

10 CFR 50.82(a)(4)

TM-19-025

April 5, 2019

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

Three Mile Island Nuclear Station, Unit 1  
Renewed Facility Operating License No. DPR 50  
NRC Docket No. 50 289

Subject: Three Mile Island Nuclear Station, Unit 1 - Post-Shutdown Decommissioning Activities Report

References: 1) Letter from J. Bradley Fewell (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Certification of Permanent Cessation of Power Operations for Three Mile Island Nuclear Station, Unit 1," dated June 20, 2017 (ML17171A151)

2) Regulatory Guide 1.185, Revision 1, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report," dated June 2013 (ML13140A039)

Pursuant to 10 CFR 50.82(a)(4)(i), Exelon Generation Company, LLC (Exelon) is submitting the post-shutdown decommissioning activities report (PSDAR) for Three Mile Island Nuclear Station, Unit 1 (TMI-1). On June 20, 2017, Exelon informed the U.S. Nuclear Regulatory Commission (NRC) that TMI-1 will permanently cease power operations on or about September 30, 2019 (Reference 1). In accordance with 10 CFR 50.54(bb) and 10 CFR 50.82(a)(4)(i), Exelon is required to submit a Spent Fuel Management Plan (SFMP), Site Specific Decommissioning Cost Estimate (DCE), and Post-Shutdown Decommissioning Activities Report (PSDAR) within two years of permanent cessation of operations.

The Attachment to this letter provides the TMI-1 PSDAR. The TMI-1 SFMP and DCE are being submitted under separate cover letters. The PSDAR has been developed consistent with Regulatory Guide 1.185, Revision 1, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report" (Reference 2). The TMI-1 PSDAR includes: 1) a description of the planned decommissioning activities; 2) a schedule for their accomplishments; 3) a summary of the site-specific decommissioning cost estimate; and 4) a discussion that provides a basis for concluding that the environmental impacts associated with site-specific decommissioning will be bounded by appropriate, previously issued, environmental impact statements. The PSDAR also includes a discussion of the schedule and costs associated with the management of spent fuel and site restoration.

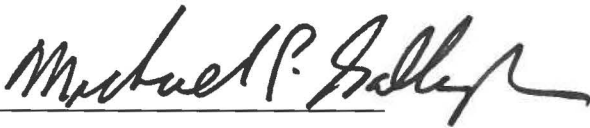
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In accordance with 10 CFR 50.82(a)(4)(i), a copy of the TMI-1 PSDAR is being provided to the Commonwealth of Pennsylvania by transmitting a copy of this letter and its supporting attachment to the designated State Officials.

This letter contains no new regulatory commitments.

If you have any questions concerning this submittal, please contact Paul Bonnett at (610) 765-5264.

Respectfully,

A handwritten signature in black ink, reading "Michael P. Gallagher". The signature is fluid and cursive, with a horizontal line drawn underneath the name.

Michael P. Gallagher  
Vice President, License Renewal & Decommissioning  
Exelon Generation Company, LLC

Attachment: Three Mile Island Nuclear Station, Unit 1 - Post-Shutdown Decommissioning  
Activities Report

cc: w/Attachment

Regional Administrator - NRC Region I  
NRC Senior Resident Inspector – Three Mile Island Nuclear Station – Unit 1  
NRC Project Manager, NRR – Three Mile Island Nuclear Station – Unit 1  
NRC Project Manager, NMSS/DUWP/RDB – Three Mile Island – Unit 2  
Director, Bureau of Radiation Protection - PA Department of Environmental Resources

**Attachment 1:**

**Three Mile Island Nuclear Station, Unit 1**

**Post-Shutdown Decommissioning Activities Report**



# POST-SHUTDOWN DECOMMISSIONING ACTIVITIES REPORT

Three Mile Island  
Nuclear Station, Unit 1

April 2019



**Three Mile Island Nuclear Station, Unit 1  
Post-Shutdown Decommissioning Activities Report**

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**ACRONYMS**

AIF	Atomic Industrial Forum
ALARA	As Low as Reasonably Achievable
BMP	Best Management Practices
CFR	Code of Federal Regulations
CWA	Clean Water Act
D&D	Decontamination and Dismantlement
DCE	Decommissioning Cost Estimate
DTF	Decommissioning Trust Fund
DOE	Department of Energy
EPA	Environmental Protection Agency
ER	Environmental Report
Exelon	Exelon Generation Company, LLC
FP	Fire Protection
FSAR	Final Safety Analysis Report
FSS	Final Status Survey
FWS	Fish and Wildlife Service
GEIS	Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities (NUREG-0586)
GPUN	GPU Nuclear, Inc.
GTCC	Greater than Class C
GW	Groundwater
HVAC	Heating Ventilating Air Conditioning
ISFSI	Independent Spent Fuel Storage Installation
LLRW	Low-Level Radioactive Waste
LTP	License Termination Plan
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MGD	Million Gallons per Day
MWt	Megawatt-thermal
NEI	Nuclear Energy Institute
NESP	National Environmental Studies Project
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission

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ODCM	Offsite Dose Calculation Manual
PADEP	Pennsylvania Department of Environmental Protection
PA SHPO	Pennsylvania State Historic Preservation Office
PSDAR	Post-Shutdown Decommissioning Activities Report
PWR	Pressurized Water Reactor
REMP	Radiological Environmental Monitoring Program
SEIS	Generic Environmental Impact Statement for License Renewal of Nuclear Plants (NUREG-1437), Supplement 37, "Regarding Three Mile Island Nuclear Station, Unit 1"
SFP	Spent Fuel Pool
SSCs	Structures, Systems and Components
TMI-1	Three Mile Island Nuclear Station, Unit-1
TMI-2	Three Mile Island Nuclear Station, Unit-2
TMINS	TMI Nuclear Station
UFSAR	Updated Final Safety Analysis Report
USACE	U.S. Army Corps of Engineers

**Three Mile Island Nuclear Station, Unit 1  
Post-Shutdown Decommissioning Activities Report**

## **1 INTRODUCTION AND SUMMARY**

### **1.1 INTRODUCTION**

In accordance with the requirements of Title 10 of the Code of Federal Regulations (CFR), Part 50, Section 50.82, "Termination of license," paragraph (a)(4)(i), this report constitutes the Post-Shutdown Decommissioning Activities Report (PSDAR) for the Three Mile Island Nuclear Station, Unit 1 (TMI-1). This PSDAR addresses the following:

1. A description of the planned decommissioning activities along with a schedule for their accomplishment.
2. A discussion that provides the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate previously issued environmental impact statements.
3. A summary of site-specific decommissioning cost estimate (DCE), including the projected cost of managing irradiated fuel and the post-decommissioning site restoration cost. The DCE is being submitted to the NRC under a separate cover letter (Reference 7).

The PSDAR has been developed consistent with Regulatory Guide 1.185, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report," (Reference 1). This report is based on currently available information and the plans discussed herein may be modified as additional information becomes available or conditions change. As required by 10 CFR 50.82(a)(7), Exelon Generation Company, LLC (Exelon) will notify the Nuclear Regulatory Commission (NRC) in writing, with copies sent to the State of Pennsylvania, before performing any decommissioning activity inconsistent with, or making any significant schedule change from, those actions and schedules described in the PSDAR, including changes that significantly increase the decommissioning cost. Additionally, to comply with its continuing obligation under 10 CFR 50.82(a)(6)(ii) to assure that any decommissioning activity that would result in significant environmental impacts would be previously reviewed by the NRC, Exelon will provide the NRC with updates of site-specific impact assessments after decommissioning activities that could cause such effects have been finally determined and scheduled.

