average elevation of the water surface in the river at CCEC is approximately 277 feet MSL according to the 2023 U.S. Geological Survey quadrangle map (USGS 2023).

3.2.2.1 Surface Water Use

Surface water is withdrawn at CCEC during its decommissioned state for service water equipment testing purposes. As described in Section 2.2.1, the reactor coolant system was drained and vented, spent fuel was transferred from the SFP to the onsite ISFSI, the SFP was drained and covered, and the external fill structure of Cooling Tower B was removed.

As described in Section 3.2.1.1, the SRBC's Comprehensive Plan provides a framework for the SRBC to manage the Susquehanna River Basin's water resources. The SRBC monitors and manages surface water use in the area. Electric generation and public water supply sectors represent the largest demands on water supply in the Susquehanna River Basin. In 2019, surface water withdrawals from the Susquehanna River for electric generation were 2,677.6 mgd, which was about 86 percent of the total surface water withdrawals of 3,109.8 mgd. Consumptive use due to electric generation was 90.9 mgd, which was about 34 percent of the total consumptive use of 266 mgd. Projected surface water withdrawals for electric generation in

2040 are expected to be reduced to 2,287.1 mgd, which is about 83 percent of the total projected surface water withdrawals of 2,743.3 mgd. Consumptive use due to electric generation is also projected to decrease to 80.7 mgd, which is about 30 percent of the total projected consumptive use of 265.1 mgd. Through its planning and regulatory functions, the SRBC continues to assess water use and availability conditions throughout the river basin and review and approve water withdrawal, consumptive use, and diversion projects. (SRBC 2021a)

SRBC Docket No. 20221203 (effective January 1, 2023–April 19, 2034) includes limits for surface water withdrawals and consumptive use from the onsite industrial wells and the Susquehanna River. As described in Section 3.2.1.1, because electric generation was discontinued in September 2019 and the facility was in the process of decommissioning, the facility's water demand decreased. The current docket authorizes surface water withdrawal of up to 44 mgd with consumptive use of up to 6.00 mgd (groundwater and surface water). (SRBC 2022)

In 2020 through 2024, average annual surface water withdrawals ranged from 10.06 mgd to 15.28 mgd. The daily maximum production rate per year ranged from 13.57 mgd in 2024 to 37.56 mgd in 2022. These daily maximum withdrawal rates are below the docket peak daily limit of 44 mgd. Several monitoring points used for calculating consumptive use were abandoned since the plant was shut down; therefore, representative values for consumptive use during this period are not available. (SRBC 2022)

3.2.2.2 Surface Water Quality

Cooling water discharges decreased following the cessation of operations at CCEC. Discharges from CCEC to the Susquehanna River are authorized under NPDES Permit No. PA 0009920, issued by the PA DEP in 2009, which is under administrative extension. Compliance with NPDES permit limits is confirmed by monitoring. CCEC discharges comply with the NPDES permit limits, and no notices of violation (NOVs) or permit non-compliance issues were reported in 2020 through 2024. CEG submitted an NPDES permit renewal application in March 2025 to support resumption of power operations. Chemical additives used in the SWS and CWS to control biofouling are listed in the 2025 NPDES permit renewal application.

CCEC generates two types of wastewater: industrial waste treatment effluents and sanitary liquid wastes. Industrial wastewater treatment includes settling and filtration to remove solids, an air flotation unit to remove oil and grease, and potential of hydrogen (pH) adjustment. CCEC has an onsite sewage treatment plant to treat sanitary wastewater generated at the plant. Digested sanitary sludge from the sewage treatment plant is analyzed for radionuclides and transferred to a PA DEP-approved agriculture utilization facility for disposal. (NRC 2009a) No industrial waste treatment effluents were discharged in 2020 through 2024.

As described in Section 3.2.1.2, CEG maintains an environmental emergency response plan. CCEC uses BMPs to prevent pollutants from stormwater, to direct the flow of stormwater, or to treat stormwater. Surface waters of the Susquehanna River are protected from potential spills by the station flood protection dike and the station yard drainage system. Potential liquid spills

from within the flood protection dike are expected to be collected and transported via the station yard drainage system, which flows into the east dike settling basin (EDSB) before discharging into the Susquehanna River from the east side of CCEC. The EDSB is equipped with a floating oil boom and a gate valve that can be closed to stop the discharge of liquids from the basin. Furthermore, operating a valve in the discharge weir wall can increase the EDSB holding capacity. This valve in the discharge weir wall is normally kept closed. A NPDES-permitted internal outfall (Outfall 005B) receives water from the operation of the EDSB drain valve, and there are monitoring requirements and permit limits for pH, total suspended solids, and oil and grease.

As part of the RGPP, three surface water sampling locations (SW-E-1, SW-E-2, SW-E-3) were designated as idle in 2020 because CEG made a fleetwide decision to realign RGPPs with the objective of Nuclear Energy Institute 07-07, which involves management of inadvertent releases of licensed material to groundwater. Therefore, surface water samples were not collected from these locations in 2021 through 2024. Tritium and other radionuclides were not detected at concentrations exceeding the LLD in any of the three locations during the 2019 and 2020 sampling events.

Surface water samples are collected as part of the REMP at one upstream location and two downstream locations between 0.5 mile (downstream) and 8.5 miles (upstream) of CCEC. Composite samples are analyzed for tritium quarterly and gamma isotopes monthly. (CEG 2025d) In 2020 through 2024, tritium was detected in a downstream location at a maximum concentration of 2,910 pCi/L in 2020. The tritium detection was a result of CCEC releasing effluent under permitted discharges in accordance with NRC regulations. Tritium detections in 2020 through 2024 were far below the MCL of 20,000 pCi/L. Gamma radionuclides were not detected above the minimum detectable concentration in 2020 through 2022. In 2023, low-level I-131 was detected at a maximum of 2.48 pCi/L. The source was determined to be medical sources from Hershey Medical. (EGC 2021a; CEG 2022a; CEG 2023a; CEG 2024f; CEG 2025d)

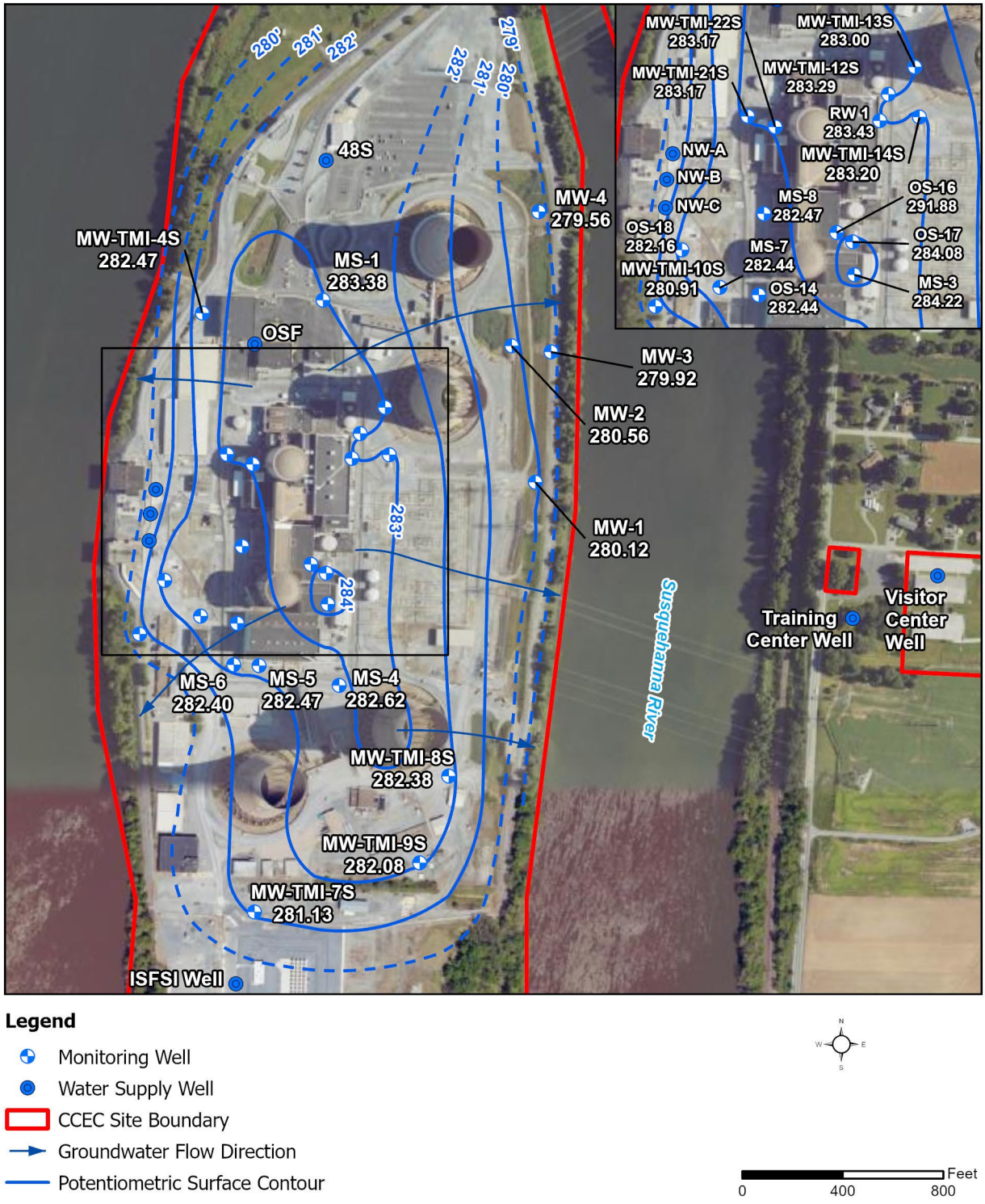

Figure 3.2-1 Overburden Potentiometric Surface Map, May 2024

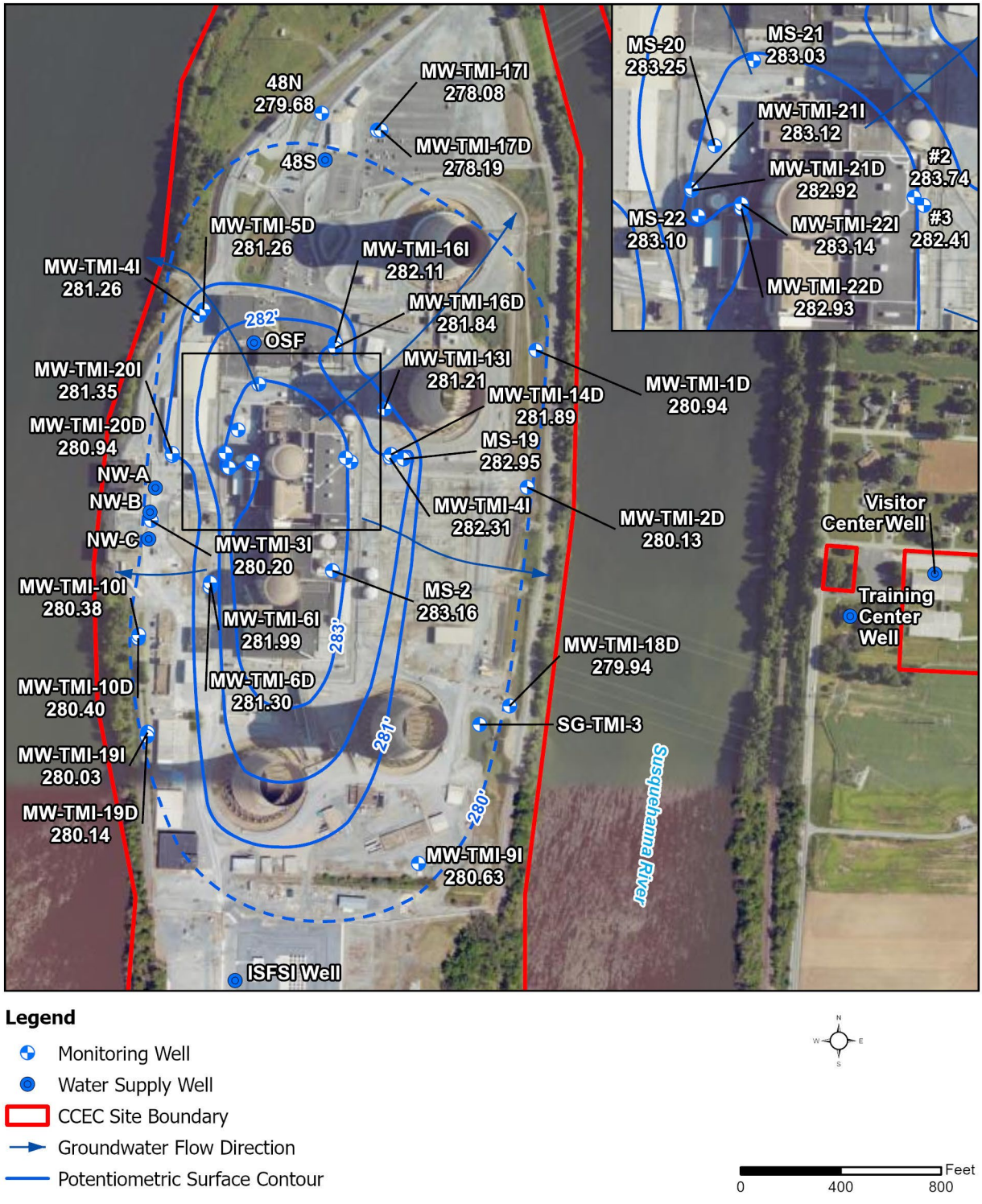

Figure 3.2-2 Bedrock Potentiometric Surface Map, May 2024

3.3 Ecological Resources

3.3.1 Terrestrial Ecology

3.3.1.1 Terrestrial Ecoregion

CCEC lies within the Northern Piedmont EPA Level III ecoregion. This ecoregion is enveloped by the Southeastern Plains (EPA Level II) and Eastern Temperate Forests (EPA Level I) ecoregions, respectively. (EPA 2006)

The Northern Piedmont ecoregion consists of low rounded hills, irregular plains, and open valleys, and is underlain by metamorphic, igneous, and sedimentary rocks. Crestal elevations typically range from about 325 feet on limestone to 1,300 feet on more resistant metamorphic rock. Isolated higher rocky hills and ridges occur and were formed by diabase intrusions. The climate is humid continental, with cold winters, hot summers, and an average of 170–210 days without killing frost. The natural vegetation is mostly Appalachian Oak Forest (dominated by white and red oaks). Some oak-hickory-pine forests occurred along the Susquehanna River and are dominated by hickory (*Carya* spp.), Virginia pine (*Pinus virginiana*), pitch pine (*Pinus rigida*), chestnut oak (*Quercus prinus*), white oak (*Quercus alba*), and black oak (*Quercus velutina*). There are scattered serpentine barrens in Chester, Delaware, and Lancaster Counties of Pennsylvania. (Woods et al. 1999)

Soils within the Northern Piedmont ecoregion are generally deep, well-developed alfisols and ultisols of moderate to excellent fertility. Those derived from the carbonate bedrock in the York and Lancaster valleys are exceptionally fertile. Land use and land cover is a complex mix of small farms interspersed with residential, commercial, and industrial development and scattered woodland. (Woods et al. 1999)

3.3.1.2 Site and Vicinity – Terrestrial Resources

The NRC's 2024 Environmental Assessment for Specific Decommissioning Activities (EASDA) at TMI-2 provides descriptions and characterizations of terrestrial resources at CCEC and within the 6-mile vicinity of the site (NRC 2024d). 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 Wildlife Habitat Council Conservation Certification Projects

Terrestrial monitoring is conducted at CCEC as part of the Wildlife Habitat Council (WHC) Conservation Certification. Current monitoring efforts include those for eastern blue birds (*Sialia sialis*) and wood ducks (*Aix sponsa*). Projects that have not been maintained since the 2019 shutdown include bat monitoring, raptor monitoring, and reptile and amphibian identification and tracking.

Bluebird Trail Project

The objective of the Bluebird Trail project is to provide nesting habitat for eastern bluebirds and to monitor and track nesting success. The project also monitors other bird species that may use the boxes. This project is locally aligned with the 2015–2025 Pennsylvania Wildlife Action Plan.

Bluebird boxes were originally installed in 2011. Currently, there are 17 bluebird boxes located on the south end of CCEC property. The boxes were installed at the appropriate height and at a distance away from trees to help prevent predation and give birds the appropriate space to thrive in. The boxes are situated in areas that provide adequate food and water for survival. In March 2015, predator guards were added to each of the bluebird houses to increase brood success by further decreasing predation.

Bluebird box monitoring began in 2015 when CCEC joined the Pennsylvania Bluebird Society. Monitoring is conducted each spring in accordance with guidelines published by the Pennsylvania Bluebird Society to document bluebird brood success. Bluebird nest locations are marked on a map, and information including species, nest type, number of eggs, hatchlings, and fledglings, and predator species are recorded. Monitoring results have indicated success with an increase in nest activity each year.

Wood Duck Monitoring

The purpose of the wood duck monitoring project is to provide nesting locations for wood ducks via the installation of nesting boxes. The nesting boxes were installed with predator guards to limit predation. Further, the nesting boxes are located in an area that provides the necessary cover, water, and food resources to sustain the breeding wood ducks. A total of 30 wood duck boxes are currently onsite.

Though wood ducks are the target species for the project, other cavity nesting waterfowls including hooded mergansers (*Lophodytes cucullatus*) and terrestrial species like eastern screech owls (*Megascops asio*), squirrels (*Sciurus* spp.), and raccoons (*Procyon lotor*) have also been documented in the boxes.

The wood duck nesting boxes are cleaned and analyzed for repairs and replacement every spring prior to the nesting season. CCEC tracks the maintenance on the boxes; however, the nesting boxes are not actively monitored throughout the nesting season to ensure that the nests are not disturbed. In the fall, nest boxes are analyzed to document nest success, and to again determine if boxes need to be repaired or replaced. According to the monitoring data, the wood duck boxes have been successful, as nesting activity in the boxes has increased since their installation in 2008.

Bat Monitoring

Bat monitoring was conducted at CCEC in 2017–2018 as part of the WHC Conservation Certification. The target species during this monitoring phase was little brown bat (*Myotis lucifugus*), though any species of bat were documented if observed. Monitoring occurred once

per month from May through June of each year. During the 2017–2018 monitoring period, no bats were observed at CCEC.

Raptor Monitoring

The purpose of the raptor monitoring program in 2002 to 2018 was to monitor target species, including bald eagle (*Haliaeetus leucocephalus*), kestrel (*Falco sparverius*), peregrine falcon (*Falco peregrinus*), and osprey (*Pandion haliaetus*) to aid in the breeding success of the raptors, as well as help the Pennsylvania Game Commission (PGC) monitor the activity of the species.

The site natural resource committee worked closely with PGC, including participating in annual walkdowns with agency biologists, to report all raptor nest activity, as well as to capture and transport any injured raptors or fledglings to the closest wildlife rehabilitation center. After rehabilitation, birds were returned to their nest, or as close to it as possible. All protected species were handled by working with the PGC and in compliance with CEG's avian and wildlife management procedure.

CCEC uploaded bald eagle nest observations to the PGC website, which maintains a map of all active eagle nests in the state and tracks observations of nesting activity, at least once annually as soon as nesting activity could be documented.

Raptor monitoring at CCEC was discontinued after 2018.

Reptile and Amphibian Identification and Tracking

An inventory of reptiles and amphibians was conducted for the WHC Conservation Certification and included in CEG's Wildlife Management Plan, as described in the 2019 PSDAR (EGC 2019a). A total of 23 species of snakes, turtles, lizards, and amphibians were observed or believed to occur at the site during this inventory. Reptile and amphibian identification and tracking are no longer conducted at CCEC.

3.3.1.4 Procedures and Protocols – Terrestrial Ecology

3.3.1.4.1 Avian and Wildlife Management Procedure

The purpose of the avian and wildlife management administrative procedure is to provide guidance on how to properly respond when encountering or potentially disturbing injured or healthy wildlife. This procedure is required to maintain compliance with federal and state bird protection laws including, but not limited to, the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGEPA), and the Endangered Species Act (ESA).

One avian incident has been reported at CCEC since 2020. The incident occurred in June 2022 when a deceased peregrine falcon was found trapped in razor wire onsite. The incident was reported following the Avian and Wildlife Management procedure.

3.3.1.4.2 Pesticides Management Procedure

The purpose of the pesticides management administrative procedure is to delineate regulatory requirements related to the management (handling, application, storage, disposal and recordkeeping requirements) of pesticides as set forth in the Federal Insecticide, Fungicide, and Rodenticide Act (7 USC 6 et seq.), supporting federal regulations (40 CFR 122 and 40 CF4 171), and the applicable state-specific laws, rules and regulations.

3.3.1.4.3 WHC Wildlife Management Plan

This plan was developed in 2015 and is a comprehensive strategy that outlines goals of the wildlife habitat program, describes projects to achieve these goals, makes provisions for monitoring projects, and presents implementation and evaluation schedules. The WHC Wildlife Management Plan includes the ecological background and wildlife inventory of CCEC site. Additional information on the WHC Wildlife Management Plan is discussed in the 2019 PSDAR (EGC 2019a).

3.3.1.4.4 Environmental Review and Environmental Evaluations

CCEC follows CEG's environmental review administrative procedure and Environmental Evaluations administrative guidance. The purpose of the environmental review procedure is to provide a process for screening proposed activities to determine if an activity requires further analysis for environmental impacts and risk. The purpose of the Environmental Evaluations administrative guidance is to provide CCEC's environmental personnel with direction on performing environmental evaluations to identify the environmental and regulatory impacts, if any, of proposed activities.

3.3.1.4.5 Excavation, Trenching, and Shoring Procedure

The purpose of the excavation, trenching, and shoring administrative procedure is to provide safe work practices for excavating, trenching, and shoring and to provide instructions for identifying overhead high voltage hazards associated with excavation activities. This procedure is applicable to all excavation activities, including drilling and piercing, and is based on the requirements of 29 CFR 1926, Subpart P.

3.3.1.5 Permits and Regulatory Controls – Terrestrial Ecology

CCEC does not currently maintain any 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

As described in Section 3.3.1.4.1, one avian incident has been reported at CCEC since 2020. In the event of a reportable incident, the PGC is contacted, and CCEC follows the agency's recommendations to resolve each incident.

3.3.2 Aquatic Ecology

3.3.2.1 Marine Ecoregion

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

3.3.2.2 Site and Vicinity – Aquatic Ecology

CCEC is located on the north end of Three Mile Island and is bordered by the Susquehanna River, which is the source and receiving water body for the plant's cooling system. The intake and discharge structures for CCEC are located along the west shore of Three Mile Island, and the intake withdraws water from the center channel. (EGC 2019a) Descriptions and discussions in the NRC's EASDA regarding aquatic resources for CCEC and the 6-mile vicinity of the site remain valid (NRC 2024d). State and federally protected aquatic species are discussed in further detail in Section 3.3.3 of this report.

3.3.2.3 Studies and Monitoring – Aquatic Ecology

No studies or monitoring efforts for aquatic ecology have been conducted at CCEC since the 2024 EASDA.

3.3.2.4 Procedures and Protocols – Aquatic Ecology

CEG implemented an environmental emergency response plan at CCEC to establish preventive and emergency response programs to protect human health and the environment from the effects of accidental or inadvertent releases of polluting materials into the air, soil, or surface water from CCEC. Examples of polluting materials include hazardous waste, residual waste, petroleum products, hazardous and toxic substances, and non-authorized discharges to the site stormwater collection and conveyance system.

CEG consolidated the requirements of the individual pollution prevention and spill response programs into a single facility plan. This plan documents the pollution prevention design features of CCEC as well as the established plans and procedures that ensure facility operation in compliance with PA DEP's Emergency Environmental Response Guidelines. PA DEP's Emergency Environmental Response Guidelines and the SWPPP Supplement provide consolidated guidance to assist regulated facility owners in preparing plans that meet the objectives of the following programs:

- SPCC Plan
- Pollution Incident Prevention (PIP) Plan
- Spill Prevention Response Plan
- Preparedness, Prevention and Contingency Planning for hazardous waste management
- Hazard Communication and Community Right to Know parts of the Superfund Act
- Hazardous Waste Contingency Plan

- Amendments and Reauthorization Act of 1986
- SWPPP and BMPs under the site NPDES permit
- PA DEP Regulated Storage Tank Program (Facilities > 21,000 gallons total hazardous substance storage capacity)

3.3.2.5 Permits and Regulatory Controls – Aquatic Ecology

CCEC's NPDES permit (No. PA 0009920) authorizes CCEC to discharge into the Susquehanna River in accordance with effluent limitations, monitoring requirements, and other conditions set forth in the permit. Per the NPDES permit, the PA DEP has determined that CCEC closed-cycle recirculating cooling tower system is best technology available (BTA) for impingement mortality and entrainment.

In a letter dated March 7, 2025, CEG submitted an updated NPDES permit renewal application to PA DEP for CCEC. In the application, CEG included a BTA statement that shows CCEC utilizes BTA for both impingement mortality and entrainment reduction per the final CWA Section 316(b) rule for existing facilities that became effective on October 14, 2014. At the time of this report, the renewed NPDES permit has not yet been issued by PA DEP.

CCEC was previously authorized by the PA DEP and the USACE to perform maintenance dredging of the cooling water intake structure in the Susquehanna River. As described in Section 4.2.2.2, the USACE dredging permit expired, and as listed in Table 2.2-2, CEG plans to apply for a new permit prior to dredging.

3.3.2.6 Communications with Federal and State Agencies – Aquatic Ecology

There have been no communications with federal and state agencies related to aquatic ecology at CCEC since the NRC's EASDA (NRC 2024d). Section 3.3.1.6 and 3.3.3.6 include correspondences related to terrestrial ecology and special status species and habitats, respectively.

3.3.3 Special Status Species and Habitats

3.3.3.1 Federally Listed Species and Critical Habitats

The ESA provides protection for imperiled species and their habitat. The U.S. Fish and Wildlife Service (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. The action area for assessing the potential impacts of the proposed restart of operations and proposed resumption of operations on federally listed species is defined below (see Figure 3.3-1).

Terrestrial Region

The terrestrial region of CCEC action area consists of CCEC site boundary as illustrated in Figure 2.1-2. As described in Section 3.1, the site has remained largely the same since shutdown in 2019.

Aquatic Region

The aquatic region of CCEC action area encompasses the intake structure maintenance dredging area, as described in Section 3.2.2, as well as the region of the Susquehanna River that could experience heightened temperatures related to the CCEC thermal mixing zone during the proposed restart and resumption of operations. Historical thermal studies that were conducted to map the thermal mixing zone are described in the 2009 SEIS. Based on these historical studies, the thermal mixing zone of CCEC extended 16 feet offshore and 82 feet downstream of the discharge sump. (NRC 2009a) For the purpose of assessing impacts to ESA-listed species, the aquatic region of CCEC action area conservatively includes the width of the Susquehanna River center channel from the intake structure to 82 feet downstream of the discharge sump.

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. According to the USFWS, the current known ranges of the endangered Indiana bat (*Myotis sodalis*), endangered northern long-eared bat (*Myotis septentrionalis*), proposed endangered tricolored bat (*Perimyotis subflavus*), proposed threatened green floater (*Lasmigona subviridis*), proposed threatened monarch butterfly (*Danaus plexippus*), and endangered northeastern bulrush (*Scirpus ancistrochaetus*) overlap with CCEC action area. There is no proposed or final critical habitat present for any of these species within CCEC action area. (USFWS 2025a) A list of federally listed and proposed species is provided in Table 3.3-1.

The bog turtle (*Glyptemys muhlenbergii*) was included in the analysis of the 2009 SEIS and was determined not to occur in CCEC site or associated transmission line ROW (NRC 2009a). According to the latest information provided by USFWS, the current known range of the bog turtle does not overlap with CCEC action area (USFWS 2025a). Further, the bog turtle has not been observed or documented at CCEC site. Therefore, the bog turtle is not relevant to the

restart operations and resumption of operations of CCEC, and the species is anticipated to not be considered for further analysis.

Indiana Bat

The Indiana bat is listed as an endangered species under the ESA. The species has chestnut brown to dark gray fur, with the belly being lighter than the back. Indiana bat ears and wing membranes have a dull appearance and flat coloration that does not contrast with the fur, and the fur lacks luster compared with that of little brown bats. The nose of the species is lighter in color than that of the little brown bat. (USFWS 2025b)

During winter, Indiana bats are restricted to suitable underground hibernacula. Most of these sites are caves located in karst areas of the east-central United States; however, Indiana bats also hibernate in other cave-like locations such as abandoned mines. Most Indiana bats hibernate in caves or mines where the ambient temperature remains below 10 degrees Celsius, or 50.0 degrees Fahrenheit (°F), but above freezing, and remains relatively stable. (USFWS 2025b)

In summer, most reproductive females occupy roost sites in forested areas under the exfoliating bark of dead or dying trees that retain large, thick slabs of peeling bark. Roost trees are often within canopy gaps in a forest, in a fence line, or along a wooded edge. Habitats in which maternity roosts occur include riparian zones, bottomland and floodplain habitats, wooded wetlands, and upland communities. Indiana bats typically forage in semi-open to closed forested habitats with open understory, forest edges, and riparian areas. Adult males occupy similar habitats but can use a wider range of roosts compared to females. (USFWS 2025b)

Threats to the species include human disturbance of hibernating bats, commercialization of caves where the bats hibernate, loss of summer habitat, pesticides and other contaminants, and most recently, the disease white-nose syndrome. (USFWS 2025b)

According to USFWS, the current known range of the Indiana bat overlaps with the CCEC action area (USFWS 2025a). Suitable roosting and maternity habitat for the species is potentially present in CCEC action area; however, no occurrences of Indiana bats have been documented at CCEC action area (NRC 2024e).

Northern Long-eared Bat

In 2022, USFWS published a final rule to reclassify the northern long-eared as endangered under the ESA. This species of bat is medium-sized, about 3 to 3.7 inches in length, with a wingspan of 9 to 10 inches. Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various-sized caves or mines with constant temperatures, high humidity, and no air currents. Within hibernacula, surveyors find them hibernating most often in small crevices or cracks, often with only the nose and ears visible. During the summer and portions of the fall and spring, northern long-eared bats may be found roosting singly or in colonies underneath bark, in cavities or in crevices of both live trees and

snags, or dead trees. Males and nonreproductive 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 2025c)

According to USFWS, the current known range of the northern long-eared bat overlaps with CCEC action area (USFWS 2025a). Suitable roosting and maternity habitat for the northern long-eared bat is potentially present in CCEC action area; however, no occurrences of northern long-eared bats have been documented at CCEC action area (NRC 2024e).

Tricolored Bat

In 2022, USFWS announced a proposal to list the tricolored bat as endangered under the ESA. This species of bat is one of the smallest bats that is native to North America. The once-common species is wide ranging across the eastern and central United States and portions of southern Canada, Mexico, and Central America. During the spring, summer, and fall (collectively referred to as the non-hibernating seasons), tricolored bats primarily roost among leaf clusters of live or recently dead deciduous hardwood trees. In the southern and northern portions of the range, tricolored bats also roost in Spanish moss (*Tillandsia usneoides*) and *Usnea trichodea* lichen, respectively. In addition, tricolored bats have been observed roosting during summer among pine needles, eastern red cedar (*Juniperus virginiana*), within artificial roosts such as barns, beneath porch roofs, bridges, concrete bunkers, and, rarely, within caves. Female tricolored bats exhibit high site fidelity, returning year after year to the same summer roosting locations. Female tricolored bats form maternity colonies and switch roost trees regularly. Males roost singly. During the winter, tricolored bats hibernate (reducing their metabolic rate, body temperature, and heart rate) in caves and mines. Although, in the southern United States, where caves are sparse, tricolored bats often hibernate in road-associated culverts, as well as sometimes in tree cavities and abandoned water wells. Tricolored bats exhibit high site fidelity, with many individuals returning year after year to the same hibernaculum. The species faces extinction due to impacts of white-nose syndrome. (USFWS 2025d)

According to USFWS, the current known range of the tricolored bat overlaps with CCEC action area (USFWS 2025a). Suitable roosting and maternity habitat for the tricolored bat is potentially present in CCEC action area; however, no occurrences of the species have been documented at CCEC action area (NRC 2024e).

Green Floater

In 2023, USFWS announced a proposal to list the green floater as a threatened species under the ESA. Green floaters are small freshwater mussels with ovate trapezoidal shaped shells that

are yellowish brown to olive green with green rays. Green floaters prefer streams with slow to medium flows and good water quality. They are often found in sand or small gravel substrates where they establish a foothold and bury themselves as deep as 15 inches. They have limited mobility, and fast-flowing currents or high-water events can cause them to be washed downstream. When they occur in larger streams and rivers, they are found in quieter pools and eddies, away from strong currents. (USFWS 2025e)

According to USFWS, the current known range of the green floater overlaps with CCEC action area (USFWS 2025a). Suitable habitat for the green floater is potentially present in CCEC action area, specifically in the near-shore areas and other low-velocity areas of the Susquehanna River; however, no occurrences of the species have been documented at CCEC action area (NRC 2024e).

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, a 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 2025f)

According to the USFWS, the current known range of the monarch butterfly extends across the contiguous United States and overlaps with CCEC 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 CCEC action area that are not maintained by mowing (NRC 2024e).

Northeastern Bulrush

The northeastern bulrush is listed as an endangered species under the ESA. In 2024, the USFWS proposed a rule to delist the species as their review indicated that threats to the northeastern bulrush have been eliminated or reduced to the point that the species no longer meets the definition of an endangered or threatened species under the ESA. If the rule is finalized, the prohibitions and conservation measures provided by the ESA, particularly through Sections 7 and 9, are anticipated to no longer apply to the northeastern bulrush. (USFWS 2024)

The northeastern bulrush is a member of the Cyperaceae (sedge) family. It is a tall, leafy, perennial herb that produces stems and leaves from short, thick, underground rhizomes. It is distinguished from other *Scirpus* species by its drooping, clustered, fruiting heads; dark, chocolate-brown florets; achene bristles that are barbed to the base; and broad bracts. (USFWS 2024)

The northeastern bulrush is a wetland obligate plant occurring in acidic to almost neutral wetlands including sinkhole ponds, wet depressions, and vernal pools (collectively, seasonal or ephemeral wetlands); American beaver (*Castor canadensis*) flowages; and other riparian areas found in hilly country. Optimal habitat includes abundant sunlight, higher organic matter, and seasonally and/or annually fluctuating water levels, although prolonged periods with too much or too little water may be detrimental. (USFWS 2024)

According to USFWS, the current known range of the northeastern bulrush overlaps with CCEC action area (USFWS 2025a). Suitable habitat for the species is potentially present in CCEC action area; however, no occurrences of the northeastern bulrush have been documented at CCEC action area (NRC 2024e).