### **1.2 BACKGROUND**

The Three Mile Island Nuclear Station (TMINS) is located in the Londonderry Township of Dauphin County approximately 10 miles southeast of Harrisburg, Pennsylvania. The TMINS site includes Three Mile Island Unit 1 (TMI-1) and Unit 2 (TMI-2), and encompasses approximately 440 acres including Three Mile Island and adjacent islands on the north end, a strip of land on the mainland along the eastern shore of the river, and the area on the eastern shore of Shelley Island that is within the exclusion area (a 2,000-foot radius from a point equidistant between the centers of the Reactor Buildings).

TMI-1 is a single unit Babcock & Wilcox Pressurized Water Reactor (PWR), owned and operated by Exelon. TMI-1 is licensed to generate 2568 megawatts-thermal (MWt). The current facility operating license for TMI-1 expires on April 19, 2034. TMI-1 structures are located on the northern most section of Three Mile Island. The Reactor Building (containment structure) is a steel-lined, reinforced-concrete structure in the shape of a cylinder and capped with a shallow dome. The cylindrical walls are prestressed with a post-tensioning tendon system in the vertical and

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horizontal directions. The dome roof is prestressed utilizing a three way post tensioning tendon system. The inside surface of the reactor building is lined with a carbon steel liner to ensure a high degree of leak tightness for containment. The principal structures of TMI-1 include the reactor building, turbine generator building, fuel handling building, the TMI-1 intake pump and screenhouse structure and the TMI-1 FLEX Storage Facility (formerly the TMI-2 intake pump and screenhouse structure), two natural draft cooling towers, circulating water pump houses, waste storage and handling buildings, the long-term steam generator storage building, desilting basins, and administrative buildings. The TMI-1 intake structure and submerged discharge pipe are located on the western side of the island. Exelon plans to construct an Independent Spent Fuel Storage Installation (ISFSI) in the south parking area for storage of spent fuel from TMI-1.

The TMINS site also includes a second unit (TMI-2) owned by FirstEnergy Corporation (FirstEnergy). TMI-2 has been shut down since the accident in 1979 and since 1993 has been in a SAFSTOR condition known as "post-defueling monitored storage" pending decommissioning at some future time (Reference 2). The TMI 230 kV switchyard and a small land parcel near the TMI-2 cooling towers along the eastern shoreline of Three Mile Island are also owned by FirstEnergy. The TMI-2 structures are intermingled with those of TMI-1; however, the decommissioning of TMI-2 and TMI-1 are independent actions and this PSDAR will only describe actions applicable to TMI-1.

A brief history of the major milestones related to TMI-1 construction and operational history is as follows:

- |                                       |                   |
|---------------------------------------|-------------------|
| • Construction Permit Issued:         | May 18, 1968      |
| • Full Term Operating License Issued: | April 19, 1974    |
| • Commercial Operation:               | September 2, 1974 |
| • Original License Expiration:        | April 19, 2014    |
| • Renewed License Expiration:         | April 19, 2034    |

By letter dated June 20, 2017 (Reference 3), Exelon provided formal notification to the NRC that it intended to permanently cease power operations of TMI-1 no later than September 30, 2019, in accordance with 10 CFR 50.82(a)(1)(i) and 10 CFR 50.4(b)(8). Upon docketing of the certifications required by CFR 50.82(a)(1)(i) and 10 CFR 50.82(a)(1)(ii), pursuant to 10 CFR 50.82(a)(2), the 10 CFR Part 50 license for TMI-1 will no longer authorize operation of the reactor or emplacement or retention of fuel in the reactor vessel.

Pursuant to 10 CFR 50.51(b), "Continuation of license," the license for a facility that has permanently ceased operations continues in effect beyond the expiration date to authorize ownership and possession of the utilization facility until the Commission notifies the licensee in writing that the license has been terminated.

During the period that the license remains in effect, 10 CFR 50.51(b) requires that the licensee:

- Take actions necessary to decommission and decontaminate the facility and continue to maintain the facility including storage, control, and maintenance of the spent fuel in a safe condition.
- Conduct activities in accordance with all other restrictions applicable to the facility in accordance with NRC regulations and the 10 CFR Part 50 facility license.

10 CFR 50.82(a)(9) states that all power reactor licensees must submit an application for termination of the license at least two years prior to the license termination date and that the



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application must be accompanied or preceded by a license termination plan to be submitted for NRC approval.

### **1.3 SUMMARY OF DECOMMISSIONING ALTERNATIVES**

The NRC has evaluated the environmental impacts of three general methods for decommissioning power reactor facilities in NUREG-0586, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Supplement 1, Regarding the Decommissioning of Nuclear Power Reactors" (GEIS) (Reference 4). The three general methods evaluated are summarized as follows:

- **DECON:** The equipment, structures and portions of the facility and site that contain radioactive contaminants are promptly removed or decontaminated to a level that permits termination of the license shortly after cessation of operations.
- **SAFSTOR:** After the plant is shut down and defueled, the facility is placed in a safe, stable condition and maintained in that state (safe storage). The facility is decontaminated and dismantled at the end of the storage period to levels that permit license termination. During SAFSTOR, a facility is left intact or may be partially dismantled, but the fuel is removed from the reactor vessel and radioactive liquids are drained from systems and components and then processed. Radioactive decay occurs during the SAFSTOR period, thereby lowering the level of contamination and radioactivity that must be disposed of during decontamination and dismantlement.
- **ENTOMB:** Radioactive structures, systems and components (SSCs) are encased in a structurally long-lived substance, such as concrete. The entombed structure is appropriately maintained, and continued surveillance is carried out until the radioactivity decays to a level that permits termination of the license.

The decommissioning approach that has been selected by Exelon for TMI-1 is the SAFSTOR method. The primary objectives of the TMI-1 decommissioning project are to remove the facility from service, reduce residual radioactivity to levels permitting unrestricted release, restore the site, perform this work safely, and complete the work in a cost-effective manner. The selection of a preferred decommissioning method is influenced by a number of factors at the time of plant shutdown. These factors include the cost of each decommissioning method, minimization of occupational radiation exposure, availability of a Department of Energy (DOE) high-level waste (spent fuel) repository or a consolidated interim storage facility, regulatory requirements, and public concerns. In addition, 10 CFR 50.82(a)(3) requires decommissioning to be completed within 60 years of permanent cessation of operations.

Currently, Exelon plans to store the spent fuel in the spent fuel pool (wet storage) until ISFSI construction is completed, which is scheduled to occur in 2021. Then, spent fuel will be transferred to the ISFSI for dry storage until it can be transported offsite. Finally, the facility will be decontaminated and dismantled to levels that allow unrestricted release of the property. In accordance with 10 CFR 50.82(a)(9), a license termination plan will be developed and submitted for NRC approval at least two years prior to termination of the license.

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The decommissioning approach for TMI-1 is described in the following sections.

- Section 2.0 describes the planned decommissioning activities and the general timing of their implementation.
- Section 3.0 describes the overall decommissioning schedule, including the spent fuel management activities.
- Section 4.0 provides an analysis of expected decommissioning costs, including the costs associated with spent fuel management and site restoration.
- Section 5.0 describes the basis for concluding that the environmental impacts associated with decommissioning TMI-1 are bounded by appropriate, previously issued environmental impact statements.
- Section 6.0 is a list of references.