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 MBTA that may visit CCEC. 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 2025g)

In addition to the MBTA, bald and golden eagles are protected under the BGEPA. The BGEPA, 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 2025h)

CCEC site is located in the Atlantic Flyway, one of four administrative flyways established in North America to facilitate management of migratory birds and their habitats (USFWS 2025i). 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 11 birds of conservation concern overlap with CCEC action area: bald eagle (*Haliaeetus leucocephalus*), black-billed cuckoo (*Coccyzus erythropthalmus*), cerulean warbler (*Dendroica cerulea*), chimney swift (*Chaetura pelagica*), golden eagle (*Aquila chrysaetos*), Kentucky warbler (*Geothlypis formosa*), prairie warbler (*Setophaga discolor*), prothonotary warbler (*Protonotaria citrea*), red-headed woodpecker (*Melanerpes erythrocephalus*), rusty blackbird (*Euphagus carolinus*), and wood thrush (*Hylocichla mustelina*). With exception of the golden eagle and rusty blackbird, the breeding ranges of the remaining species overlap with CCEC 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 CCEC action area. Subsequently, no critical habitat is present in CCEC 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. The National Oceanic and Atmospheric Administration (NOAA) is responsible for identifying and describing EFH for sharks, tuna, and other highly migratory species that cross regional boundaries. NOAA only provides EFH for federally managed fish and invertebrates. (NOAA 2002)

A review of the NOAA EFH was conducted to determine the location of EFH in CCEC affected area. No EFH is present within CCEC 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 PAs 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 Office of National Marine Sanctuaries, part of NOAA, manages a national system of 19 underwater PAs. (NOAA 2025c)

There are no national marine sanctuaries that overlap with the CCEC affected area (NOAA 2025d).

3.3.3.4 State-listed Species

Several terrestrial species that Pennsylvania natural resources agencies have listed as state-threatened or endangered or designated as species of greatest conservation need are known to occur in the CCEC action area. American holly (*Ilex opaca*), which has the status of state-threatened, was observed on the southern portion of the island in 2008 during ecological

surveys conducted in support of the 2009 LR. Bald eagles (*Haliaeetus leucocephalus*), peregrine falcons (*Falco peregrinus*), and ospreys (*Pandion haliaetus*), all of which are protected under Pennsylvania's Game and Wildlife Code, are also known to occur in the CCEC action area. Undisturbed areas in the southern half of the island are likely to provide favorable habitat for these birds. (NRC 2024d)

According to a 2024 PA DEP Pennsylvania Natural Diversity Inventory (PNDI) review, no aquatic state-listed species have been identified near Three Mile Island. Further, there have been no observations of state-listed aquatic species at CCEC. (NRC 2024d) Therefore, no aquatic state-listed species are known to occur in CCEC action 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, respectively. There have been no other recent studies or monitoring specific to special status species and habitats conducted at CCEC.

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. CCEC 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, respectively. CCEC 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

There have been no communications with federal and state agencies regarding aquatic ecology specific to CCEC since the 2024 EASDA.

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

Common Name	Scientific Name	ESA Protected Status
Indiana Bat	*Myotis sodalis*	E
Northern Long-eared Bat	*Myotis septentrionalis*	E
Tricolored Bat	*Perimyotis subflavus*	PE
Green Floater	*Lasmigona subviridis*	PT
Monarch Butterfly	*Danaus plexippus*	PT
Northeastern Bulrush	*Scirpus ancistrochaetus*	E

(USFWS 2025a)

E = endangered
PE = proposed endangered
PT = proposed threatened

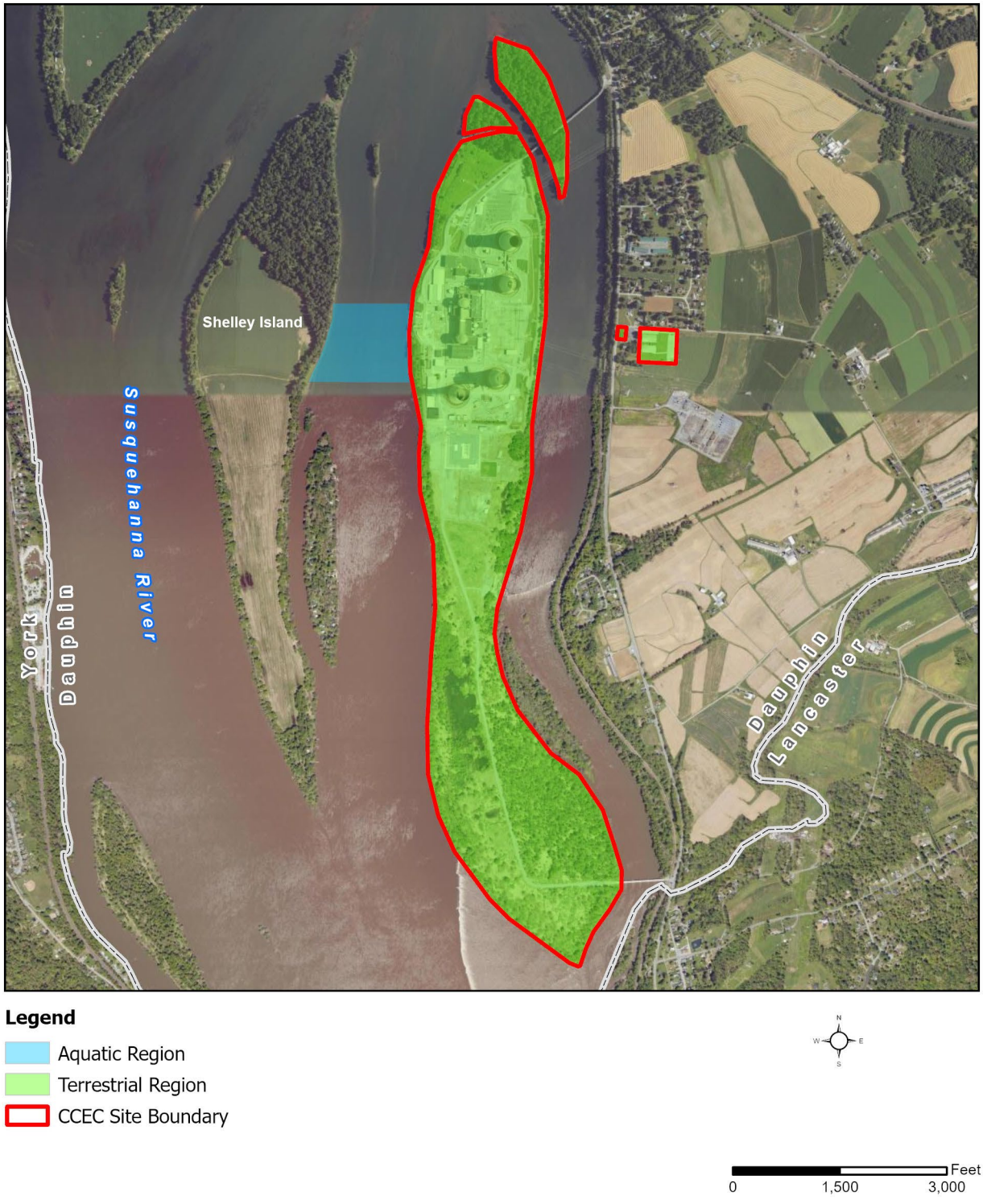

Figure 3.3-1 CCEC ESA Action Area

3.4 Socioeconomics

This section primarily describes CCEC staffing levels, tax payments, operating expenditures, and housing and income, as these are the factors that impact socioeconomic changes in the plant's region of influence.

As of March 2025, the workforce at CCEC includes approximately 225 employees. Approximately 73 percent of the workforce hails from the Pennsylvania counties of Lancaster (25 percent), Dauphin (23 percent), York (13 percent), and Cumberland (12 percent); thus, these are the counties of focus for the housing and income discussions.

Tables 3.4-1 and 3.4-2 present updated housing information, as well as employment and income information, for Lancaster, Dauphin, York, and Cumberland Counties. In 2023, homeowner vacancy rate in Lancaster County, where most CCEC employees reside, was 0.6 percent, and the rental vacancy rate was 3.2 percent. (USCB 2023a) The unemployment percent in Lancaster County in 2023 was 2.1 percent, the median household income was $80,067, and per capita income was $40,791.

CCEC tax payments largely decreased every year after decommissioning. Beginning in 2027, it is anticipated that tax payments after resumption of power operations are expected to be roughly equal to the total of the last annual payment paid prior to decommissioning plus increases correlated with market changes.

Lastly, operating expenditures for nuclear plants are largely based off plant staffing levels and yearly tax payments. Because both CCEC workforce and its anticipated yearly tax payments are expected to return to approximately the pre-decommissioning values, as discussed above, operating expenditures are expected to level out as well.

This section uses U.S. Census Bureau data to determine population characteristics for portions of Pennsylvania and Maryland. The information is compared to information found in the SEIS to assess new and potentially significant changes for population in the 50-mile radius surrounding CCEC.

The 50-mile radius surrounding CCEC encompasses a total of 22 counties; 16 counties in Pennsylvania: Adams, Berks, Chester, Columbia, Cumberland, Dauphin, Franklin, Juniata, Lancaster, Lebanon, Mifflin, Northumberland, Perry, Schuylkill, Snyder, and York, and 6 counties in Maryland: Baltimore, Carroll, Cecil, Frederick, Harford, and Washington.

County population estimates were obtained using 2000, 2010, and 2020 U.S. Census Bureau redistricting census data for Pennsylvania and Maryland. According to the 2010 census, the permanent population of the 22 counties was approximately 4,918,857. There was an increase of 275,888 people residing within these counties between the years 2010 and 2020. (USCB 2010; USCB 2020)

Table 3.4-3 shows the reported 2000, 2010, and 2020 census population data and the population change for the 22 counties that are wholly and partially within the 50-mile radius of CCEC.

The census data show that the two largest counties in the State of Pennsylvania within a 50-mile radius of CCEC are Lancaster County, Pennsylvania (2020 population 552,984), and Chester County, Pennsylvania (2020 population 534,413). Both counties experienced an increase in population from 2010 to 2020. (USCB 2010; USCB 2020)

Similarly, the two largest counties in the State of Maryland within a 50-mile radius of CCEC are Baltimore County, Maryland (2020 population 854,535) and Frederick County, Maryland (2020 population 271,717). Both counties also experienced an increase in population from 2010 to 2020 (USCB 2010; USCB 2020).

Table 3.4-1 Housing Statistics for Lancaster, Dauphin, York, and Cumberland Counties, 2023

Metric	Lancaster	Dauphin	York	Cumberland
Total Housing Units	220,296	128,573	191,099	112,477
Occupied Units	211,669	121,773	183,864	107,981
Vacant Units	8,627	6,800	7,235	4,496
Homeowner Vacancy (percent)	0.6	0.4	0.5	0.2
Rental Vacancy (percent)	3.2	3.8	3.5	0.3
Median House Value ($)	306,900	239,800	257,600	285,200
Median Rent ($/month)	1,329	1,244	1,149	1,148

(USCB 2023a)

Table 3.4-2 Employment and Income Statistics for Cumberland, Dauphin, Lancaster, and York Counties, 2023

Metric	Cumberland	Dauphin	Lancaster	York
Unemployment Percent	1.8	2.9	2.1	2.6
Median Household Income	$82,174	$74,170	$80,067	$81,362
Per Capita Income	$47,216	$41,034	$40,791	$40,595

(USCB 2023b)

Table 3.4-3 County Populations Totally or Partially within a 50-Mile Radius of CCEC

County	2000 Census Population[(a)]	2010 Census Population[(b)]	2020 Census Population[(c)]	Population Change 2000–2010	Population Change 2010–2020
Pennsylvania (16 Counties)					
Adams	91,292	101,407	103,852	10,115	2,445
Berks	373,638	411,442	428,849	37,804	17,407
Chester	433,501	499,132[(d)]	534,413	65,631	35,281
Columbia	64,151	67,295	64,727	3,144	-2,568
Cumberland	213,674	235,406	259,469	21,732	24,063
Dauphin	251,798	268,100	286,401	16,302	18,301
Franklin	129,313	149,618	155,932	20,305	6,314
Juniata	22,821	24,636	23,509	1,815	-1,127
Lancaster	470,658	519,445	552,984	48,787	33,539
Lebanon	120,327	133,568	143,257	13,241	9,689
Mifflin	46,486	46,682	46,143	196	-539
Northumberland	94,556	94,528	91,647	-28	-2,881
Perry	43,602	45,969	45,842	2,367	-127
Schuylkill	150,336	148,289	143,049	-2,047	-5,240
Snyder	37,546	39,702	39,736	2,156	34
York	381,751	434,972	456,438	53,221	21,466
Maryland (6 Counties)					
Baltimore	754,292	804,990[(e)]	854,535	50,698	49,545
Carroll	150,897	167,134	172,891	16,237	5,757
Cecil	85,951	101,108	103,725	15,157	2,617
Frederick	195,277	233,385	271,717	38,108	38,332
Harford	218,590	244,826	260,924	26,236	16,098
Washington	131,923	147,430	154,705	15,507	7,275
Total (22 Counties)	4,462,380	4,919,064	5,194,745	456,684	275,681

a) USCB 2000; b) USCB 2010; c) USCB 2020; d) Census count revised on February 19, 2013; e) Census count revised on March 21, 2013.

3.5 Historic and Cultural Resources

Cultural resources include precontact era 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). Any cultural resources listed on or eligible for the NRHP are considered historic properties under the National Historic Preservation Act of 1966 [Public Law 89-675].

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

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

As part of the initial LR process for CCEC, consultation with the Pennsylvania Historical and Museum Commission (PHMC) regarding the application for LR was initiated in 2007 in order to provide the opportunity to address any potential concerns raised by continued operations during the LR term. In a letter dated June 4, 2007, the PHMC found that the activities described in the proposed action should have no effect on historic and archaeological resources (AmerGen 2008; NRC 2009a). The cultural background and known historic resources at the CCEC site and in the surrounding area at the time was documented by NRC in Section 2.2.9 of the 2009 LR SEIS.

In 2009, following discussions with the PHMC, Exelon (now CEG) committed to implementing a cultural resources management plan (CRMP) by 2010 (EGC 2009; NRC 2009b). A cultural resources protection plan and an archaeological resources erosion monitoring plan were developed to ensure protection of potential cultural resources.

As part of the transition into decommissioning, consultation with the Pennsylvania State Historic Preservation Officer was initiated in 2019 to provide the opportunity to address any potential concerns raised by the decommissioning project as planned in the PSDAR. The results of CEG's updated cultural resources review for the CCEC site and an approximate 6-mile radius is documented in Attachment 1 of the PSDAR. In a letter dated February 19, 2019, the PHMC found that decommissioning activities would have no effect on historic properties. Additionally, the PHMC found that decommissioning activities would have no effect on archaeological resources, provided that decommissioning activities would be limited to the operational area. The operational area at CCEC consists of the north end of Three Mile Island from the fence line encompassing the south parking area northward. The operational area also includes the North and South Access Roads and the junction with the mainline railroad at the North Access Road. This area encompasses the reactor and surrounding buildings, intake structure and discharge

pipe, parking lots, laydown yards, landscaped areas, and transportation infrastructure. (EGC 2019a) The operational area is depicted in Figure 3.5-1.

In order to identify new and significant cultural resources recorded since the 2009 SEIS and PSDAR, an updated review of Pennsylvania's State Historic and Archaeological Resource Exchange (PA-SHARE) online database was conducted on April 21, 2025. This review included all archaeological sites and aboveground properties within the CCEC site boundary and within an additional 1-mile radius of CCEC to consider potential indirect effects of activities related to both the preparations for and the resumption of power operations. The records review found that there have been 8 cultural resource investigations within the CCEC site boundary, which are listed in Table 3.5-1, with 10 previously recorded archaeological sites and 4 aboveground cultural resources located within the same area. While the archaeological resources have been previously documented in the SEIS and PSDAR, the aboveground resources have not been listed because they were considered not eligible for the NRHP at the time. As listed in Table 3.5-2, of the 14 recorded resources, two resources have been determined eligible for listing on the NRHP, two have been determined not eligible, and the remaining 10 properties are listed as Undetermined. One of these resources, the Three Mile Island Unit 2 Historic District (2010RE03382), was determined eligible following the 2019 PSDAR.

The Area of Potential Effect for preparation for the resumption of power operations at CCEC includes the entire CCEC site plus a 1-mile-radius buffer. The limits of disturbance for activities in preparation for the resumption of power operations are bounded by the operational area, which, as depicted in Figure 3.5-1, constitutes the area that is already developed and was previously disturbed due to the initial construction of the facility. No construction or ground-disturbing activities have been identified or proposed outside the previously disturbed areas of the CCEC action area. CEG has no plans for developing CCEC facilities offsite.

CEG continues to implement site-specific policies and procedures, including the CRMP, to address unanticipated discoveries of cultural resources, including protocols should an unanticipated discovery be made. CEG also utilizes standard protocols for environmental reviews of facility operations and activities and for excavations, which serve as additional, generic protection for inadvertent impacts to cultural resources.

Table 3.5-1 Previous Cultural Resource Investigations within CCEC Site Boundary (Sheet 1 of 2)

Survey Company and Author	Report Date	Description	Findings
KCI Technologies; Richard Geidel	1970	Phase I and Phase II Archaeological Investigations 36DA51 East Channel Fish Passage Facility, Three Mile Island, Dauphin County, Pennsylvania	One site (36DA51) identified by Phase I survey, a further Phase II investigation of the site was conducted.
Pennsylvania Historical and Museum Commission; Ira F. III Smith	1977	Early and Middle Woodland Campsites on Three Mile Island, Dauphin County, Pennsylvania	An archaeological investigation conducted in 1967 prior to station construction. Involved preliminary testing at multiple locations and an intensive excavation of 36DA50.
Heberling Associates, Inc.; Paul A. Raber and Scott D. Heberling	2009	Archaeological context and reconnaissance results for CCEC	Investigations included a detailed literature review, assessment of previously recorded sites, and the identification of area with high potential for intact, precontact archaeological sites.
Brockington & Associates; D. Franz	2015	Phase I Archaeological Investigation for the proposed NLF at the York Haven Hydroelectric Project	Summary and abstract not found, associated with site 36DA0100.
Richard Grubb & Associates, Inc.; Lynn Alpert, Lauren Dunkle, and Chelsea Troppauer	2021	Reconnaissance-level Historic Architectural Survey, Amtrak Conestoga to Royalton Replacement Project, Lancaster and Dauphin Counties, Pennsylvania	Documented 29 individual historic properties and historic districts, listed in or determined eligible for listing in the NRHP.
ASC Group, Inc., WSP USA, and Markosky Engineering, Inc.; Benjamin Harvey	2023	Chesapeake Mapping Initiative: Crowdsourcing African American Cultural Sites in Southcentral Pennsylvania	Investigation was one part of a large public crowdsourcing project that added or updated 126 records in PA-SHARE.