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Post-Shutdown Decommissioning Activities Report**

**2 DESCRIPTION OF PLANNED DECOMMISSIONING ACTIVITIES**

Exelon is currently planning to decommission TMI-1 using a SAFSTOR method. SAFSTOR is broadly defined in Section 1.3 of this report. Use of the SAFSTOR method will require the management of spent fuel because of the DOE's failure to perform its spent fuel removal obligations under its contract with Exelon. To explain the basis for projecting the cost of managing spent nuclear fuel, a discussion of spent fuel management activities for the site is included herein.

The initial decommissioning activities to be performed after plant shutdown will entail preparing the plant for a period of safe-storage (also referred to as dormancy). This will entail de-fueling the reactor and transferring the fuel into the spent fuel pool, draining fluids from and de-energizing systems that are no longer required, reconfiguring the electrical distribution, ventilation, heating, and fire protection systems, and minor deconstruction activities. Systems temporarily needed for continued operation of the spent fuel pool may be reconfigured for operational efficiency.

During dormancy, TMI-1 will be staffed with personnel that will monitor, maintain and provide security for plant facilities and the ISFSI, once constructed. Staffing and configuration requirements are expected to change during the period of dormancy, principally dependent upon the status of on-site fuel storage, which can be characterized as follows:

- Wet storage in the spent fuel pool;
- Dry storage in the ISFSI; and
- No fuel on site.

Spent fuel will remain in the spent fuel pool until it meets the criteria for transfer to dry storage in the ISFSI. After all fuel has been transferred to the ISFSI, the pool and supporting systems will be drained and de-energized for the remainder of the dormancy period. The spent fuel will be stored in the ISFSI until it is transferred offsite to consolidated interim storage or a DOE repository.

Decontamination and dismantlement (D&D) activities will be scheduled to enable the license to be terminated within 60 years after permanent cessation of operations. Following completion of the D&D activities, the NRC license will be terminated, and site restoration will be performed to place the site in a condition acceptable for beneficial reuse.

The current decommissioning cost estimate assumes that remaining structures will be demolished to three-feet below grade and that the excavations will be backfilled with suitable material and erosion controls emplaced.

Decommissioning activities will be performed in accordance with written, reviewed, and approved site procedures. There are no identified or anticipated decommissioning activities that are unique to the TMI-1 site.

Compliance with applicable regulatory programs will be maintained throughout the decommissioning process to ensure the health and safety of workers, the public, and the environment. Radiological monitoring programs will be conducted in accordance with the facility's revised Technical Specifications, Facility Operating License, Updated Final Safety Analysis Report (UFSAR), Radiological Environmental Monitoring Program (REMP), and the Offsite Dose Calculation Manual (ODCM). Non-radiological environmental monitoring programs will be conducted in accordance with applicable regulatory requirements and permits.

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Tables 2.1 and 2.2 below provide summaries of the schedule / plant status and costs for decommissioning TMI-1. The major decommissioning activities and general sequence are discussed in more detail in the sections that follow.

**Table 2.1:  
Decommissioning Schedule and Plant Status Summary**

<b>Plant Status / Decommissioning Activities</b>	<b>Start</b>	<b>End</b>	<b>Approximate Duration (years)</b>
<b>Pre-Shutdown</b>			
Pre-Shutdown Planning	2017	Sep 2019	
<b>Preparations for Dormancy</b>			
Plant Shutdown / Defueling Outage	Sep 2019 <sup>[a]</sup>	Sep 2019	
Preparations for Dormancy	Sep 2019	Feb 2021	1.3
<b>Dormancy</b>			
Dormancy w/ Wet Fuel Storage	Feb 2021	Dec 2022	1.9
Dormancy w/ Dry Fuel Storage	Dec 2022	Sep 2034	11.7
Fuel Shipping	Sep 2034	Dec 2035	1.3
Dormancy w/ No Fuel	Dec 2035	Aug 2073	37.6
<b>Decommissioning Preparations</b>	Aug 2073	Feb 2075	1.5
<b>Decommissioning Operations</b>			
Large Component Removal	Feb 2075	Jun 2076	1.4
Plant Systems Removal and Building Decontamination	Jun 2076	Dec 2078	2.5
License Termination	Dec 2078	Sep 2079	0.8
<b>Total from Shutdown to Completion of License Termination</b>			<b>60</b>
<b>Site Restoration</b>	Sep 2079	Sep 2081	2.0

<sup>a</sup> TMI-1 will permanently cease operation no later than September 30, 2019.

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**Table 2.2:  
Decommissioning Cost Summary**  
(December 31, 2018, dollars – thousands)

<b>Decommissioning Periods</b>	<b>Radiological Decommissioning</b>	<b>Spent Fuel Management</b>	<b>Site Restoration</b>
<b>Pre-Shutdown</b>			
Pre-Shutdown Planning <sup>[a]</sup>	4,046	20,608	
<b>Preparations for Dormancy</b>			
Planning and Preparations	93,745	39,949	
<b>Dormancy</b>			
Dormancy w/ Wet Fuel Storage	72,886	38,251	
Dormancy w/ Dry Fuel Storage	77,761	41,418	
Fuel Shipping	8044	18,405	
Dormancy w/ No Fuel	213,912		
<b>Decommissioning Preparations</b>			
Site Reactivation	51,962		797
Preparations for D & D	37,563		1,046
<b>Decommissioning Operations</b>			
Large Component Removal	215,674		3,377
Plant Systems Removal and Building Decontamination	192,677		2,044
License Termination	33,021		
<b>Site Restoration</b>	261		78,882
<b>Total<sup>[b]</sup></b>	<b>1,001,552</b>	<b>158,631</b>	<b>86,146</b>

## 2.1 DISCUSSION OF DECOMMISSIONING ACTIVITIES

The following narrative describes the basic activities associated with decommissioning TMI-1. The site specific DCE, as further discussed in Section 4, is divided into phases or periods based upon major milestones within the project or significant changes in the annual projected expenditures. The following sub-sections correspond to the major decommissioning periods within the estimate.

<sup>a</sup> Costs represent projected spend in 2019 only.

<sup>b</sup> Columns may not add due to rounding

## **Three Mile Island Nuclear Station, Unit 1 Post-Shutdown Decommissioning Activities Report**

### **2.1.1 Preparations for Dormancy**

The NRC defines SAFSTOR as, "A method of decommissioning in which a nuclear facility is placed and maintained in a condition that allows the facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use." The facility is left intact (during the dormancy period), with most structures maintained in a stable condition; some outbuildings not related to power production will be removed. Systems that are not required to support the spent fuel, HVAC, Emergency Plan or site security are drained, de-energized, and secured. Some cleaning / removal of loose contamination and or fixation and sealing of remaining contamination is performed. Access to contaminated areas is maintained secure to provide controlled access for inspection and maintenance.

The process of placing the plant in safe-storage will include, but is not limited to, the following activities:

- Creation of an organizational structure to support the decommissioning plan and evolving emergency planning and site security requirements.
- Revision of technical specifications, plans, and operating procedures appropriate to the operating conditions and requirements.
- Characterization of the facility and major components as may be necessary to plan and prepare for the dormancy phase.
- Management of the spent fuel pool and reconfiguring fuel pool support systems so that draining and de-energizing may commence in other areas of the plant.
- Deactivation (de-energizing and or draining) of systems that are no longer required during the dormancy period.
- Processing and disposal of water and water filter and treatment media (resins) not required to support dormancy operation.
- Construction of the ISFSI and acquisition of the dry fuel storage casks for off-load of the spent fuel pool.
- Disposition of incidental waste that may be present and is ready to ship prior to the start of the dormancy period, such as excess tools and equipment and waste produced while deactivating systems and preparing the facility for dormancy.
- Reconfiguration of power, lighting, heating, ventilation, fire protection, and any other services needed to support long-term storage and periodic plant surveillance and maintenance.
- Stabilization by fixing or removing loose incidental surface contamination to facilitate future building access and plant maintenance. Decontamination of high-dose areas is not anticipated.
- Performance of interim radiation surveys of the plant, posting caution signs and establishing access requirements, where appropriate.
- Maintenance of appropriate barriers for contaminated and radiation areas.
- Reconfiguration of security boundaries and surveillance systems, as needed to support efficiency during the dormancy period.



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The following is a general discussion of the planned reconfiguration expected after plant shutdown.

### ***2.1.1.1 Electrical Systems***

The electrical systems will undergo a series of reconfigurations between shutdown and the time all spent fuel has been transferred to the ISFSI. The reconfigurations will be performed to reduce operating and maintenance expenses, while maintaining adequate power for station loads, and backup power for spent fuel pool-related systems and critical security equipment.

### ***2.1.1.2 Mechanical Systems***

Following shutdown, as applicable, fluid filled systems will be drained and abandoned, and resins removed based on an evaluation of system category, functionality, and plant configuration. The plant configuration and functionality of each system within the plant configuration as it evolves will determine when a system can be drained and abandoned.

### ***2.1.1.3 Ventilation and Heating Systems***

Ventilation will be reconfigured to support remaining systems and habitability. Fluid filled systems will either be drained or freeze protection installed, and the heating steam secured. The ventilation system will be reconfigured to maintain building temperature to support habitability and the functioning of Spent Fuel Pool Cooling systems, Fire Protection systems, Security systems, and Dry Fuel Storage systems as needed.

### ***2.1.1.4 Fire Protection Systems***

Fire Protection (FP) systems will be reconfigured based on a fire hazards analysis. The fire hazards analysis provides a comprehensive evaluation of the facility's fire hazards, the fire protection capability relative to the identified hazards, and the ability to protect spent fuel and other radioactive materials from potential fire induced releases. The fire hazards analysis will be reevaluated and revised as necessary to reflect the unique or different fire protection issues and strategies associated with decommissioning. It is expected that as the plant's systems are drained and the combustible loading footprint shrinks, the FP requirements will be reduced.

### ***2.1.1.5 Maintenance of Systems Critical to Decommissioning***

There are no mechanical systems that will be critical to the final decommissioning process. As such, mechanical systems will be abandoned after all spent fuel has been transferred to the ISFSI, with the exception of systems required to maintain habitability during dormancy. The site power distribution system will be abandoned with the possible exception of motor control centers that are required to support ventilation and lighting.

The organization responsible for the final dismantlement will be expected to establish temporary services, including electrical and cranes.

## **2.1.2 Dormancy**

Activities required during the early dormancy period while spent fuel is stored in the fuel pool will be substantially different than those activities required during dry fuel storage.

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Early activities include operating and maintaining the spent fuel pool and its associated systems, and transferring spent fuel from the pool to the ISFSI. Once the ISFSI is completed (estimated in late 2021), the spent fuel will be transferred from the spent fuel pool to the ISFSI. Spent fuel transfer to the ISFSI is expected to be complete in 2022. After all of the spent fuel is removed from the spent fuel pool, the spent fuel pool and supporting systems will be drained and de-energized for long-term storage.

Dormancy activities will include security, preventive and corrective maintenance on security systems, area lighting, general maintenance of buildings, freeze protection heating, ventilation of buildings for periodic habitability, routine radiological inspections of contaminated structures, maintenance of structural integrity, and a site environmental and radiation monitoring program.

A 24-hour/7-day per week security force will be present during the dormancy period. Security during the dormancy period will be conducted primarily to safeguard the spent fuel stored on site and prevent unauthorized entry. Security barriers, sensors, alarms, and other surveillance equipment will be maintained as required to provide security.

An environmental surveillance program will be carried out during the dormancy period to monitor for radioactive material in the environment. Appropriate procedures will be established and initiated for potential releases that exceed prescribed limits. The environmental surveillance program will consist of a version of the program in effect during normal plant operations that will be modified to reflect the plant's conditions and risks at the time.

During the dormancy period, additional activities will include transferring the spent fuel from the ISFSI to the DOE. For planning purposes, Exelon's Spent Fuel Management Plan as submitted in Reference 5 reflects the dates described in Table 2.1. It is acknowledged that the plant owner will seek the most expeditious means of removing fuel from the site when DOE commences performance. The ISFSI pad and associated facilities will be decommissioned along with the power block structures during the deferred decontamination and dismantlement phases.

### **2.1.3 Decommissioning Preparations**

Prior to the commencement of decommissioning operations, preparations will be undertaken to reactivate site services and prepare for decommissioning. Preparations include engineering and planning, a site characterization, and the assembly of a decommissioning management organization. This would likely include the development of work plans, specifications and procedures.

### **2.1.4 Decommissioning Operations (Decontamination and Dismantlement)**

Following the preparations for decommissioning, physical decommissioning activities will take place. This includes the removal and disposal of contaminated and activated components and structures, leading to the termination of the 10 CFR Part 50 operating license. Although much of the radioactivity will decrease during the dormancy period due to decay of  $^{60}\text{Co}$  and other short-lived radionuclides, the internal components of the reactor vessel will still exhibit radiation dose rates that will likely require remote sectioning under water due to the presence of long-lived radionuclides such as  $^{94}\text{Nb}$ ,  $^{59}\text{Ni}$ , and  $^{63}\text{Ni}$ . Portions of the biological shield wall may also be radioactive due to the presence of activated trace elements with longer half-lives (such as  $^{152}\text{Eu}$  and  $^{154}\text{Eu}$ ). It is assumed that radioactive contamination on SSC surfaces will not have decayed

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to levels that will permit unrestricted release. These surfaces will be surveyed, and items dispositioned in accordance with the license termination release criteria.

Significant decommissioning activities in this phase include:

- Reconfiguration and modification of site structures and facilities, as needed, to support decommissioning operations. Modifications may also be required to the reactor or other buildings to facilitate movement of equipment and materials, support the segmentation of the reactor vessel and reactor vessel internals, and for large component removal.
- Design and fabrication of temporary and longer-term shielding to support removal and transportation activities, construction of contamination control envelopes, and the procurement of specialty tooling.
- Procurement or leasing of shipping cask, cask liners, and industrial packages for the disposition of low-level radioactive waste.
- Disposition of legacy waste, including retired Steam Generators and Hot Leg piping.
- Decontamination of components and piping systems, as required, to control worker exposure to levels as low as reasonably achievable.
- Removal of piping and components no longer essential to support decommissioning operations.
- Removal of control rod drive housings and the head service structure from reactor vessel head. Segmentation of the vessel closure head.
- Removal and segmentation of the plenum assembly. Segmentation will maximize the loading of the shielded transport casks, i.e., by weight and activity. The segmentation operations will be conducted under water using remotely operated tooling and contamination controls.
- Disassembly and segmentation of the remaining reactor internals, including the core former and lower core support assembly. Some material is expected to exceed Class C disposal requirements. As such, the segments will be packaged in modified fuel storage canisters for future geologic disposal.
- Removal of the Reactor Vessel. If segmentation of the reactor vessel is necessary, a shielded platform will be installed for cutting operations, which will be performed using remotely operated equipment within a contamination control envelope.
- Removal of the activated portions of the concrete biological shield and accessible contaminated concrete surfaces. If dictated by the steam generator and pressurizer removal scenarios, those portions of the associated D-Rings (biological shield walls) necessary for access and component extraction will be removed.
- Removal of the steam generators and pressurizer for material recovery and controlled disposal. The steam generators will be moved to an on-site processing center and prepared for transport to the waste processor. It may be necessary to cut the steam generators in half, across the tube bundles, with the exposed ends capped and sealed to facilitate transport. It is expected that the pressurizer will be disposed of intact.
- Remediation and removal of the contaminated equipment and material from the auxiliary building and any other contaminated areas. Radiation and contamination controls will be

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utilized until residual levels indicate that the structures and equipment can be released for unrestricted access and conventional demolition. This activity may necessitate the dismantling and disposition of most of the systems and components (both clean and contaminated) located within these buildings. This activity facilitates surface decontamination and subsequent verification surveys required prior to obtaining release for demolition.