Table 3.5-1 Previous Cultural Resource Investigations within CCEC Site Boundary (Sheet 2 of 2)

Survey Company and Author	Report Date	Description	Findings
Brockington & Associates; Eric Poplin	2023	Phase I Archaeological Investigation for the Proposed NLF at the York Haven Hydroelectric Project (FERC No. 1888), Dauphin County, Pennsylvania	Phase I survey found most of the area to be disturbed but also identified archaeological material near two previously identified sites (36DA0099 and 36DA0100).
Brockington & Associates; Eric Poplin	2024	York Haven Inland NLF	Phase III investigations of two sites (36DA0099 and 36DA0100) partially identified by previous survey.

Table 3.5-2 Cultural Resources Located within CCEC Site Boundary

Resource No. (PASS No.)	Resource Name	County	Type	NRHP Status
1967RE00104 (36DA0050)	Three Mile Island	Dauphin	Archaeological, Precontact Open Habitation Site	Undetermined
1967RE00117 (36DA0052)	Three Mile Island – General	Dauphin	Archaeological, Precontact Open Habitation Site	Undetermined
1967RE00414 (36DA0051)	—	Dauphin	Archaeological, Precontact Open Habitation Site	Not Eligible
1976RE00432 (36DA0099)	Three Mile Island	Dauphin	Archaeological, Precontact Open Habitation Site	Undetermined
1976RE01065 (36DA0097)	Three Mile Island	Dauphin	Archaeological, Precontact Open Habitation Site	Undetermined
1976RE01100 (36DA0096)	Three Mile Island	Dauphin	Archaeological, Precontact Open Habitation Site	Undetermined
1976RE01233 (36DA0101)	Three Mile Island	Dauphin	Archaeological, Historic and Precontact Site	Undetermined
1976RE01528 (36DA0098)	Three Mile Island	Dauphin	Archaeological, Precontact Open Habitation Site	Undetermined
1983RE02035	Three Mile Island	Dauphin	Aboveground, Historical Industry/Processing/Extract – Energy Facility	Not Eligible
2008RE00850	Three Mile Island Farm	Dauphin	Aboveground, Historic House and Silo	Undetermined
2008RE01311 (36DA0235)	Three Mile Island Farm	Dauphin	Archaeological, Historic Farmstead (Agriculture)	Undetermined
2010RE03382	TMI-2	Dauphin	Historic District	Eligible
2016RE02956 (36DA0100)	Three Mile Island	Dauphin	Archaeological, Precontact Open Habitation Site and Historic Domestic Site	Eligible
2022RE08874	Pennsylvania Railroad: Main Line (Philadelphia to Harrisburg: Three Mile Island Spur)	Dauphin	Aboveground, Historic Railroad Segment	Undetermined

Note: cell containing "—" contained no data in PA-SHARE.

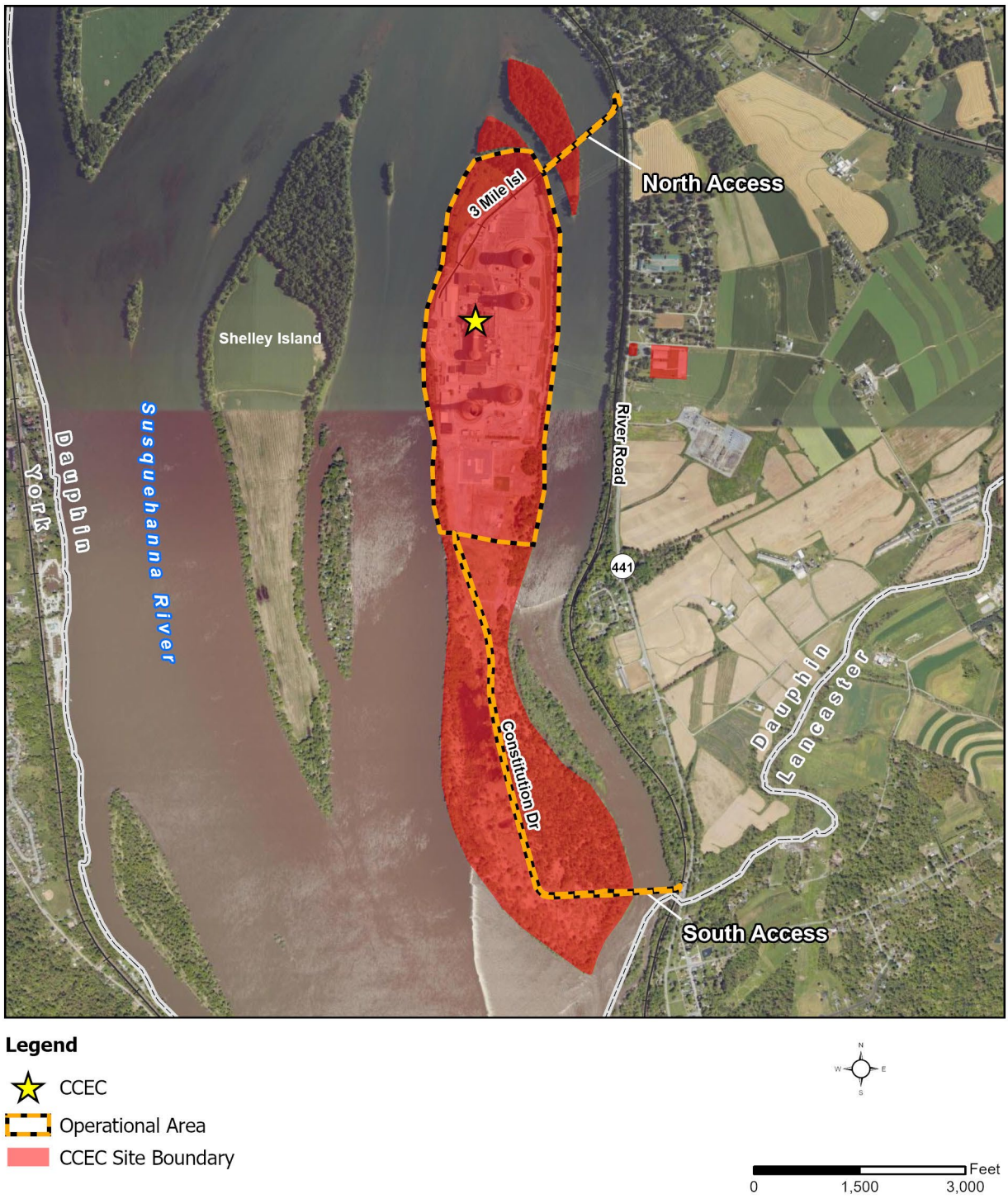

Figure 3.5-1 Operational Area

3.6 Air Quality

The Clean Air Act 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 under the provisions of the Clean Air Act. The EPA classifies air quality within an air quality control region (AQCR) according to whether the region meets or exceeds federal primary and secondary National Ambient Air Quality Standards. 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.

Emissions from nonradiological air pollution sources, including the criteria pollutants, are controlled through compliance with federal, state, and local regulations. Nonattainment areas are areas where the ambient levels of criteria air pollutants in the air violate the criteria set forth in federal, state, and local regulations. Attainment areas are areas that meet the criteria or cannot be classified (depending on the pollutant and other factors). A maintenance area is an area that formerly violated the attainment criteria but currently meets the attainment criteria. (EPA 2025)

As stated in the SEIS, there are no Class I federal areas in which visibility is an important value, as designated in 40 CFR (81)(D), within 100 miles of CCEC (NRC 2009a). CCEC falls within the South-Central Pennsylvania Intrastate Air Quality Control Region (40 CFR 81.105). The AQCR contains eight counties in the State of Pennsylvania.

As of March 31, 2025, 10 counties and one city in the 62-mile area are nonattainment areas for 8-hour ozone (2015). These include New Castle County, Delaware; Baltimore City, Baltimore County, Carroll County, Cecil County, Frederick County, Harford County, Howard County, and Montgomery County, Maryland; Chester County, and Montgomery County, Pennsylvania. Eleven counties and one city in the 62-mile area are nonattainment areas for 8-hour ozone (2008). These include New Castle County, Delaware; Baltimore City, Baltimore County, Carroll County, Cecil County, Harford County, and Howard County, Maryland; Berks County, Chester County, Lancaster County, Lehigh County and Montgomery County, Pennsylvania. Baltimore County, Maryland, is a non-attainment area for sulfur dioxide (2010) and Berks County, Pennsylvania, is a non-attainment area for lead (2008). (EPA 2025)

As of March 31, 2025, 16 counties and one city in the 62-mile area are maintenance areas for $PM_{2.5}$ (1997). These include New Castle County, Delaware; Baltimore City, Baltimore County, Carroll County, Frederick County, Harford County, Howard County, Montgomery and Washington County, Maryland; Berks County, Chester County, Cumberland County, Dauphin County, Lancaster County, Lebanon County, Montgomery County and York County, Pennsylvania. New Castle County, Delaware, Lancaster County, Lebanon County, Lehigh County, Montgomery County, and York County, Pennsylvania, are maintenance areas for $PM_{2.5}$ (2006). Lebanon County, Pennsylvania, is a maintenance area for $PM_{2.5}$ (2012). Baltimore City and Montgomery County, Maryland, are maintenance areas for CO (1971). Frederick County

and Montgomery County, Maryland, are maintenance areas for 8-hour ozone (2008). (EPA 2025)

CCEC's previous air permit (No. 22-05029) expired on October 31, 2022. Since decommissioning, CCEC did not require an air permit, and CEG was not required to submit emission reports to PA DEP after the permit expired. Table 3.6-1 includes emissions reported to the state in 2020 through 2022. There were no NOVs or noncompliances associated with CCEC air emissions in 2020 through 2022. As listed in Table 2.2-2, CEG plans to apply for a new air permit. No ozone or nitrogen oxides emissions tests have been completed on CCEC transmission lines.

Estimated emissions from potential direct and indirect greenhouse gas (GHG) sources are collected and submitted to a central corporate database for use in quantifying sitewide GHG emissions. GHG data for mobile sources are not compiled or reported, except those under corporate control (fleet vehicles). Within CEG, GHG emissions from fleet vehicles are tracked through fleet fuel usage. The data are tracked for the CEG fleet rather than individual facilities; therefore, no information on emissions from vehicles specific to CCEC is readily available.

Direct and indirect emissions at CCEC for 2020 through 2024 are presented in Table 3.6-2. CCEC's direct emissions are due to stationary combustion sources, process carbon dioxide (CO_2), and some ozone depleting chemical (ODC) refrigerants. No hydrofluorocarbon (HFC)/perfluorocarbon (PFC) information is available.

Table 3.6-1 CCEC Annual Emissions (Tons Per Year)

Emission (Tons)	Permit Limits	2020	2021	2022
NOx	100	0.726	0.616	0.35
SOx	100	0.01	0.009	0.008
CO	100	0.186	0.158	0.087
PM_{10}	100	0.029	0.024	0.016
VOCs	50	0.029	0.025	0.017
HAPs	25/10	0.029	0.025	0.017

NOx = nitric oxide

SOx = sulfur oxide

CO = carbon monoxide

HAPs = hazardous air pollutants

VOCs = volatile organic compounds

Table 3.6-2 CCEC Annual GHG Emissions (CO_2e in Metric Tons Per Year)

CO_2e (Metric Tons)	2020	2021	2022	2023	2024
Stationary combustion sources	30.9	26.9	14	23.5	2.3
SF_6	0	0	0	0	0
CO_2	6.5	0	0	0	0
HFC/PFC Refrigerants	NA	NA	NA	NA	NA
ODC Refrigerants	0	0	0	0	0
Total Direct Emissions	37.4	26.9	14	23.5	2.3
Onsite Electricity Usage	9,142	8,095	8,428	6,792	5,259

CO_2e = carbon dioxide equivalent

SF_6 = sulfur hexafluoride

HFC = hydrofluorocarbon

PFC = perfluorocarbon

ODC = ozone depleting chemical

3.7 Human Health

3.7.1 Nonradiological Health

3.7.1.1 Chemical Hazards

Work at CCEC 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). This program includes, but is not limited to, hazard-specific training and material handling procedures on topics such as proper use of personal protective equipment (PPE) and chemical hygiene.

The effectiveness of the industrial safety program is indicated by the low number of injuries and illnesses experienced by the plant's workers. CCEC's OSHA form 300A submittals report the number of recordable injuries and illnesses from hazards experienced by CCEC workers in a given year; submittals for the years 2020 through 2024 were reviewed. These submittals do not specify the cause of reported injuries/illness; however, they are useful in showing the overall rate of injury/illness (which could include chemical hazards, in the case any incident occurred). CCEC's recordable injury and illness incident rate per 100 equivalent full-time employees for 2020 through 2024 is 0.5, which is comparable to the nuclear electric power generation industry's rate of 0.2 for 2023. (BLS 2024)

3.7.1.2 Microbiological Hazards

In the GEIS, the NRC considered health impacts from disease-causing microorganisms, also known as etiological agents, to both the public and plant workers. Etiological agents of particular concern for public and occupational health include enteric pathogens (bacteria that typically exists in the intestines of animals and humans [e.g., *Pseudomonas aeruginosa*]), thermophilic fungi, bacteria (e.g., *Legionella* spp. and *Vibrio* spp.), free-living amoebae (e.g., *Naegleria fowleri* and *Acanthamoeba* spp.), as well as organisms that produce toxins that affect human health (e.g., dinoflagellates [*Karenia brevis*] and blue-green algae). Etiological agents associated with nuclear power stations may be present in elevated numbers in unheated and heated water systems, as well as in cooling systems, receiving and source water bodies, and site sewage treatment facilities. (NRC 2024a)

Legionella is a respiratory hazard transmitted via inhalation of aerosolized water containing the bacteria. Occupational worker exposure to these hazards can be limited through proper maintenance of systems, processes, and machinery and through the use of PPE. CCEC's cooling towers have been offline since 2019 and no heated effluent is currently discharged to the environment, due to CCEC's decommissioning status. Chemical additives, including antimicrobial and neutralizing agents, are added to water systems at CCEC as needed to control biofouling. Additions are controlled by CCEC staff and managed according to the applicable chemical adjustment recommendations. Sampling requirements and discharge limits for free available chlorine, total residual oxidants, spectrus CT 1300, and hydrazine are outlined in CCEC's NPDES permit.

Cyanobacteria, commonly known as blue-green algae, are single-celled bacterial organisms classified as phytoplankton that can cause harmful algal blooms (HABs). Dinoflagellates, another type of phytoplankton, specifically cause the recurring Red Tide blooms. 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)

Publicly available information from the Pennsylvania HABs Dashboard indicated that there are no active HAB sampling stations located near CCEC and no blooms were reported in the vicinity of the site (PA DEP 2024). CEG has not been contacted by any local or state regulatory agency with respect to algal growth or bacterial blooms. The Susquehanna River near Harrisburg, including the area near the plant intake and discharge, supports recreational activities such as boating and fishing.

Combined sewer overflow has been a longstanding issue in the City of Harrisburg, with discharges from the combined sewer and stormwater system impacting local water quality. Each summer bacterial testing is conducted along the Susquehanna River and Paxton Creek, downstream of the city's combined sewage outfalls. (LSRA 2024) To address the problem, Capital Region Water and the City of Harrisburg entered into a consent decree requiring wastewater system improvements, with Phase 1 scheduled for completion by 2032 (MDPA 2023).

CEG has not been contacted by any local or state regulatory agency with respect to algal growth or bacterial blooms in the Susquehanna River nearby CCEC.

The Centers 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 in untreated recreational water in Pennsylvania were reported in 2019, and 13 cases of illness were reported for 2020. (CDC 2024a; CDC 2024b)

3.7.1.3 Physical Hazards (Including Electrical Safety)

Physical hazards can include those associated with maintenance activities, confined spaces, electrical systems, noise, and heat stress. CCEC's industrial safety program ensures that physical safety risks are identified, controlled, and mitigated through administrative procedures, engineering controls, and personnel training.

Work on the in-scope transmission lines and switchyards is conducted under electrical safety procedures that include, but are not limited to, topics such as arc flash protection, PPE for electrical hazards, and safe work practices for working near energized equipment.

Occupational hazards are managed according to OSHA requirements.

3.7.2 Radiological Health

3.7.2.1 Public Exposure

CEG implements a corporate radiation protection program at CCEC, as required by 10 CFR 20.1101 – Radiation Protection Programs, to protect employees, contractors, visitors, and offsite members of the public from radiation and radioactive materials.

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 ALARA 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.

CCEC uses its Offsite Dose Calculation Manual (ODCM), which specifies the methods and parameters to calculate doses resulting from liquid and gaseous radioactive effluents. These methods ensure that radioactive material discharges from CCEC meet NRC and EPA regulatory dose standards. CCEC's annual radioactive effluent release reports contain a detailed presentation of the releases from CCEC and the resultant calculated doses.