- Surface soil, sub-surface media and groundwater will meet the unrestricted use criteria in 10 CFR 20.1402.
- Underground piping (or similar items) and associated soil will be removed as necessary to meet license termination criteria.

At least two years prior to the anticipated date of license termination, a License Termination Plan (LTP) will be submitted to the NRC. That plan will include: a site characterization, description of the remaining dismantling / removal activities, plans for remediation of remaining radioactive materials, developed site-specific Derived Concentration Guideline Levels, methodology and criteria for the final status (radiation) survey (FSS), designation of the end use of the site, an updated cost estimate to complete the decommissioning, and associated environmental concerns.

The FSS plan will identify the radiological surveys to be performed once the decontamination activities are completed, and it will be developed using the guidance provided in the "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)." The MARSSIM "provides information on planning, conducting, evaluating, and documenting building and surface soil final status radiological surveys for demonstrating compliance with dose or risk-based regulations or standards." The MARSSIM uses the Data Quality Objective / Analysis processes tool for data collection activities and provides a basis for balancing decision uncertainty with available resources. This document incorporates statistical approaches to survey design and data evaluation. It also identifies commercially available instrumentation and procedures for conducting radiological surveys. Use of this guidance ensures that the surveys are conducted in a manner that provides a high degree of confidence that applicable NRC criteria are satisfied. Once the FSS is complete, the results will be submitted to the NRC, along with a request for termination of the NRC license.

Exelon may release unaffected portions of the site on a partial site release basis, as they become available, before all site decommissioning work has been completed.

### **2.1.5 Site Restoration**

After the NRC terminates the license, site restoration activities will be performed, at the licensee's discretion. Exelon currently assumes that remaining structures will be removed to a nominal depth of three feet below the surrounding grade level. Affected area(s) would then be backfilled with suitable fill materials, graded, and appropriate erosion controls established.

Non-contaminated concrete remaining after the demolition activities may be used for backfilling subsurface voids or may be transported to an offsite area for appropriate disposal as construction debris.

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## **2.2 GENERAL DECOMMISSIONING CONSIDERATIONS**

### **2.2.1 Major Decommissioning Activities**

As defined in 10 CFR 50.2, "definitions," a "major decommissioning activity" is "any activity that results in permanent removal of major radioactive components, permanently modifies the structure of the containment, or results in dismantling components for shipment containing greater than class C waste in accordance with § 61.55 of this chapter." The following discussion provides a summary of the major decommissioning activities currently planned for decommissioning TMI-1. These activities are envisioned to occur in the Dismantling and Decontamination Period. The schedule may be modified as conditions dictate.

Prior to starting a major decommissioning activity, the affected components will be surveyed and decontaminated, as required, in order to minimize worker exposure, and a plan will be developed for the activity. Shipping casks and other equipment necessary to conduct major decommissioning activities will be procured.

The initial major decommissioning activity inside the containment building will be the removal, packaging, and disposal of systems and components attached to the reactor, to provide access and allow it to be removed.

The reactor vessel internals will be removed from the reactor vessel and segmented, if necessary, for packaging, transport and disposal, or to separate greater than Class C (GTCC) waste. Internals classified as GTCC waste will be segmented and packaged into containers similar to spent fuel canisters for transfer to the DOE. Removal of the reactor vessel follows the removal of the reactor vessel internals. Industry experience indicates that there may be several options available for the removal and disposal of the reactor vessel (i.e., segmentation or disposal as an intact package). The viability of these options will be analyzed as a part of future planning and preparation activities. If the reactor vessel is segmented, it is likely that the work would be performed remotely using a contamination control envelope.

Other major decommissioning activities that would be conducted include the removal and disposal of the turbine, condenser, pressurizer, steam generators, reactor coolant piping, reactor coolant pumps and motors, spent fuel pool support equipment, and neutron activated / contaminated concrete or metals.

#### **Other Decommissioning Activities**

In addition to the reactor and large components discussed above, all other plant components will be removed from the Reactor, Auxiliary, Intermediate, Turbine, and associated support buildings (including the long-term steam generator storage building), radiologically surveyed and dispositioned appropriately.

### **2.2.2 Decontamination and Dismantlement Activities**

The overall objective of D&D is to ensure that radioactively contaminated or activated materials will be removed from the site to allow the site to be released for unrestricted use. This is achieved in part by radioactive decay during the SAFSTOR period which will significantly reduce the quantity of radioactive material that must be disposed of during decontamination and



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dismantlement. The disposition of remaining radioactive materials will be accomplished by the decontamination and / or dismantlement of contaminated structures. This may be accomplished by decontamination in place, off-site processing of the materials, or direct disposal of the materials as radioactive waste. A combination of these methods may be utilized. The methods chosen will be those deemed most appropriate for the particular circumstances.

Low-level radioactive waste (LLRW) will be managed in accordance with approved procedures and commercial disposal facility requirements. This includes characterizing contaminated materials, packaging, transporting and disposal at a licensed LLRW disposal facility.

### **2.2.3 Radioactive Waste Management**

A major component of the decommissioning work scope for TMI-1 is the packaging, transportation and disposing of primarily contaminated / activated equipment, piping, concrete, and in some cases soil. A waste management plan will be developed to incorporate the most cost-effective disposal strategy, consistent with regulatory requirements and disposal / processing options for each waste type at the time of the D&D activities. Decommissioning wastes from TMI-1 may be disposed of at the Waste Control Specialists, LLC facility in Andrews, Texas and the EnergySolutions, Inc. facility in Clive, Utah. If other licensed disposal facilities become available in the future, Exelon may elect to use them. Radioactive wastes from TMI-1 will be transported by licensed transporters. The waste management plan will be based on the evaluation of available methods and strategies for processing, packaging, and transporting radioactive waste in conjunction with the available disposal facility options and associated waste acceptance criteria.

### **2.2.4 Removal of Mixed Wastes**

If mixed wastes are generated, they will be managed in accordance with applicable Federal and State regulations, and transported by authorized licensed waste transporters to authorized licensed waste management facilities. If technology, resources, and approved processes are available, these processes will be evaluated to render the mixed waste non-hazardous.

### **2.2.5 Site Characterization**

During the decommissioning process, site characterization will be performed in which radiological, regulated, and hazardous wastes will be identified, categorized, and quantified. Surveys will be conducted to establish hazardous and radioactive material contamination levels and radiation levels throughout the site. This information will be used in developing procedures, surveys and sampling plans to ensure that hazardous, regulated, and radiologically contaminated areas are remediated and to ensure that worker exposure is controlled. As decontamination and dismantlement work proceeds, radiological surveys will be conducted to maintain a current site characterization and to ensure that decommissioning activities are adjusted accordingly.

As part of the site characterization process, a neutron activation analysis calculation study of the reactor internals and the reactor vessel will be performed. Using the results of this analysis (along with benchmarking surveys), neutron irradiated components will be classified (projected for the future D&D time-frame) in accordance with 10 CFR Part 61, "Licensing requirements for land disposal of radioactive waste." The results of the analysis form the basis of the plans for removal, segmentation, packaging and disposal.



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**2.2.6 Groundwater Protection and Radiological Decommissioning Records Program**

A groundwater (GW) protection program currently exists at TMI-1 in accordance with the Nuclear Energy Institute (NEI) Technical Report 07-07, "Industry Groundwater Protection Initiative - Final Guidance Document" (Reference 6). This program is directed by procedures and will continue during decommissioning.

Exelon will also continue to maintain the existing radiological decommissioning records program required by 10 CFR 50.75(g). The program is directed by procedures.

Neither the monitoring results of the groundwater protection program nor events noted in 10 CFR 50.75(g) reports indicate the presence of long-lived radionuclides in concentrations sufficient to preclude unrestricted release under 10 CFR 20.1402, "Radiological criteria for unrestricted use."

**2.2.7 Changes to Management and Staffing**

Throughout the decommissioning process, plant management and staffing levels will be adjusted to reflect the ongoing transition of the site organization. Staffing levels and qualifications of personnel used to monitor and maintain the plant during the various periods after plant shutdown will be subject to appropriate Technical Specification and Emergency Plan requirements. These staffing levels do not include contractor staffing which may be used to carry out future fuel movements, plant modifications in preparation for SAFSTOR, and the D&D / license termination / site restoration work. Contractors may also be used to provide general services, staff augmentation or replace permanent staff. The monitoring and maintenance staff will be comprised of radiation protection, radiological environmental monitoring program, plant engineering and craft workers as appropriate for the anticipated work activities.

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**3 SCHEDULE OF PLANNED DECOMMISSIONING ACTIVITIES**

Exelon intends to pursue the decommissioning of TMI-1 utilizing a SAFSTOR methodology and will make appropriate filings with the NRC to obtain authority prior to beginning radiological decommissioning. The SAFSTOR method involves removal of radioactively contaminated or activated material from the site following an extended period of dormancy. Work activities associated with the planning and preparation period began before the plant was permanently shut down and continues into 2019. The schedule of spent fuel management and major decommissioning activities is provided in Table 2.1. Additional detail is provided in the site-specific DCE (Reference 7). Dates in the site-specific DCE are based on a September 2019, shutdown date. The schedule accounts for spent fuel being stored in the ISFSI until the assumed date of transfer to the DOE.

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**4 ESTIMATE OF EXPECTED DECOMMISSIONING AND SPENT FUEL MANAGEMENT COSTS**

10 CFR 50.82(a)(4)(i) requires the submission of a PSDAR prior to or within two years following permanent cessation of operations that contains a site-specific DCE, including the projected cost of managing irradiated (also called spent) fuel.

Exelon has prepared a DCE for TMI-1, which provides the site-specific projected costs of radiological decommissioning, managing spent fuel, and site restoration; each category accounted for separately. This DCE was submitted to the NRC on April 5, 2019 (Reference 7) and constitutes the TMI-1 site-specific DCE. This DCE fulfills the requirements of 10 CFR 50.82(a)(4)(i) and 10 CFR 50.82(a)(8)(iii) for a site-specific DCE for TMI-1. Section 4.1 describes the projected expenditures in the DCE to produce Table 2.2.

The methodology used to develop the site-specific DCE follows the basic approach originally advanced by the Atomic Industrial Forum (AIF) in its program to develop a standardized model for DCEs. The results of this program were published as AIF/NESP-036, "A Guideline for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," (Reference 8). The AIF document presents a unit cost factor method for estimating direct activity costs, simplifying the estimating process. The unit cost factors used in the study reflect the latest available data, at the time of the study, concerning worker productivity during decommissioning.

Under NRC regulations (10 CFR 50.82(a)(8)), a licensee must provide reasonable assurance that funds will be available (or "financial assurance") for decommissioning (i.e., radiological decommissioning) costs. The regulations also describe the acceptable methods a licensee can use to demonstrate financial assurance. Most licensees do this by funding a nuclear decommissioning trust fund (DTF).

Exelon maintains two separate trusts for this purpose, a tax qualified fund (Qualified Trust) and a non-tax qualified fund (Non-Qualified Trust). The trustee for both funds is Northern Trust Bank. As of December 31, 2018, the DTF has a total balance of \$669,617,000 (Reference 9). The adequacy of these funds to cover all radiological decommissioning costs shown in Table 2.2 is demonstrated in Reference 7.

The 10 CFR 50.75(c) minimum formula amount for TMI-1 as of December 31, 2018 is \$493,028,000 (Reference 9). As indicated in Table 2.2, the estimated cost of radiological decommissioning at TMI-1 is \$1,001,552,000. In accordance with Regulatory Guide 1.185 (Reference 1), the site-specific DCE (Reference 7) exceeds the minimum formula amount.

10 CFR 50.82(a)(6)(iii) states that, "Licensees shall not perform any decommissioning activities," as defined in 10 CFR 50.2 that, "Result in there no longer being reasonable assurance that adequate funds will be available for decommissioning." Exelon does not intend to perform any decommissioning activities that would jeopardize the availability of adequate funds for the completion of decommissioning.

10 CFR 50.82(a)(8)(iv) states that, "For decommissioning activities that delay completion of decommissioning by including a period of storage or surveillance, the licensee shall provide a means of adjusting cost estimates and associated funding levels over the storage or surveillance period." Section 4.2 details how Exelon will meet this requirement.

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### **4.1 COST ESTIMATE ADJUSTMENTS**

Table 2.2 reflects the projected expenditures required for decommissioning TMI-1 from the DCE (Reference 7) escalated to December 31, 2018 dollars. The updated projected costs for radiological decommissioning, spent fuel management, and site restoration (non-radiological decommissioning) efforts are separately reflected in Table 2.2. Items to note relative to the costs are:

- (1) The DCE (Reference 7) is in June 2018 dollars. The costs reflected in Table 2.2 have been escalated to December 31, 2018, dollars. The escalation was determined using a forecasted average annual escalation rate of 2.8638% (based on the most recent data at the time of this submittal). This rate was calculated using the Employment Cost Index Total Compensation Private Industry Workers United States (NAICS).
- (2) Projected radiological decommissioning planning costs and spent fuel management costs incurred in 2019 prior to permanent shutdown are included in Table 2.2 under "Pre-Shutdown Planning." Decommissioning Planning costs for prior years, associated with radiological decommissioning planning performed by a dedicated site organization, are not reflected in Table 2.2.

### **4.2 MEANS OF ADJUSTING COST ESTIMATES AND ASSOCIATED FUNDING LEVELS**

During the SAFSTOR period, the site-specific DCE will be periodically updated in compliance with Exelon procedures and applicable regulatory requirements.

In accordance with 10 CFR 50.82(a)(8)(v), decommissioning funding assurance will be reviewed and reported to the NRC annually during the SAFSTOR period. The latest site specific DCE adjusted for inflation, in accordance with applicable regulatory requirements, will be used to demonstrate funding assurance. In addition, actual radiological and spent fuel management expenses will be included in the annual report in accordance with the applicable regulatory requirements.