CCEC's radioactive effluents in 2020 through 2024 were well within federal limits. To account for the continuous, low-level migration of existing tritium in onsite groundwater to the river via known hydrologic pathways, one administrative abnormal liquid release is recorded per month. These entries reflect an ongoing condition rather than discrete release events. Therefore, for consistency and regulatory tracking, 12 administrative releases are reported annually for the years 2020 through 2024. These do not reflect new or unplanned releases but are recorded as part of standard compliance documentation. However, there were no other abnormal liquid releases from CCEC for 2020 through 2024. There was one abnormal gaseous release in 2020 during the draining of a BWST. The release, documented under permit G-20201013-531-C, was unplanned because it originated from a location not typically used for releases. No abnormal gaseous releases occurred in 2021 through 2024. (EGC 2021b; CEG 2022b; CEG 2023b; CEG 2024g; CEG 2025e)

CCEC's REMP provides additional assurance that there are no significant dose or radiological environmental impacts due to CCEC. The REMP measures the aquatic, terrestrial, and atmospheric environment for ambient radiation and radioactivity. Monitoring is conducted by sampling the following: surface water, drinking water, effluent water, stormwater, groundwater, fish, sediment, air, milk, and food products. For the years 2020 through 2024, CCEC did not have any adverse effects on the health of the public or environment. Calculated whole body dose to the maximum individual from CCEC liquid and airborne effluents in 2020 through 2024 are presented in Table 3.7-1. (EGC 2021a; CEG 2022a; CEG 2023a; CEG 2024f; CEG 2025d)

In 2020 through 2024, no measurable activities above background levels were detected that could be attributed to the plant's fuel cycle. Measured activities were consistent with historical results, with no permanent buildup of radioactive materials in the environment and no increase in background radiation levels. Samples analyzed for gross beta, gamma-emitting radionuclides, strontium-90, iodine-131, and other activation or fission products were within expected ranges or below detection limits. No radiological environmental impacts to human health or the environment were identified for 2020 through 2024. These findings confirm that operations during this period had no adverse effects on the health of the public or the surrounding environment. (EGC 2021a; CEG 2022a; CEG 2023a; CEG 2024f; CEG 2025d)

3.7.2.2 Occupational Exposure

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

In accordance with 10 CFR 20.2206 – Reports of Individual Monitoring, occupational radiation exposure data from CCEC is provided to the NRC yearly through the Radiation Exposure Information and Reporting System. The most recent data submittal occurred in April 2025, for the calendar year 2024.

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 NOT SIGNIFICANT. 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 experience by workers in operating facilities. (NRC 2002)

Table 3.7-1 Calculated Whole Body Dose to the Maximum Individual from CCEC Effluents (2020–2024)

Year	Liquid Releases (mrem/yr)	Airborne Releases – Noble Gases (mrem/yr)	Airborne Releases – Iodines/Tritium/Particulates (mrem/yr)	Individual Whole Body Dose (mrem/yr)[(a)]
2020	0.021	0	0.0239	0.05
2021	0.00543	0	0.0102	0.016
2022	0.00566	0	0.00257	0.009
2023	0.0115	0	0.00017	0.013
2024	0.0137	0	0.000245	0.015

(EGC 2021a; CEG 2022a; CEG 2023a; CEG 2024f; CEG 2025d)

a: These values sum together CCEC and TMI-2 maximum doses.

mrem/yr: millirem per year

3.8 Waste Management

3.8.1 Radioactive Waste Management

Section 2.2.3 includes a brief discussion of CCEC's liquid, gaseous, and solid radioactive waste systems. CEG plans to restore the liquid waste disposal system to support limited radwaste processing and liquid effluent releases in accordance with regulatory limits and current environmental authorizations prior to the resumption of power operations.

Disposal of radioactive waste prior to 2019 was primarily handled by EnergySolutions and secondarily handled by Waste Control Specialists. Radioactive waste was transported by Hittman Transportation.

Currently, low-level radioactive waste (LLRW) onsite is stored at the solid waste storage facility (also referred to as "the modules"). There is currently one liner of resin and one liner of filters stored in the modules. The interim solid waste storage facility is also an approved storage location for LLRW; however, no LLRW is currently stored in this location. LLRW can also be stored in the waste handling and packaging facility yard while awaiting shipment. Presently, there are about six shipping containers of LLRW in various states of loading in the waste handling and packaging facility yard. As reported in Annual Radiological Effluent Release Reports, LLRW was not shipped offsite during 2023 and 2024. The type and quantity of radiological waste shipped offsite for 2020 through 2022 is presented in Table 3.8-1.

CCEC currently stores low-level mixed waste (LLMW) in the interim solid waste storage facility. Minimal LLMW has been generated at CCEC in the past 5 years, and LLMW was not shipped offsite during 2024. CCEC does not have any onsite waste disposal facilities. Processing and disposal of LLMW is anticipated to be handled by EnergySolutions, as needed.

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

3.8.2 Nonradioactive Waste Management

The Bureau of Waste Management of the PA DEP oversees the solid and hazardous waste programs, including waste disposal, transportation, and storage. Types of nonradioactive waste produced at CCEC include discarded surface coatings, glycols/antifreeze, spent oil filters, grease, oil-contaminated soil and debris, nonhazardous waste oil, and other chemical wastes. Universal wastes, such as spent fluorescent bulbs and batteries common to any industrial facility, are also generated at CCEC. (AmerGen 2008)

CCEC is classified by the EPA as a small quantity generator (SQG) of hazardous waste and operates under the EPA ID No. PAR000037861. CEG has detailed procedures for hazardous waste, universal waste, waste oil management, and waste minimization, which cover characterization, storage, and shipping of the various types of nonradioactive waste.

Nonradioactive waste is currently staged in waste building #35. CEG maintains a list of approved waste vendors used to manage and dispose of universal, hazardous, nonhazardous, and medical waste. The type and quantity of nonradiological waste shipped offsite in 2020 through 2024 is presented in Table 3.8-2. The higher values in 2023 and 2024 were due to decommissioning activities. The bulk of the nonhazardous material disposed of in 2023 and 2024 was used oil from equipment, unused resin, and unused products that were in storage.

The PA DEP regulates medical waste through the Municipal Waste Program, which enforces Chapter 28 of Pennsylvania's Environmental Protection Code on Regulated Medical Waste (25 PAC § 284). CCEC is subject to these regulations and maintains detailed procedures for pathogen exposure and medical waste management, which covers storage and shipment of medical waste. CCEC has generated regulated medical waste, primarily sharps, for disposal. In the event that medical attention was required onsite, the medical waste is expected to typically be handled by an approved vendor.

Table 3.8-1 Type and Quantity of Solid Waste Shipped Offsite (Total Quantity Cubic Meters by Year)

Types of Waste	2020	2021	2022
Spent resins, filter sludges, filters, evaporator bottoms, etc.	0.00E+00[a]	1.08E+01[a]	2.24E+00[a]
Dry compressible waste, contaminated equipment, etc.	1.35E+02	3.34E+01	4.13E+00
Irradiated components, control rods, etc.	0.00E+00	0.00E+00	0.00E+00
Other (Mercury, Sulfuric Acid, NaOH, Oil, Sludge, Sealed Sources)	0.00E+00[b]	0.00E+00[b]	0.00E+00[b]

(EGC 2021b; CEG 2022b; CEG 2023b)

a = Spent resins, filters, evaporator bottoms, etc.
b = Oil, Sludge, Sealed Sources

Table 3.8-2 Type and Quantity of Nonradioactive Waste Shipped Offsite (Total Pounds by Year)

Types of Waste	2020	2021	2022	2023	2024
Hazardous Waste	560	571	18	1,169	11,613
Universal Waste	1,874	396	272	66,139	4,328
Nonhazardous Waste	20,068	7,000	1,368	19,841	93,946
E-waste	N/A	N/A	240	1,200	2,200

4.0 ENVIRONMENTAL IMPACTS

The following subsections address impacts to environmental resource areas associated with preparation for and resumption of power operations at CCEC. In this chapter, applicable environmental resource areas include a 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 CCEC for power operations are anticipated to occur in previously disturbed areas of the site, and there are no planned CCEC projects that are expected to change existing land uses. As discussed in Section 3.1, there is an NLF project associated with the York Haven Dam at the southern tip of Three Mile Island. The project is unrelated to CCEC and is not expected to have an impact on preparations for power operations or associated land uses. Therefore, impacts related to the preparation for the resumption of CCEC power operations to land use are anticipated to be NOT SIGNIFICANT.

4.1.2 Environmental Impacts from the Resumption of Power Operations

Environmental impacts from the resumption of power operations are expected to result only from operational and maintenance activities at or in immediate proximity to existing facilities on previously disturbed land within the industrial area of CCEC. CEG has no plans for developing CCEC facilities offsite. No changes to onsite land use due to the resumption of CCEC operations are planned. CEG anticipates the CCEC workforce returning to pre-shutdown levels; therefore, impacts to offsite land use are expected to be similar to pre-shutdown conditions.

Visual appearance of CCEC has been well established, with minimal changes anticipated from the resumption of power operations. The predominant visual features are the cooling towers, turbine buildings, and reactor containment structures. The resumption of power operations, and operation of the cooling towers, are expected to result in the reappearance of vapor plumes under certain meteorological conditions. Vapor plumes are anticipated to be more persistent when there is high relative humidity or low air temperatures (NRC 2009a). There is no planned demolition or construction associated with operation activities that are expected to change the overall plant aesthetic or land use. Therefore, impacts related to the resumption of CCEC power operations to land use and visual resources are anticipated 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. CCEC is anticipated to be restored to previous OL conditions at 2019 shutdown. No major demolition activities are anticipated and no new construction on undeveloped land is planned. Any new construction, if needed, is expected to be on previously disturbed land and follow existing site procedures and environmental screening processes.

As discussed in Section 3.2.1.2, mid-field RGPP wells MW-TMI-6I and MW-TMI-6D were abandoned in 2024 and are planned to be replaced. Since no major demolition activities or new building construction on undeveloped land are anticipated, geologic resources are not expected to be used or altered during the preparations for resumption of power operations at CCEC. Monitor well installations are expected to be installed per CEG procedures and state and local regulations.

All planned disturbances for the preparations for the resumption of operations are expected to occur in previously disturbed areas, reducing the potential impact on groundwater resources. The impact to groundwater resources from these activities is considered likely to be localized and of short duration. As discussed in Section 3.2.2.2, a potential release of pollutants during ground disturbance activities are expected to be mitigated through CCEC NPDES permit, emergency environmental plans, and associated BMPs. As discussed in Section 3.8.2, CCEC has procedures in place for the management, classification, handling, storage, and shipping of nonradioactive waste. All previous radioactive waste, nonradioactive waste, and mixed waste procedures and processes are anticipated to remain in place for restart activities, minimizing potential impacts to groundwater from waste processes at CCEC. CCEC's current waste minimization plan was written for decommissioning activities, and is being updated for restart activities, in compliance with 40 CFR 260–279.

As discussed in Section 4.4.1, staffing for preparations for resumption of power operations is expected to be similar to that needed during planned outages prior to decommissioning, which is approximately 1,200 total onsite staff. The temporary increase in staffing is expected to cause increased potable groundwater use. As described in Section 3.2.1.1, the combined maximum pump capacity of the two onsite water supply wells OSF and 48S is 70 gpm. In the GEIS, the NRC concluded that groundwater impacts from withdrawals of less than 100 gpm would be SMALL (NRC 2024a).

As discussed in Section 3.2.1.1, SRBC Docket No. 20221203 includes limits for groundwater withdrawals and consumptive use from three onsite industrial water supply wells (Wells A, B, and C). It is specified in SRBC Docket No. 20221203 that the current approved groundwater withdrawal and consumptive use rate limits were reduced because electric generation discontinued. CCEC submitted an SRBC docket application in August 2025 requesting that the

SRBC increase groundwater withdrawal and consumptive use from those listed in Docket No. 20221203. Groundwater withdrawal and consumptive use rates during the preparations for resumption of power operation are limited to the authorization in SRBC Docket No. 20221203.

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 the 2019 shutdown; however, the consumptive use may be slightly higher than during prior operations. CCEC plans to request groundwater withdrawal rates similar to those previously allocated in the 2011 SRBC Docket (20110610) and to request consumptive use limits slightly higher than those allocated in the 2011 SRBC docket. Prior to decommissioning, surface water withdrawals were reduced by using pumps only when needed and by staggered pump exercising. CCEC plans to continue to utilize modified pump operations during resumption of power operations.

The impacts of groundwater use from operations are described in the 2009 SEIS. No water supply wells have been plugged/abandoned, placed temporarily out of service, repaired or replaced, and no plans to install additional water supply wells are anticipated for the resumption of power operations. The SRBC manages a subset of groundwater resources in the Susquehanna River Basin. As discussed in Section 3.4, resumption of power operations is anticipated to require staffing levels similar to pre-decommissioning, approximately 600 full-time staff; therefore, potable groundwater use for the resumption of power operations is expected to be similar to that prior to decommissioning. Additionally, the NRC concluded in its 2009 SEIS that the impacts to groundwater withdrawals and groundwater quality during previous operations would be SMALL. (NRC 2009a)

In the 2013 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 2009 SEIS, the NRC did not evaluate impacts from potential inadvertent radionuclide releases to groundwater.

CEG monitors onsite groundwater in accordance with CCEC RGPP, which is described in Section 3.2.1.2, and groundwater monitoring results are reported in AREORs. Since decommissioning, tritium is the only radionuclide detected onsite due to a previous inadvertent release. The maximum tritium detection in 2020 through 2024 was 2,770 pCi/L, which is far below the EPA MCL of 20,000 pCi/L.

As presented in Section 3.2.1.2, a potential radiological release at CCEC to groundwater is expected to initially migrate downward to the water table, migrate with the groundwater radially outward from the center of the island, and ultimately discharge to the Susquehanna River. As described in Section 3.2.1.1, groundwater does not migrate beneath the river from the island to the mainland or other nearby islands due to the opposing flow of groundwater from higher land

on both sides of the river; therefore, tritium is not expected to migrate to any public groundwater supply wells or domestic wells located off island. Potentiometric surface maps are depicted in Figures 3.2-1 and 3.2-2. In addition, there are no major sources of groundwater withdrawal that might reverse the direction of groundwater flow or cause groundwater flow from CCEC toward any existing domestic wells.

Groundwater use for the resumption of power operations is expected to be similar to prior operations; however, consumptive use may be slightly higher than during prior operations. A subset of groundwater use is managed by the SRBC. Groundwater is monitored via the CCEC RGPP and reported to track groundwater quality and assess any inadvertent radiological releases. As discussed in Section 3.2.1.2, CEG maintains an environmental emergency response plan establishing procedures to manage nonradioactive materials. Therefore, impacts to groundwater resources during resumption of power operations are expected to be NOT SIGNIFICANT.

4.2.2 Surface Water Resources

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

Surface water withdrawals and consumption are anticipated to remain in compliance with SRBC docket authorizations as discussed in Section 3.2.2.1. In preparation for resuming power operations, the cooling tower basins are expected to be filled using water obtained from the Susquehanna River. Approximately 682,000 gallons are required to fill the SFPs (approximately 670,000 gallons), which are currently drained and covered, the reactor vessel (approximately 3,400 gallons) and piping (approximately 8,250 gallons). (EGC 2019b) This volume is insignificant compared to water availability in the Susquehanna River, which, as described in Section 3.2.2, has an annual mean stream flow of approximately 38,213 cubic feet per second (17.15 million gpm). Therefore, the impact of this water use on surface water resources is anticipated to be NOT SIGNIFICANT.

As described in Section 4.2.1.1, CCEC is anticipated to be restored to previous OL conditions at 2019 shutdown. No major demolition activities are anticipated and no new construction on undeveloped land is planned. Any new construction, if needed, is expected to be on previously disturbed land and expected to follow existing site procedures and environmental screening processes. All planned disturbances for the preparations for the resumption of operations are expected to occur in previously disturbed areas, reducing the impact on surface water resources.

The impact to surface water resources from these activities is considered likely to be localized and of short duration. As discussed in Section 3.2.2.2, any potential release of pollutants during potential ground disturbance activities is anticipated to be mitigated through CEG's NPDES permit (PA 0009920), emergency environmental plans, and associated BMPs.

Based on the analysis above, impacts to surface water resources during the period of preparations for resumption of power operations are expected to be NOT SIGNIFICANT.

4.2.2.2 Environmental Impacts from the Resumption of Power Operations

Upon resumption of power operations, raw water is expected to be withdrawn from the Susquehanna River for CCEC's SWS and the CWS. Prior to plant shutdown in 2019, the SRBC previously approved the withdrawal of 122.8 mgd from the Susquehanna River and the consumptive use (groundwater and surface water) of up to 19.2 mgd for electric generation processes under Commission Docket No. 20110610. (SRBC 2022) Surface water use is expected to be similar to amounts from prior operations during resumption of power operations. Because surface water use during prior operations was consistently below limits in the 2011 docket, CCEC requested a smaller surface water withdrawal allocation limit. Consumptive use is expected to be slightly higher than during prior operations. A metering plan for measuring consumptive use was submitted with the SRBC application for a docket renewal with modification.

During prior operations, CCEC used two hyperbolic NDCTs for dissipating the heat rejected from the plant steam cycle and several other cooling systems that dissipate heat from other portions of the plant. Makeup water for cooling tower evaporation, wind loss, and blowdown were obtained from the open-cycle cooling water system. The CWS was supplied from the Susquehanna River through the intake structure. After passing through the secondary services coolers, river water was mixed with circulating water in the circulating pumps. Prior to decommissioning, the maximum withdrawal of makeup water for cooling tower losses was 15,250 gpm. Under normal operations, approximately 12,250 gpm of cooling tower makeup water was withdrawn. (AmerGen 2008)

Prior to decommissioning, the cooling tower blowdown, at a normal rate of 3,000 gpm (maximum of 6,000 gpm), was combined with the open-cycle cooling water and discharged to the Susquehanna River (AmerGen 2008). Section 4.4.1 of the SEIS concluded that consumptive use of surface water would be SMALL, even during drought conditions (NRC 2009a).