If the funding assurance demonstration shows the DTF is not sufficient, then an alternate funding mechanism allowed by 10 CFR 50.75(e) and the guidance provided in Regulatory Guide 1.159 (Reference 10) (applicable revision at the time) will be put in place.

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**5 ENVIRONMENTAL IMPACTS**

To support the PSDAR environmental impacts review, the environmental effects of decommissioning activities planned for TMI-1, as currently understood, were evaluated to determine if potential environmental impacts are bounded by previously issued environmental impact statements (Reference 11). NRC regulation 10 CFR 50.82(a)(4)(i) requires that the PSDAR include "... a discussion that provides the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate previously issued environmental impact statements." To determine if the estimated potential environmental impacts associated with TMI-1 decommissioning activities are bounded, the potential environmental impacts were compared to those evaluated in:

- NUREG-0586, Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1, Regarding the Decommissioning of Nuclear Power Reactors (Reference 4) (Referred to as the Decommissioning GEIS or GEIS)
- NUREG-1496, Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities (Reference 12)
- Atomic Energy Commission, Final Environmental Statement Related to the Operation of Three Mile Island Nuclear Station, Units 1 and 2 (Reference 13) (Referred to as the FES)
- NUREG-0112, Final Supplement to the FES Related to the Operation of Three Mile Island Nuclear Station, Unit 2 (Reference 14) (Referred to as the Final Supplement to the FES)
- NUREG-1437, Revision 1, Generic Environmental Impact Statement for License Renewal of Nuclear Plants (Reference 15)
- NUREG-1437, Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 37, Regarding Three Mile Island Nuclear Station, Unit 1 (Reference 16) (Referred to as the SEIS)

As required, site-specific impact assessments were conducted for threatened and endangered species and environmental justice. Site-specific assessments were also performed for aquatic ecology, terrestrial ecology, and cultural and historic resources for decommissioning activities beyond the "operational area," as that term is defined in the Decommissioning GEIS (Reference 4). For the purpose of assessing decommissioning environmental impacts, the operational area at TMI-1 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. Excavation of fill within the site boundaries on Three Mile Island could potentially take place outside of the operational area.

The levels of significance assigned to site-specific environmental impacts are classified as small, moderate, or large, as defined in the Decommissioning GEIS (Reference 4).

TMI-1's decommissioning plans are consistent with the methods assumed by NRC in the Decommissioning GEIS. No unique site-specific features or unique aspects of the planned

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decommissioning have been identified. Also, Exelon has concluded that the environmental impacts associated with planned TMI-1 decommissioning activities are either bounded by the impacts addressed by previously issued environmental impact statements or are expected, based on site specific reviews, to be small. In the latter cases, after decommissioning plans mature and before decommissioning activities occur that could be potentially impactful to the environmental resource or would be otherwise inconsistent with those actions or activities described in the PSDAR, Exelon will notify the NRC in writing and seek appropriate environmental review in accordance with applicable NRC regulations.

### **5.1 ENVIRONMENTAL IMPACT OF TMI-1 DECOMMISSIONING**

The following is a summary of the reasons for reaching the conclusions that the environmental impacts of decommissioning TMI-1 are (1) bounded by the Decommissioning GEIS or (2) site-specific, small, and bounded by other previously issued environmental impact statements, or (3) expected to be site-specific and small, and Exelon will notify the NRC in writing and seek appropriate environmental review in accordance with applicable NRC regulations before decommissioning activities occur that could be potentially impactful to the environmental resource. Each environmental resource evaluated in the GEIS is addressed. As a general matter, TMI-1 has lower generating capacity than the 1,000-MW reference pressurized water reactor (PWR) used in the GEIS to generically evaluate the environmental impacts of decommissioning, and its decommissioning impacts are therefore bounded by those assessments. Further, no unique site-specific environmental features or unique aspects of the planned decommissioning activities have been identified.

#### **5.1.1 Onsite / Offsite Land Use**

In Section 4.3.1 of the GEIS, the NRC generically determined land use impacts to be small for facilities having land-use changes only within the site boundary. For decommissioning that involves land use changes beyond the site boundary, the GEIS concluded that impacts could not be predicted generically and must be evaluated on a site-specific basis.

No offsite land is expected to be needed to support TMI-1 decommissioning. Onsite land is expected to be sufficient for decommissioning activities (e.g., laydown, staging, handling, temporary storage, processing, packaging, and shipping of waste and materials, personnel processing, and parking). Site restoration activities include backfill of excavations. The fill needed will be obtained from material (e.g., crushed concrete) resulting from onsite demolition. If additional fill is needed, it could be excavated from onsite or, if more appropriate or practical, fill could also be purchased. The Pennsylvania Department of Environmental Protection (PADEP) regulates fill and has established criteria for clean and regulated fill and permitting requirements for beneficial reuse of regulated fill under its municipal and residual waste regulations (25 Pa. Code § 287.2 or 271.2). Exelon will comply with state regulations regarding the use of fill materials and will obtain permits as needed.

Exelon has determined that onsite land to be used to support decommissioning at TMI-1 has been previously disturbed and decommissioning activities at TMI-1 would not result in changes in onsite land use patterns. After the site is released for unrestricted use, the land could continue as industrial use or be available for other nonindustrial uses. Exelon concludes that anticipated onsite land use impacts are bounded by the GEIS.



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### **5.1.2 Water Use**

The GEIS observes that quantities of water required during decommissioning are trivial compared to those used when a plant is operating. The GEIS mentions construction dust abatement and decontamination (flushing systems or pressure-washing components) as typical decommissioning water uses. NRC asserted in Section 4.3.2 of the GEIS that potential impacts of decommissioning on water use at all plants are neither detectable nor destabilizing and made the generic conclusion that impacts in all cases are small.

TMI-1 obtains surface water from the center channel of the Susquehanna River for circulating water and service water cooling and discharges to the same channel downstream from the intake structure. Onsite groundwater wells supply water for domestic water consumption, cooling water makeup, and other industrial uses.

Exelon expects to reduce Susquehanna River water and groundwater withdrawals substantially following plant shutdown. Upon plant shutdown, the discharge of waste heat via the cooling towers or to the Susquehanna River will end, which will eliminate most evaporative losses resulting from station operation. Water consumption will be further reduced when it is no longer necessary to provide secondary cooling for the spent fuel pool. The spent fuel pool will be used until all the spent fuel is moved into dry storage. TMI-1's industrial groundwater use is associated with evaporation from the plant's industrial cooler water system and makeup to the spent fuel pool. Industrial groundwater use will be phased out early in the SAFSTOR dormancy period.

Because Exelon expects water use during TMI-1 decommissioning to be much lower than water use during operational years, which is consistent with the statements made in the GEIS, and because there is nothing about TMI-1's design, location, configuration, operating history, or decommissioning plans that would alter or contradict this generic conclusion, Exelon concludes that decommissioning water use impacts for TMI-1 are bounded by the analysis in the GEIS.

### **5.1.3 Water Quality**

Decommissioning activities with potential for impacting surface water quality include fuel removal, stabilization, large component removal, decontamination and dismantlement, and structure dismantlement. Stormwater runoff and accidental releases (spills) are the most likely sources of pollutants entering surface waters during decommissioning. The GEIS asserts that regulatory programs applicable to permitted substance releases plus the application of Best Management Practices (BMPs) for controlling stormwater runoff and erosion will render any change in surface water quality from decommissioning activities nondetectable and non-destabilizing. With respect to groundwater, the GEIS noted that demolishing concrete structures and storing rubble on site could result in changes (higher alkalinity) in local water chemistry, but the non-radiological effects of such changes on water quality would be non-detectable offsite at all nuclear power plants. Furthermore, Subtitle D of the Resource Conservation and Recovery Act would apply to concentrated subsurface placement of demolition debris, which would limit water quality effects from using rubble and soil as fill material.