Section 3.2.2.2 includes a discussion of discharges from CCEC to the Susquehanna River authorized under CCEC's NPDES permit, including sanitary waste and the industrial wastewater treatment system discharges. In March 2025, an NPDES renewal application to support resumption of power operations was submitted to the PA DEP. CCEC maintains an environmental emergency response plan establishing preventive and emergency response programs to protect human health and the environment from the effects of accidental or inadvertent releases of polluting materials into the air, soil, or surface water from CCEC and consolidated the requirements of the individual pollution prevention and spill response programs into a single facility plan. CCEC uses BMPs to prevent pollutants from entering stormwater, to direct the flow of stormwater, or to treat stormwater. CCEC has an onsite sewage treatment plant to treat sanitary wastewater generated at the plant. Digested sanitary sludge from the sewage treatment plant is analyzed for radionuclides and transferred to a PA DEP-approved agriculture utilization facility for disposal.

Dredging of the intake bay is anticipated to be conducted during resumption of power operations. Plans and details have not been established, but dredged material is expected to be

placed on the east side of Three Mile Island, as in the past. Dredging activities are anticipated to be conducted in accordance with the state maintenance dredging permit. The previous dredging permit issued by the USACE expired and CEG plans to apply for permits prior to dredging. The NRC concluded in the GEIS that the impact of dredging on water quality would be SMALL during the initial LR and subsequent license renewal (SLR) terms for all nuclear plants (NRC 2024a).

CEG expects the PA DEP to decrease the thermal discharge limit from 115°F to 110°F based on the thermal discharge limits of other facilities in the region. Because the thermal discharge limits are expected to be lower, CEG expects that the thermal discharges to the Susquehanna River is anticipated to be below the previous power operations.

As discussed above, surface water resources are managed by the SRBC Comprehensive Plan (SRBC 2021b), and surface water discharges are authorized and monitored by CCEC's NPDES permit. As discussed in Section 3.2.1.2, CEG maintains an environmental emergency response plan establishing preventive and emergency response programs. Additionally, the NRC concluded in the 2009 SEIS that the consumptive use of surface water would be SMALL, even during drought conditions. (NRC 2009a) Therefore, impacts to surface water resources during the period of 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 ground-disturbing activities, herbicide and pesticide use, and equipment and vehicle traffic, 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 is expected to only be temporary and 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 CCEC power operations on terrestrial ecology are anticipated to be NOT SIGNIFICANT.

4.3.1.2 Environmental Impacts from the Resumption of Power Operations

In the 2009 SEIS, the NRC evaluated CCEC operational impacts on terrestrial resources using the 1996 GEIS. Since the 2009 SEIS was published, terrestrial issues have been reorganized and updated in the GEIS.

The GEIS includes two terrestrial resource issues applicable to CCEC that were not previously analyzed in the 2009 SEIS: (1) non-cooling system impacts on terrestrial resources, and (2) exposure of terrestrial organisms to radionuclides.

Exposure of Terrestrial Organisms to Radionuclides

CCEC REMP was established prior to the plant becoming operational to provide information on background radiation present in the area. The goal of the REMP is to evaluate the impact of the plant on the environment. Environmental samples from different media are monitored as part of the program in accordance with specifications detailed in the ODCM and CCEC Technical Specifications. The program compares data from indicator locations near the plant to control locations farther away from the site to assess operation impacts. (CEG 2025d) Historical CCEC REMP data is described in the 2009 SEIS (NRC 2009a).

The AREOR provides REMP data obtained through analyses of environmental samples collected at CCEC. Based on the results of the REMP and the doses calculated from measured effluents, CCEC operations from 2014 to mid-2019 and during decommissioning from mid-2019 through 2024 did not have any adverse effects on the health of the public or on the environment. (EGC 2015a; EGC 2016a; EGC 2017a; EGC 2018a; EGC 2019c; EGC 2020a; EGC 2021a; CEG 2022a; CEG 2023a; CEG 2024f; CEG 2025d) Therefore, exposure of terrestrial organisms to radionuclides for the resumption of power operations of CCEC are anticipated to be NOT SIGNIFICANT.

Non-cooling System Impacts on Terrestrial Resources

Utilization of the site-specific programs (e.g., SPCC, PIP, SWPPP, NPDES) and BMPs described in Section 3.3.2.4 is expected to be continued at CCEC to decrease environmental effects and reduce the occurrence of inadvertent releases of nonradiological contaminants. Further, administrative procedures described in Section 3.3.1.4, including those related to avian and wildlife management, pesticides and herbicide management, and environmental review and evaluations, are expected to help minimize impacts on terrestrial resources. Therefore, non-cooling system impacts related to the resumption of CCEC power operations on terrestrial resources are anticipated to be NOT SIGNIFICANT.

4.3.2 Aquatic Ecology

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

No ground disturbing activities are proposed for preparations for the resumption of power operations. Further, 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, PIP, SWPPP, NPDES) is 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 CCEC 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 CCEC operations are anticipated to be similar to those described in the 2009 SEIS (NRC 2009a). Since the 2009 SEIS was published, aquatic issues have been reorganized and updated in the GEIS.

The GEIS includes three aquatic resource issues applicable to CCEC that were not previously analyzed in the 2009 SEIS: (1) exposure of aquatic organisms to radionuclides, (2) effects of dredging on aquatic organisms, (3) impacts of transmission line ROW management on aquatic resources.

Exposure of Aquatic Organisms to Radionuclides

As described in Section 4.3.1.2, CCEC 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, CCEC operations from 2014 to mid-2019 and during decommissioning from mid-2019 through 2024 did not have any adverse effects on the health of the public or on the environment. (EGC 2015a; EGC 2016a; EGC 2017a; EGC 2018a; EGC 2019c; EGC 2020b; EGC 2021a; CEG 2022a; CEG 2023a; CEG 2024f; CEG 2025d) 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 CCEC is anticipated to be NOT SIGNIFICANT.

Effects of Dredging on Aquatic Organisms

CCEC is expected to perform maintenance dredging around the intake structure during the resumption of power operations. All dredged material is expected to be placed off the east side of Three Mile Island in the same area where it was placed prior to the shutdown. Though plans and details for maintenance dredging for CCEC resumption of power operations have not yet been established, CCEC anticipates complying with the conditions listed in their maintenance dredging permit, as described in Section 3.3.2.5. Therefore, the effects of dredging on aquatic organisms for the resumption of power operations of CCEC are anticipated to be NOT SIGNIFICANT.

Impacts of Transmission Line ROW Management on Aquatic Resources

Vegetation management practices described in the 2009 SEIS remain valid (NRC 2009a). No land disturbance activities are planned at CCEC, and activities related to the proposed resumption of power operations are anticipated to be limited to previously disturbed areas. As described in Section 3.3.2.4, CCEC maintains an environmental emergency response plan that includes requirements of the individual pollution prevention and spill response programs

including the SPCC Plan, PIP Plan, SWPPP, and other related BMPs. CCEC also maintains administrative procedures including those for pesticides and herbicides management, environmental review, and environmental evaluations that help minimize impacts. ROW management are 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 CCEC are 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

No ground disturbing or tree clearing activities are proposed for preparations for the resumption of power operations. Further, activities related to preparations for the resumption of power operations 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 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 expected to minimize impacts to terrestrial resources. Therefore, impacts related to the preparations for the resumption of CCEC 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

CEG considered relevant new information on the impacts to threatened, endangered, and protected species since the initial LR. Potential impacts related to the resumption of CCEC 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 six species listed, or proposed for listing, under the ESA overlap with the CCEC action area: the Indiana bat (endangered), northern long-eared bat (endangered), tricolored bat (proposed endangered), green floater (proposed threatened), monarch butterfly (proposed threatened), and northeastern bulrush (endangered). The potential impacts of resumption of CCEC power operations on each of these species are discussed below.

Indiana Bat, Northern Long-eared Bat, and Tricolored Bat

Indiana bats, northern long-eared bats, and tricolored bats have not been observed in the CCEC action area. In addition, no bat species were identified in the CCEC action area during the 2024 PA DEP PNDI review on the occurrence of federally listed threatened and endangered species. However, Indiana bats, northern long-eared bats, and tricolored bats could potentially occur in immediately adjacent lands that support Virginia pine (*Pinus virginiana*), sweet birch

(*Betula lenta*), flowering dogwood (*Cornus florida*), white oak (*Quercus alba*), northern red oak (*Quercus rubra*), black oak (*Quercus velutina*), and tulip tree (*Liriodendron tulipifera*). Further, these species could potentially transit the CCEC action area when foraging or migrating. (NRC 2024e)

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

- *Mortality or injury from collisions with plant structures*: Bat collisions with plant structures at nuclear power plants are not well documented but are likely to be rare. There have been no observations or records of bat incidents at CCEC.
- *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 could potentially impact the habitat for bats. CEG conducts an environmental review for engineering-related activities, including ground disturbance, prior to project activities.
- *Behavioral changes from construction activities*: No construction or ground disturbing activities have been identified or proposed outside the previously disturbed areas of the CCEC action area. The restoration activities described in Section 2.1.2 are expected to be temporary and localized. Bats, if present in the CCEC 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 would establish colonies in the man-made structures at CCEC. As such, behavioral changes to bats from construction activities during the resumption of power operations at CCEC are not anticipated.

CCEC expects to follow established procedures and processes for any required consultation after the resumption of operations. Compliance with all regulatory requirements associated with the federally listed species is expected to continue to be an administrative control practiced by CEG for the life of the facility. Therefore, CEG concludes that the resumption of CCEC power operations MAY AFFECT, BUT IS NOT LIKELY TO ADVERSELY AFFECT, the Indiana bat, northern long-eared bat, and tricolored bat. This conclusion 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).

Green Floater

Green floaters have not been observed in the CCEC action area. In addition, the species was not identified in the CCEC action area during the 2024 PA DEP PNDI review on the occurrence of federally listed threatened and endangered species. However, suitable habitat for green floaters is potentially present in the near-shore areas and other low-velocity areas of the Susquehanna River. (NRC 2024e)

Potential impacts to the green floater from the resumption of CCEC power operations are discussed below:

- *Impacts related to water quality, including chemical and thermal effluents*: As stated in Section 3.2.2.2, discharges from CCEC to the Susquehanna River are authorized under the NPDES permit (No. PA 0009920). Approved biocides are anticipated to be used in accordance with provisions of the NPDES permit, and compliance with NPDES permit limits for discharge of these biocides and associated residuals is expected to be confirmed by monitoring. There have been no NOVs, non-compliance issues, or fish kills that have been reported from 2020 through 2024. Through continued compliance with the NPDES permit conditions and continued operation of the existing closed-cycle recirculating cooling tower system, CEG concludes that water quality and thermal impacts are anticipated to have NO EFFECT on the green floater during the resumption of CCEC power operations.
- *Dredging and other potential impacts*: As described in Section 4.3.2.2, CCEC is expected to comply with the conditions listed in their maintenance dredging permit for periodic intake maintenance dredging that may be required during the resumption of power operations. As described in Section 3.3.1.4 and 3.3.2.4, CCEC follows administrative procedures related to excavation, trenching, and shoring, and maintains an environmental emergency response plan that consolidates site-specific programs such as the SPCC Plan, PIP Plan, SWPPP, and BMPs under the NPDES. As such, CEG concludes that dredging associated with the resumption of CCEC power operations MAY AFFECT, BUT IS NOT LIKELY TO ADVERSELY AFFECT, the green floater.

CCEC expects to follow established procedures and processes for any required consultation after the resumption of operations. Compliance with all regulatory requirements associated with federally listed species is anticipated to continue to be an administrative control practiced by CEG for the life of the facility. Therefore, CEG concludes that the resumption of CCEC power operations MAY AFFECT, BUT IS NOT LIKELY TO ADVERSELY AFFECT, the green floater.

Monarch Butterfly

As described in Section 3.3.3.1.2, USFWS announced in 2024 a proposal to list the monarch butterfly as a threatened species under the ESA. Monarchs have not been observed or reported in CCEC action area and would only have the potential to occur in the action area seasonally and infrequently (NRC 2024e). Suitable habitat for the monarch butterfly is likely present in undeveloped portions of CCEC that are not maintained by mowing. Further, common milkweed has been documented on the south end of Three Mile Island.

CCEC does not have specific requirements to track or maintain monarch habitat at the site. All plant operations are located in previously disturbed areas, and no vegetation clearing or ground disturbing activities are proposed that could potentially impact habitat for the monarch butterfly. Activities including, but not limited to, engineering configuration changes, maintenance activities, operational changes, and procedure changes are anticipated to undergo environmental compliance reviews, as applicable, 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, CEG concludes that the resumption of CCEC power operations MAY AFFECT, BUT IS NOT LIKELY TO ADVERSELY AFFECT, the monarch butterfly.

Northeastern Bulrush

As described in Section 3.3.3.1.2, USFWS announced in 2024 a proposal to delist the northern bulrush from the ESA. Per the proposal, threats to the species have been eliminated or reduced to the point that the species no longer meets the definition of an endangered or threatened species. (USFWS 2024) There have been no observations of the northern bulrush in CCEC action area. However, riparian areas along the Susquehanna River next to the action area could potentially provide suitable habitat. (NRC 2024e)

CCEC is expected to continue to follow water quality regulations through authorized discharges from CCEC to the Susquehanna River under the NPDES permit (No. PA 0009920). Administrative procedures, site-specific programs, and permits related to erosion and sediment control and herbicide and pesticides applications are expected to help mitigate potential impacts to the northeastern bulrush and its associated habitat. Therefore, CEG concludes that the resumption of CCEC power operations MAY AFFECT, BUT IS NOT LIKELY TO ADVERSELY AFFECT, the northeastern bulrush.

State-Listed Species

As described in Section 3.3.3.4, several state-listed species have been known to occur in portions of CCEC and the immediate vicinity. No construction, land clearing, or land-disturbing activities are proposed during the resumption of CCEC power operations that are anticipated to impact habitat for state-listed protected species. All plant operations are located in disturbed areas and vegetation clearing is not anticipated. The various administrative controls and permits in place at CCEC are expected to ensure protection of aquatic and terrestrial habitat and species. These include the following:

- Compliance with NPDES permit requirements,
- Implementation of BMPs including SWPPP, SPCC, and PIP plans,
- Compliance with PA DEP dredge permit requirements,
- Implementation of vegetation maintenance practices including the use of selective application of EPA-approved herbicides,
- Environmental review for activities including, but not limited to, engineering configuration changes, maintenance activities, operational changes, and procedure changes prior to project activities, and
- Consultation with state and federal agencies regarding protected species, when necessary.

Based on this information, CEG concludes that impacts to state-listed species during the period of resumption of CCEC power operations is 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 11 birds of conservation concern overlap with CCEC action area. Migratory movements or local flight patterns may result in the occurrence of these birds at CCEC 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 continued operation of CCEC that are expected to impact potential habitat for birds of conservation concern. Further, various administrative controls, permits, and BMPs, including bird diverters on the meteorological evaluation tower, are in place at CCEC that 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, CEG concludes that impacts to birds of conservation concern, including bald eagles, golden eagles, and other migratory birds during the period of resumption of CCEC power operations is anticipated to be NOT SIGNIFICANT.

Essential Fish Habitat

As described in Section 3.3.3.2, no EFH occurs in CCEC action area, nor are any 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 CCEC action area. Therefore, this issue is not relevant to the resumption of CCEC power operations.

Sanctuary Resources

As described in Section 3.3.3.3, there are no national marine sanctuaries located in CCEC action area. Therefore, this issue is not relevant to the resumption of CCEC 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 pre-decommissioning outages, as the number of employees onsite at CCEC is expected to be similar. CEG anticipates roughly 1,200 staff onsite during these preparations, with the assumption that these staff are expected to be split into shifts. Additionally, these staff are expected to stay in similar accommodations in the surrounding region and follow the same transportation routes to CCEC 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 decommissioning and are expected to remain stable or decrease throughout the period of preparations for resumption of power operations, corresponding with the expiration of a Payment in Lieu of Taxes agreement in 2026. 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

After resumption of power operations, staffing numbers at CCEC are expected to level out to roughly 600, which corresponds with the pre-decommissioning levels seen during normal operations. These staff are expected to reside in similar areas as previous staff; thus, the counties impacted by resumption of power operations are likely to be the same counties as were impacted prior to decommissioning (Lancaster, Dauphin, York, and Cumberland Counties) and to utilize similar transportation routes to and from the site. Impacts on transportation and community services are not expected to substantially differ from previous analyses after resumption of power operations. As such, the impacts of staffing levels on the surrounding counties are expected to remain NOT SIGNIFICANT.

Tax payments to localities are expected to remain at decommissioning levels or decrease slightly in 2027, after which these payments are anticipated to return to pre-decommissioning levels with percent increases correlated to market conditions. Environmental impacts resulting from an increase in tax payments are generally considered to be beneficial, as payments are typically made to local jurisdictions. Since future tax payments are anticipated to be under 10 percent of the county's total revenue, impacts of tax payments after resumption of power operations are anticipated to be SMALL beneficial impacts, per the NRC 1996 GEIS. (NRC 1996) Therefore, the impacts of tax payments to localities are expected to remain NOT SIGNIFICANT.

4.5 Historic and Cultural Resources

As presented in Section 3.5, a review conducted on April 21, 2025, of resources listed on PA-SHARE found 14 cultural resources located within the approximately 400-acre CCEC property and within a 1-mile buffer of CCEC.

The 14 recorded resources within CCEC consist of 10 previously recorded archaeological sites and four aboveground cultural resources. Two resources have been determined eligible for listing on the NRHP, two have been determined not eligible, and the remaining 10 properties are listed as undetermined. The two resources determined eligible include the TMI-2 historic district (2010RE03382) and the precontact archaeological site (36DA0100).

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

As described in Section 2.2.1, CCEC previously underwent decommissioning activities after the cessation of operations in 2019. Therefore, the preparation for resumption of power operations

involves restoring the plant to its previous OL condition. While no major demolition or new construction on undeveloped land is planned, CEG does intend to upgrade or replace equipment and facilities to support and maintain power operations. However, CEG plans on limiting improvements to previously developed and/or disturbed areas. Due to the extensive development of the property, much of the existing project area has been previously disturbed. Therefore, by limiting ground disturbing activities to previously disturbed areas and maintaining the visual context of the property, direct and indirect impacts to cultural resources are anticipated to be mitigated.

Additionally, CCEC currently utilizes a CRMP, which was developed and implemented in 2009 under the advice of the Pennsylvania State Historic Preservation Officer. The current CRMP includes both a cultural resources protection plan and an archaeological resources erosion monitoring plan to ensure protection of potential cultural resources at CCEC. Following the implementation of the CRMP for CCEC, two cultural resources were determined to be eligible for listing on the NRHP. These two resources include a precontact archaeological site (36DA0100) and the TMI-2 historic district (2010RE03382). TMI-2 is not managed by CEG; however, the CRMP provides a framework for CEG to assess the potential impact that modifications or new construction may have on the historic district or other historic properties.

Therefore, by limiting ground disturbance to previously disturbed areas and by the continued application of the CRMP for CCEC, preparations for the resumption of power operations are anticipated to be NOT SIGNIFICANT on cultural resources within CCEC or within a 1-mile buffer of CCEC.

4.5.2 Environmental Impacts from the Resumption of Power Operations

As discussed in Section 2.2.2, CCEC is projected to return to operations following the approval of the 50.82(a)(2) exemption request. CEG intends to operate CCEC as the plant was operated prior to the 2019 shutdown once CCEC has been restored to its previous OL condition. Once CCEC has been fully prepared to resume operations, CEG does not anticipate the need for any ground disturbance activities resulting from the resumption of power operations. Additionally, the CRMP provides protections for cultural resources with the potential to be affected by CCEC operations. Therefore, the resumption of power activities is anticipated to be NOT SIGNIFICANT on cultural resources within CCEC or within a 1-mile buffer of CCEC.

4.6 Air Quality

4.6.1 Environmental Impacts from the Preparations for Resumption of Power Operations

The restart activities are presented in Section 2.2. No additional emission equipment units are expected or required for restart activities. Emissions expected during restart activities include the completion of emission unit maintenance and any required endurance testing prior to restart.

With the exception of purchased electricity, emissions during preparations for resumption of power operations, including GHG emissions, are expected to be similar to the 2020 through 2022 levels shown in Tables 3.6-1 and 3.6-2. This is because those years account for post-shutdown activities such as the absence of cooling tower PM emissions. Because the emissions due to the preparations for the resumption of power operations are expected to be fewer than the emissions due to operations, the environmental impacts of air emissions are expected to be NOT SIGNIFICANT.

4.6.2 Environmental Impacts from the Resumption of Power Operations

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 2024a). 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 NOT SIGNIFICANT for all plants. 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 2024f) 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).

For CCEC, 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.

As listed in Table 2.2-2, CEG plans to apply for a new air permit. Table 4.6-1 lists the emission units that are expected to be included in the new air permit application to support resumption of power operations. After the resumption of power operations, air emissions, including GHG emissions, are expected to be similar to the emissions during pre-decommissioning operations for 2014 through 2018 listed in Tables 4.6-2 and 4.6-3. This is because the same type of equipment that produced emissions for those years is being brought back online. During resumption of power operations, CCEC expects to contribute small emissions of criteria air pollutants and GHG from minor air emission sources, and CEG expects to comply with associated air permits. As stated in the GEIS, impacts to air quality are SMALL for all plants. Therefore, impacts to air quality during resumption of power operations are expected to be NOT SIGNIFICANT.

Intake temperatures were reviewed and no discernible trends were noted. After the resumption of power operations, there are no expected changes in intake temperatures.

Table 4.6-1 CCEC Air Emission Sources Expected to be Included in the Restart Application

Source ID	Source Name	Current Status	Abandonment Date
B1A	Auxiliary Boiler A	Unit Abandoned	2021
B1B	Auxiliary Boiler B	Unit Abandoned	2021
C1A	Cooling Tower A	Unit Abandoned	September 20, 2019
C1B	Cooling Tower B	Unit Abandoned	September 20, 2019
FSP1	Fire Pump Diesel	Unit Abandoned	2021
FSP3	Fire Pump Diesel	Operational	N/A
FX1A	Cummins Emergency Diesel Generator 1 (FX-Y-1A)	Unit Abandoned	May 2022
FX1B	Cummins Emergency Diesel Generator 2 (FX-Y-1B)	Unit Abandoned	May 2022
Y1A	Emergency Diesel Generator 1A	Unit Abandoned	2021
Y1B	Emergency Diesel Generator 1B	Unit Abandoned	July 2022
Y2	Security Unit Power Gen.	Operational	N/A
Y4	Station Blackout Diesel Gen.	Unit Abandoned	2021
FM02	#2 Oil Tank	Unit Abandoned	2019
S1	Stack, Auxiliary Boilers 1A/1B	Unit Abandoned	December 26, 2019
S11	Stack, Security Gen.	Operational	N/A
S14	Stack, Fire Pump	Unit Abandoned	2021
S15	Stack, Fire Pump	Operational	N/A
S16	Stack (FX-Y-1A & FX-Y-1B)	Unit Abandoned	May 2022
S2	Stack, Emergency DI. Gen.	Unit Abandoned	2021
S3	Stack, Emergency DI. Gen.	Unit Abandoned	2022
S4	Stack, Stn. Blackout Gen.	Unit Abandoned	2021
Z1A	Cooling Tower A – Fugitive Emissions	Unit Abandoned	September 20, 2019
Z1B	Cooling Tower B – Fugitive Emissions	Unit Abandoned	September 20, 2019

Note: N/A = Not Applicable, Item is still operational.

Table 4.6-2 CCEC Annual Emissions (Tons Per Year)

Emission (Tons)	Permit Limits	2014	2015	2016	2017	2018
NOx	100	5.8	7.4	10.56	8.63	3.87
SOx	100	0.1	0.06	0.06	0.03	0.02
CO	100	1.5	1.78	2.57	2.14	1.02
PM_{10}	100	62.3	54.29	64.85	59.16	57.85
VOCs	50	0.2	0.19	0.25	0.23	0.13
HAPs	25/10	0.2	0.19	0.25	0.23	0.13

NOx = nitric oxide

SOx = sulfur oxide

CO = carbon monoxide

HAPs = hazardous air pollutants

VOCs = volatile organic compounds

Table 4.6-3 CCEC Annual GHG Emissions (CO_2e in Metric Tons Per Year)

CO_2e (Metric Tons)	2014	2015	2016	2017	2018
Stationary combustion sources	270.7	2,607	3,480	2,304	197.3
SF_6	NA	0	0	0	0
CO_2	1.6	0	8.7	12.3	16.6
HFC/PFC Refrigerants	NA	NA	NA	NA	NA
ODC Refrigerants	NA	0	0	59	5.4
Total Direct Emissions	272.3	2,607	3,489	2,375	219.3
Onsite Electricity Usage	5,157	5,703	4,350	4,446	3,982

CO_2e = carbon dioxide equivalent

SF_6 = sulfur hexafluoride

HFC = hydrofluorocarbon

PFC = perfluorocarbon

ODC = ozone depleting chemical

4.7 Human Health

4.7.1 Environmental Impacts from Preparations for Resumption of Power Operations

Preparations for resumption of operations at CCEC are expected to involve maintenance, inspections, system testing, and other activities necessary to restore the facility to operational readiness. These activities are expected to result in NOT SIGNIFICANT nonradiological and radiological impacts to human health based on the continuation of existing programs, which have been proven successful through historical monitoring data.

4.7.1.1 Nonradiological Impacts

During the preparation phase, chemical use is expected to be limited to biocides and pH control agents such as sodium hypochlorite, sulfuric acid, and quaternary ammonium compounds (e.g., Nalco H150M), consistent with past site practices. These chemicals are anticipated to be applied under established procedures and reviewed by industrial safety staff to ensure regulatory compliance.

The potential for microbiological hazards, such as *Legionella*, during preparations is expected to be low. Historical monitoring data indicate that *Legionella* has not been detected at concentrations requiring further action. During preparations, cooling systems are anticipated to remain offline, and chemical treatment is expected to be implemented as needed to prevent microbial growth during system reactivation.

Industrial safety risks – such as confined space entry or electrical system maintenance – are anticipated to be mitigated using the site's OSHA-compliant program (29 CFR Parts 1910 and 1926). Based on the continuation of these established programs, nonradiological human health impacts from preparations are expected to be NOT SIGNIFICANT.

4.7.1.2 Radiological Impacts

Radiological work during preparations is anticipated to include such activities system inspections, maintenance, and management of radioactive materials under existing controls. All activities are expected to be conducted in accordance with 10 CFR Part 20 and the ALARA principle, as described in Section 3.7.

Given that CCEC public doses during operations were well within the NRC-established public dose limits, it is reasonable to expect that public doses during restart activities be well within such limits. Annual reports of environmental monitoring at CCEC 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 are expected to be NOT SIGNIFICANT.

4.7.2 Environmental Impacts from Resumption of Power Operations

Human health impacts from resumption of power operations are expected to be NOT SIGNIFICANT and to comply with regulatory limits.

4.7.2.1 Nonradiological Impacts

Chemical treatment during operations is expected to continue to be in compliance with plant and fleet procedures.

Restarting the cooling towers has the potential to reintroduce microbiological hazards, such as *Legionella*. Monitoring and chemical treatment is anticipated to be employed to control microbial growth in cooling systems. As previously done during operations, CEG plans to use an outside vendor to perform biannual *Legionella* sampling in both cooling towers. Historical monitoring data indicate that no *Legionella* was detected at concentrations requiring further action. Similar practices are expected to continue to mitigate microbial risks.

As shown in Figure 4.7-1, the in-scope transmission lines span from CCEC to the adjacent onsite 230 kV switchyard. Additional onsite lines, also within the owner-controlled area, transmit stepped-down power from the switchyard to Auxiliary Transformers 1A and 1B. These transformers provide 6.9 kV and 4.16 kV power for plant systems during outages. All transmission lines remain within the secured site boundary and do not cross publicly accessible areas.

Occupational safety risks from ongoing maintenance and electrical work is anticipated to be addressed through continuation of the site's OSHA-compliant industrial safety program. Overall, nonradiological impacts from power operations are anticipated to be NOT SIGNIFICANT.

4.7.2.2 Radiological Impacts

Radiological impacts to the public during resumption of operations at CCEC are expected to remain well below regulatory dose limits established in 10 CFR 20.1301 and 40 CFR 190.10.

CCEC's radioactive effluents from 2014 through 2019 were well within federally required limits. To account for existing tritium in groundwater onsite, which is released into the river over time, one abnormal liquid release is recorded per month for CCEC. As such, for the years 2014 through 2019, 12 abnormal liquid releases are reported per year. No abnormal gaseous releases occurred in 2014 or 2016, and one gaseous release occurred in 2015 and each of the years 2017 through 2019. The activity released by these events was accounted for in the gaseous effluent release summations for CCEC for each respective year. For CCEC from 2014 through 2019, liquid and gaseous effluents resulted in maximum hypothetical doses that were a small fraction of the quarterly and yearly ODCM limits. (EGC 2015b; EGC 2016b; EGC 2017b; EGC 2018b; EGC 2019d; EGC 2020b)

CCEC's REMP provides additional assurance that there are no significant dose or radiological environmental impacts due to CCEC. Based on the doses calculated from measured effluents for 2014 through 2019, CCEC operations did not have any adverse effects on the health of the

public or on the environment. (EGC 2015a; EGC 2016a; EGC 2017a; EGC 2018a; EGC 2019c; EGC 2020a)

To support expectations for dose levels upon restart, occupational exposure trends from similar pressurized water reactors are used. These trends, along with continued implementation of the facility's ALARA program, support the conclusion that worker doses are anticipated to remain below regulatory thresholds during future operations.

Personal dosimetry, ALARA reviews, radiation work permits, and controlled area access procedures are expected 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.

4.7.2.3 Postulated Accidents

The environmental impacts of design basis accidents and severe accidents are considered for all nuclear power plants, including CCEC. 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 2024 GEIS (NRC 2024a). A plant-specific analysis of the environmental impacts of postulated accidents, including consideration of SAMAs, was performed for CCEC in Appendix F of the 2009 SEIS (NRC 2009a).

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. If CEG's proposed actions are approved and the 10 CFR 50.82(a)(1) certifications are rescinded, CCEC will again be required to comply with 10 CFR 50.155.

As a result of the NRC's ongoing safety oversight and updates to NRC regulatory requirements, the overall risk of a severe accident has been reduced. Because the NRC's regulations and safety oversight have provided additional severe accident mitigation and have further reduced the risk profile of operating reactors since the CCEC SAMA analysis in the 2009 SEIS, further SAMA analyses would be unlikely to find any cost-effective significant plant improvements, as discussed in the GEIS.

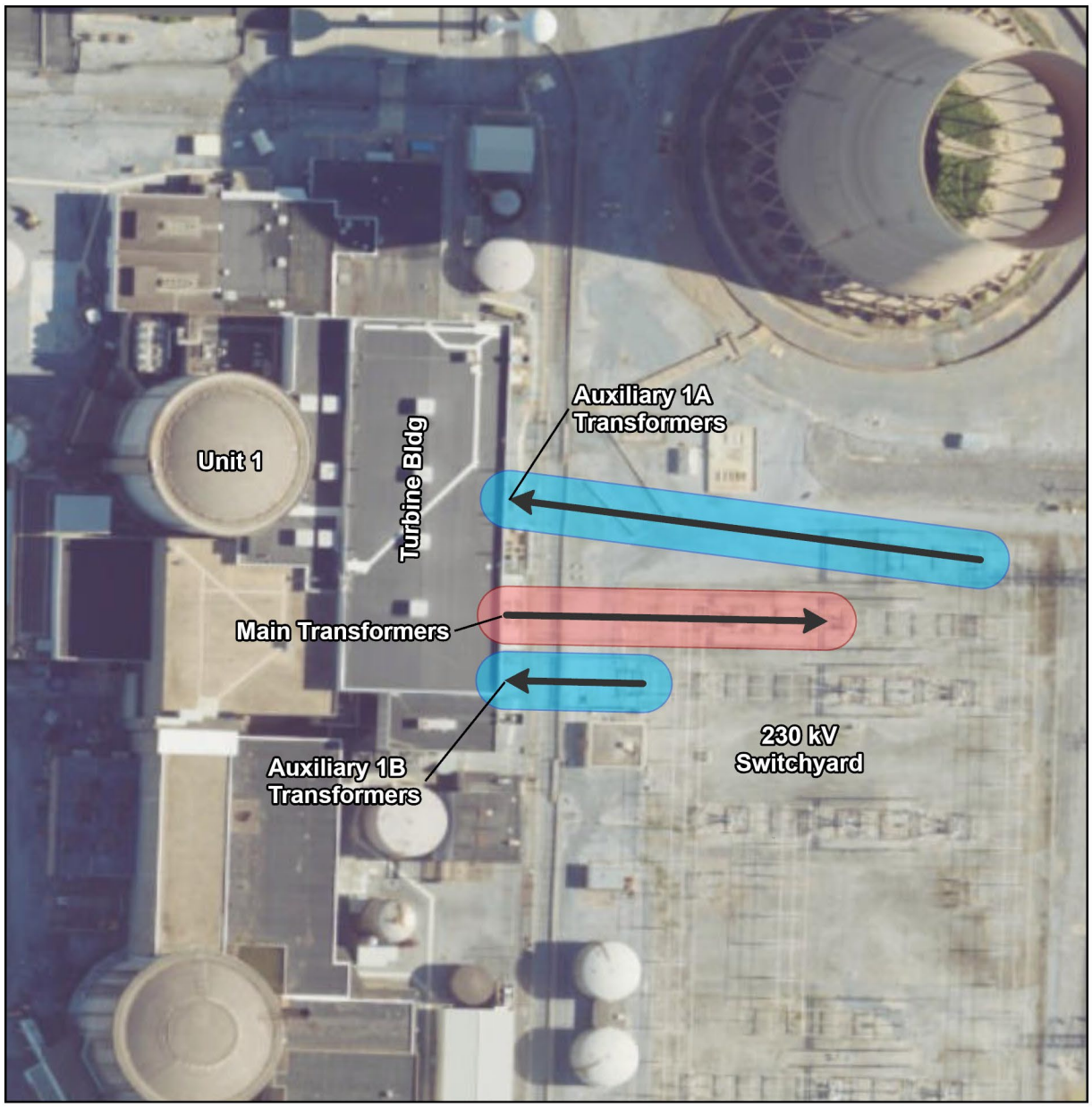

Figure 4.7-1 CCEC In-Scope Transmission Lines

4.8 Waste Management

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

During the preparation for the resumption of power operations, the radwaste system is anticipated to be restored. Restoration of radwaste processing and release capability is anticipated to be comparable to normal power operations in accordance with regulatory limits and requirements. Restart activity waste volumes are expected to be similar to an outage year during operations, the most recent being 2017. CCEC has procedures in place for the management, classification, handling, storage, and shipping of hazardous, nonhazardous, universal, and medical waste. All previous radioactive waste, non-radioactive waste, and mixed waste procedures and processes are expected to remain in place for restart activities. CCEC's current waste minimization plan was written for decommissioning activities and is expected to be updated for restart activities, in compliance with 40 CFR 260–279. Accordingly, environmental impacts to the environment from preparations related to the radwaste system restoration are expected to be NOT SIGNIFICANT.

4.8.2 Environmental Impacts from the Resumption of Power Operations

4.8.2.1 Low-Level Waste Storage and Disposal

CCEC is expected to continue to manage LLRW onsite in accordance with NRC regulations and dispose of LLRW at permitted treatment and disposal facilities. CCEC is expected to continue to use the established radiological waste programs in place, which outline the procedures for processing, sampling, analysis, packaging, storage, and shipment of LLRW in accordance with local, state, and federal requirements. Upon resumption of power, approved, transportation, treatment, and disposal vendors and facilities are anticipated to continue to be used. The type and quantity of radiological waste shipped offsite prior to decommissioning are presented in Annual Radiological Effluent Release Reports; CEG does not anticipate a significant increase in generation of LLRW upon resumption of power operations from that experienced prior to ceasing operations in 2019.

There are no planned modifications to CCEC's radioactive waste management system that are anticipated to 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 interim solid waste storage facility and the waste handling and packaging facility yard while being loaded and awaiting shipment during the resumption of power, as is discussed in Section 3.8.1.

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 will 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, CCEC's compliance with

comprehensive regulatory controls and the use of permitted treatment and disposal facilities is expected to ensure that impacts from the storage and disposal of LLRW upon the resumption of power operations are NOT SIGNIFICANT.

4.8.2.2 Mixed Waste Storage and Disposal

The generation of LLMW at CCEC is uncommon and expected to continue to be so upon the resumption of power operations. CCEC is expected to continue to use the established radiological waste programs, which include procedures specifically for LLMW management. Upon resumption of power operations, CCEC is expected to continue to store LLMW at the interim solid waste storage facility, as discussed in Section 3.8.1. As stated above, CCEC manages waste in accordance with NRC regulations and utilizes only permitted waste treatment and disposal facilities. Approved vendors for LLMW are anticipated to continue to be used upon restart. Minimal amounts of LLMW has been generated by CCEC in the past 5 years, and generation is not expected to increase during resumption of power operations from that experienced prior to ceasing operations in 2019. There are no planned modifications to CCEC radioactive waste management system that are expected to increase the amount of LLMW generated.

As per the GEIS, continued operations will not increase the small but continuing risk to human health and the environment posed by mixed waste at all plants. The radiological and nonradiological environmental impacts from the long-term disposal of mixed waste 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, CCEC's compliance with comprehensive regulatory controls and the use of licensed treatment and disposal facilities is expected to ensure that any impacts from the storage and disposal of LLMW upon the resumption of power operations are NOT SIGNIFICANT.

4.8.2.3 Nonradioactive Waste Storage and Disposal

CCEC's management of its nonradioactive waste streams, including hazardous, nonhazardous, universal and medical wastes, is discussed in Section 3.8.2. CCEC uses permitted waste vendors for all nonradioactive waste disposal and does not anticipate an increase in nonradioactive waste generation for the resumption of power operations. CCEC is a SQG of hazardous waste and expects to remain a SQG upon resumption of power operations. CCEC is expected to continue to manage nonradioactive waste in accordance with EPA and state regulations and continue to utilize CEG procedures for waste management and minimization. Nonradiological waste is anticipated to continue to be staged in waste building #35. CCEC does not expect an increase in its hazardous waste generation rate for the resumption of operations from that experienced prior to ceasing operations in 2019.

As per the GEIS, 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, the impact of nonradioactive waste storage and disposal during the resumption of power operations is anticipated to be NOT SIGNIFICANT.

4.9 Fuel Cycle

4.9.1 Environmental Impacts from Preparations for Resumption of Power Operations

Preparations for resumption of power operations at CCEC are expected to involve activities associated with the receipt, handling, and storage of new nuclear fuel assemblies. Fuel is anticipated to be procured from commercial vendors licensed by the NRC and fabricated offsite using uranium mined and processed at separate facilities.

Fresh fuel assemblies are expected to be transported by truck from Framatome's Richland, Washington, Fuel Fabrication Facility, consistent with historical operations. Transportation is anticipated to be conducted 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.

Handling activities during fuel receipt and inspections is anticipated to occur within existing plant structures and under established radiation protection and industrial safety programs, as described in Section 3.7. Preparations associated with new fuel handling are not expected to result in any significant environmental impacts. Accordingly, environmental impacts to the environment from preparations related to the fuel cycle are expected to be NOT SIGNIFICANT.

4.9.2 Environmental Impacts from Resumption of Power Operations

Following restart, CCEC is expected to resume steady-state operations using low-enriched uranium fuel enriched to no more than 5.0 weight percent uranium-235, consistent with historical licensing and technical specifications. The average burnup of peak rods is anticipated to be approximately 62,000 megawatt days per metric ton of uranium, and there are no current plans to change enrichment or burnup levels compared to previous operations.

Fuel fabrication, including uranium mining and milling activities, is expected to continue to occur offsite and remain bounded by the NRC's prior evaluations presented in the GEIS and associated references (NRC 2024a). Environmental impacts associated with fuel fabrication are expected to be NOT SIGNIFICANT.

During operations, LLRW is anticipated to be generated through normal maintenance, component replacement, and operational activities. LLRW is expected to continue to be

managed onsite in accordance with NRC regulations (10 CFR Part 20, Subpart K; 10 CFR Part 61) and shipped offsite for disposal at licensed waste facilities, as necessary. Waste generation rates are expected to be consistent with historical operations, and environmental impacts associated with LLRW management are expected to be NOT SIGNIFICANT.

Spent nuclear fuel generated following restart is anticipated to be stored in the existing SFP through the anticipated operational period ending in 2034. No transfers of spent fuel from the SFP to the onsite ISFSI are planned during this period. The ISFSI currently houses spent fuel from prior operations in NAC International MAGNASTOR DCS systems, but no expansion of the ISFSI is required to support restart activities.

Environmental impacts associated with spent fuel storage are expected to be NOT SIGNIFICANT.

4.10 Cumulative Effects

In the SEIS, the NRC staff considered the potential impacts resulting from operation of CCEC during the LR term and other past, present, and future actions in the vicinity of the plant. The NRC staff's determination is that the potential cumulative impacts resulting from operation of CCEC during the LR term are anticipated to be NOT SIGNIFICANT.

Changes to the site and vicinity were evaluated, as well as reasonably foreseeable future actions that could contribute to adverse cumulative impacts. As presented in Section 3.1, the general character of the surrounding area has remained largely the same as evidenced by a review of available aerial imagery from the time of the CCEC shutdown in 2019 to 2024. Two non-CCEC projects are occurring on Three Mile Island. Another reasonably foreseeable future action is the renewal of an OL for CCEC and the continued operation beyond April 19, 2034. While continued operations during a SLR period is a reasonably foreseeable future action, the impacts of continued operations are not expected to temporarily overlap with the restart activities or the resumption of power operations until April 19, 2034, and will therefore not be cumulative. The impacts of continued operations during a SLR period are expected to be a continuation of the impacts described for the resumption of power operations in previous Chapter 4 sections.

The first project is an inland NLF being constructed for the York Haven Hydroelectric Project on the southwest end of the island per agreement with FERC (FERC 2024). The NLF project site is located adjacent to the existing York Haven Main Dam. FERC did not identify any cumulative effects from construction and operation of the fishway (FERC 2024). Construction of the NLF by the York Haven Power Company began in August 2024 and is scheduled to continue through September 2025 but may extend into 2026 (ECRE 2024; YHPC 2024).

TMI-2 Solutions is decommissioning TMI-2. Major decommissioning activities as planned are expected to overlap with resumed power operations at CCEC (EnergySolutions 2025).

As presented in Section 2.2, the timeframe of preparation activities is 2024 to resumption of power operations. Thus, construction of the new fishway and preparation activities are anticipated to overlap temporarily. However, the NLF construction is taking place at the south end of the island, and CCEC activities are located at the north end with the NLF activities confined to use of the south entrance road. CCEC activities are landward rather than within and along the shoreline of the Susquehanna River like many of the NLF construction activities. Cumulative effects from the construction of the NLF and CCEC preparation activities are anticipated to be minimal and temporary.

The NLF and CCEC intake and discharge are all located on the western side of Three Mile Island. The NLF is being constructed downstream of CCEC intake and discharge. CCEC intake and discharge are expected to be operated in accordance with an NPDES permit. Sections 3.3 and 4.3 discuss the aquatic ecology and impacts of power operations, which are anticipated to be NOT SIGNIFICANT. Figure 3.3-1 presents the ESA action area in the Susquehanna River, which is more than 6,000 feet upstream of the existing York Haven Main Dam, the location for the NLF. No cumulative effects from the operation of CCEC and the NLF are expected.

The major decommissioning activities for TMI-2 as planned are expected to overlap with resumed power operations. TMI-2's decommissioning impacts are expected to be NOT SIGNIFICANT and focused on dismantlement and waste management activities. TMI-2 Solutions reviewed the environmental impacts of decommissioning TMI-2 and determined them to be small either by reviewing them in light of NRC's Decommissioning GEIS or through a site-specific assessment. Both projects are anticipated to be confined to the island except for transportation of waste and materials. Overall, cumulative effects from CCEC power operations and TMI-2 decommissioning are anticipated to be NOT SIGNIFICANT.

As discussed above, the impacts of these projects are anticipated to largely be confined to Three Mile Island and the limited action area in the Susquehanna River and cumulative effects, if any, are anticipated to be NOT SIGNIFICANT for any resource area.

5.0 SUMMARY OF IMPACTS AND MITIGATING ACTIONS

As described in Chapter 1, CEG is seeking authorization to resume power operations at CCEC. CEG prepared this ER to provide the NRC information to support an Environmental Assessment to fulfill its obligations under NEPA. CCEC is currently in a decommissioned state. The proposed action of preparing for resumption of power operations and resumption of power operations are described in Chapters 1 and 2. The environmental baseline, or affected environment, for CCEC is the current decommissioned state. In Chapter 3, each resource area is described using the current decommissioned 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.

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 CCEC 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, where applicable, by comparison to the NRC's findings in the GEIS.

Resumption of Power Operations

CEG plans to resume operational activities using the same management practices in use prior to decommissioning. In the evaluation of environmental impacts for resumption of power operations, CEG referenced the previous NEPA analyses summarized in the 2009 SEIS and other relevant environmental review documents.

Conclusions

As discussed in Chapter 4, updated information, analyses, and site-specific assessments indicate that preparations for resumption of operations and resumption of power operations on each resource area are NOT SIGNIFICANT. 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, CEG concludes that the environmental impacts under the no-action alternative are anticipated to not be substantially different from those identified in the GEIS and do not represent an environmentally preferable alternative to resumption of power operations at CCEC.

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 CCEC (Sheet 1 of 8)

Resource Area	ER Section	Summary of Impact	Significance of Impact
Land Use	4.1	Preparation activities for resumption of power operations are not expected to change land use, and no offsite projects were identified in CCEC vicinity that could impact preparation activities. No changes are expected to visual appearance or onsite or offsite land use from resuming CCEC power operations.	NOT SIGNIFICANT
Water Resources	4.2	Ground-disturbing activities associated with preparations for and resumption of power operations are anticipated to occur in already developed or previously disturbed areas onsite. Impacts to water resources and geologic resources 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. Additional impacts to groundwater and surface water resources are summarized below.	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 CCEC (Sheet 2 of 8)

Resource Area	ER Section	Summary of Impact	Significance of Impact
Groundwater Resources	4.2.1	During preparation activities for resumption of CCEC power operations, increases in onsite potable groundwater use due to increased staffing are expected to be less than 100 gpm. Groundwater use for industrial purposes is anticipated to be within SRBC limits. CCEC RGPP includes sampling 49 monitoring wells screened within the surficial aquifer and the bedrock aquifer. Tritium detections from a historical inadvertent radiological release continue to be far below the MCL. CCEC is expected to continue to monitor groundwater during resumed power operations in accordance with its RGPP. A potential inadvertent release of radiological or nonradiological materials is anticipated to not impact groundwater users on the mainland as groundwater does not migrate beneath the river from the island to the mainland or to other nearby islands.	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 CCEC (Sheet 3 of 8)

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 the SRBC limits and minimal compared to the volume of the Susquehanna River. Surface water use during resumed power operations is expected to be similar to pre-decommissioning operations. CCEC is expected to continue to modify pump operations, which was exercised pre-shutdown as a means of decreasing surface water use, to support resuming power operations. CCEC expects to comply with SRBC limits during resumed power operations. Discharges from CCEC to the Susquehanna River (cooling water, industrial waste treatment effluent, stormwater, and sanitary liquid wastes) are authorized under the NPDES permit, which is under administrative extension. CEG submitted an NPDES permit renewal application in March 2025 to support resuming power operations. Discharges are expected to comply with NPDES permit limits during resumed power operations. The river is protected from potential spills by the station flood protection dike and the yard drain system. Potential spills are expected to be mitigated using existing internal procedures, including use of BMPs.	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 CCEC (Sheet 4 of 8)

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 already developed or 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. CCEC anticipates minimizing impacts to wildlife using existing internal procedures (e.g., environmental review, pesticide/herbicide application, and BMPs) and by complying with applicable permits from federal, state, and local agencies, including the NPDES permit, which regulates thermal discharge and chemical releases to the Susquehanna River. CCEC expects to apply for federal, state, and local permits prior to maintenance dredging at the intake structure. Impacts to aquatic organisms during planned dredging activities are anticipated to be mitigated by complying with federal, state, and local permit requirements. CCEC anticipates continuing to evaluate the radiological impact of station operations on ecological resources in accordance with the ODCM and REMP. Based on the above information, impacts of resumption of power operations on federally and state-listed species are NOT SIGNIFICANT.	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 CCEC (Sheet 5 of 8)

Resource Area	ER Section	Summary of Impact	Significance of Impact
Socioeconomics	4.4	The number of workers at CCEC is expected to peak during preparation activities for resumption of power operations and to be similar to the number of workers during a pre-decommissioning outage (~1,200). Consequently, impacts to housing, transportation, and tax payments are expected to be similar. During resumed power operations, the number of workers is expected to be similar to that of pre-decommissioning operations (~600). CEG expects property tax payments to return to pre-decommissioning levels in 2027.	NOT SIGNIFICANT
Historic and Cultural Resources	4.5	Ground disturbance activities associated with preparations for and resumption of power operations are anticipated to be limited to already developed and previously disturbed areas. NRHP-eligible historic properties and cultural resources were identified onsite. Potential impacts to historic and cultural resources are expected to be mitigated by the CCEC CRMP.	NOT SIGNIFICANT
Air Quality	4.6	Minimal criteria pollutant emissions are expected during preparation activities for resumption of power operations. During resumed power operations, air emissions, including GHGs, are expected to be similar to those of pre-decommissioning operations. CEG is preparing an air permit application to support resuming power operations, and CCEC is expected to comply with permit requirements during resumed power operations.	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 CCEC (Sheet 6 of 8)

Resource Area	ER Section	Summary of Impact	Significance of Impact
Human Health	4.7	Increased radiological exposure to the population or workers is not expected 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, CEG is expected to use an existing internal safety program that addresses applicable OSHA standards during preparation activities for and resumption of power operations.	NOT SIGNIFICANT
Waste Management	4.8	During preparation activities for resumption of power operations, waste volumes are expected to be similar to those during an outage. During resumed power operations, waste generation volumes are expected to be similar to those during pre-decommissioning operations. CEG is expected to manage and dispose of waste in accordance with internal procedures and federal, state, and local regulations.	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 CCEC (Sheet 7 of 8)

Resource Area	ER Section	Summary of Impact	Significance of Impact
Fuel Cycle	4.9	During preparation activities for resumption of power operations, fresh fuel assemblies are anticipated to be transported to CCEC by truck. Transportation is expected to be conducted in accordance with applicable NRC and DOT regulations, including 10 CFR Part 71 and DOT hazardous materials regulations. During resumed power operations, CCEC is expected to manage LLRW in accordance with NRC regulations (10 CFR Part 20 and 10 CFR Part 61) and LLRW is anticipated to be shipped offsite to licensed facilities. Waste generation rates are expected to be similar to pre-decommissioning operations.	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 CCEC (Sheet 8 of 8)

Resource Area	ER Section	Summary of Impact	Significance of Impact
Cumulative Effects	4.10	Two projects are planned on Three Mile Island: construction of an NLF for the York Haven Hydroelectric Project on the south end of the island, and decommissioning of TMI-2. Construction of the NLF is expected to overlap temporarily with preparation activities for resumption of power operations at CCEC, but cumulative effects to resource areas are anticipated to be minimal and temporary. No cumulative effects to resource areas are expected from resumption of CCEC power operations and operation of the NLF. TMI-2 decommissioning plans are consistent with NUREG-0683 and the decommissioning GEIS. Major decommissioning activities, as defined by 10 CFR 50.2, are planned to overlap with resumption of CCEC power operations. Environmental impacts of TMI-2 decommissioning activities were evaluated in accordance with 10 CFR 50.82(a)(4)(i) and are either bounded by impacts addressed by previous Environmental Impact Statements or concluded to be NOT SIGNIFICANT based on site-specific reviews. Environmental impacts of concurrent TMI-2 decommissioning activities and resumed CCEC power operations are anticipated to be confined to Three Mile Island and the limited action area in the Susquehanna River.	NOT SIGNIFICANT

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