During TMI-1 decommissioning, compliance with permits and adherence to erosion and sediment controls, soil stabilization practices, structural practices, and pollution prevention measures would ensure that water quality impacts from decommissioning are small and temporary. Any land-disturbing activities would be of relatively short duration, permitted and overseen by responsible

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regulatory agencies, and guided by PADEP-approved Erosion and Sediment Control BMPs. Exelon will continue to comply with applicable regulations which require reporting of hazardous material spills. All reasonable precautions will be taken to prevent or mitigate spills of hazardous materials. Exelon will comply with PADEP regulations regarding fill and obtain waste permits as needed. Groundwater movement at TMI Nuclear Station (TMINS) is into the Susquehanna River. Groundwater at the station is prevented from migrating beneath the river to the mainland by the opposing flow of groundwater from higher land to either side of the river. If any localized alteration in the groundwater chemistry associated with the use of crushed concrete as clean fill were to occur, it would not impact offsite groundwater quality.

Demolition of TMI-1 structures and buildings and related earth-moving work (digging, grading, filling) has at least a limited potential to result in erosion and sedimentation that could affect water quality, but these kinds of construction activities routinely take place around operating nuclear power plants and are subject to the provisions of state-issued permits. Cofferdams with dewatering systems would be used to isolate the shoreline area and facilitate removal of the reinforced concrete intake structures. BMPs would be employed to limit erosion while these structures are being demolished/removed. After the two intake structures have been removed, measures would be employed to prevent erosion. The existing riprap at the shoreline of the north end of the island that serves to mitigate erosion would be left in place.

In Section 4.3.3 in the GEIS, NRC concluded generically that for all facilities, decommissioning impacts to surface and groundwater quality would be small. Because there is nothing about TMI-1's design, location, configuration, operating history, or decommissioning plans that would alter or contradict this generic conclusion and Exelon would comply with regulatory and permit requirements to protect surface water and groundwater resources, Exelon has determined that impacts of decommissioning on water quality would be small and bounded by the analysis in the GEIS.

### **5.1.4 Air Quality**

The GEIS identified decommissioning activities that may affect air quality, including worker transportation to and from the site, dismantling of systems and removal of equipment, movement and open storage of material onsite, demolition of buildings and structures, shipment of material and debris to offsite locations, and operation of concrete batch plants. NRC considered the potential for adverse impacts from these activities, the greatest of which would be fugitive dust, for the range of decommissioning plants and generically determined air quality impacts to be small.

During TMI-1 decommissioning, reasonable and appropriate control measures such as wetting of soil piles, covering loads and staging areas, and seeding of bare areas would be implemented to control fugitive dust so that emissions do not extend offsite in compliance with PADEP regulations (25 Pa Code §123.2). PADEP requires general permits and permit conditions for portable engines and portable crushers and grinders under 25 Pa. Code §127.514, 127.611 and 127.631. Permits governing air emissions from the decommissioning activities and equipment would be obtained as required, and as needed, Exelon will maintain existing air permits for equipment that will continue to be used during TMI-1 decommissioning. The exhaust from commuting and shipping vehicles could affect air quality somewhat, but it is unlikely that air quality would be degraded sufficiently to be noticeable beyond the immediate vicinity of State Highway 441.

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Demolition of the TMI-1 cooling towers would involve the use of explosives. The GEIS considered the use of explosives and stated in Section O.1.3 that control measures would be implemented during demolition to keep releases, including those associated with fugitive dust, within regulatory limits regardless of the methods used during demolition. PADEP also regulates use of explosives (25 Pa. Code Chapter 211), requiring their use to be designed to minimize hazards of noxious gas generation and flyrock (i.e., flying debris) as well as damages from ground vibration and airblast (i.e., airborne vibration energy). The necessary explosive use permit would be obtained and explosive use requirements and demolition industry BMPs would be implemented.

In Section 4.3.4 in the GEIS, NRC concluded that the impacts of decommissioning on air quality would be neither detectable nor destabilizing and that current and commonly used mitigation measures should be sufficient. Because (1) the air quality impacts from decommissioning activities at TMI-1 are expected to be temporary, localized, and small in magnitude, (2) reasonable and appropriate control measures would be employed, (3) the appropriate permits would be obtained, and (4) there is nothing about TMI-1's design, location, configuration, operating history, or decommissioning plans that would alter or contradict the generic conclusion in Section 4.3.4 of the GEIS, Exelon concludes that air quality impacts from TMI-1 decommissioning activities are bounded by the analysis in the GEIS.

### **5.1.5 Aquatic Ecology**

Aquatic resources may be directly or indirectly impacted by decommissioning activities. Direct impacts to aquatic communities may result from shoreline or in-water construction or from dredging. Indirect impacts may result from construction-related erosion and stormwater runoff. These impacts are typically undetectable (or barely discernible) and do not destabilize any important attributes of the resources. The GEIS determined that such decommissioning activities within the operational areas of nuclear power plants, including removal of shoreline or in-water structures, would have only minor impacts on aquatic communities, provided all appropriate BMPs are employed. Therefore, the GEIS concluded generically that aquatic impacts from decommissioning activities within a defined operational area would be small. However, the GEIS noted that if disturbance beyond the operational area is anticipated, potential impacts must be determined through site-specific analysis.

The aquatic resource of chief concern for decommissioning at TMI-1 is Lake Frederic, an impounded section of the Susquehanna River downstream of Middletown, Pennsylvania. The impoundment provides storage capacity for the York Haven Hydroelectric Project and is also the source of cooling water for TMI-1.

Biologists under contract to Metropolitan Edison, General Public Utilities Corporation, and Exelon conducted studies of Lake Frederic's aquatic communities over four distinct periods: (1) before TMI-1 and TMI-2 began operating (1970-1973), (2) during peak operation with one or two reactors in service (1974-1979), (3) the period when both reactors were shut down, following the TMI-2 accident (1980-1985), and (4) following restart of TMI-1 (1986-1990). Differences in distribution and abundance of benthic organisms and fish between years were attributed to fluctuations in environmental variables (e.g., river flow and water temperature) rather than TMI-1 operations. Taken as a whole, the studies show that the Susquehanna River in the vicinity of Three Mile Island supports a healthy benthic macroinvertebrate community and a diverse assemblage of cool water and warm water fishes. There is no indication that pollution-tolerant species or groups predominate in Lake Frederic, or that sensitive or pollution-intolerant species have been excluded

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by TMI-1 operation.

The Decommissioning GEIS identified structure dismantlement as an activity that had potential for adversely affecting aquatic communities. Direct impacts are possible from shoreline or in-water construction or from dredging. Indirect impacts may result from construction-related erosion and stormwater runoff. These impacts are typically undetectable (or barely discernible) and do not destabilize any important attributes of the resources. The GEIS concluded generically that such decommissioning activities within the operational areas of nuclear power plants, including removal of shoreline or in-water structures, would have only minor impacts on aquatic communities, provided all appropriate BMPs are employed. Therefore, the GEIS concluded that aquatic impacts from decommissioning activities would be small.

The Final Supplement to the FES considered the effects of site preparation and construction on aquatic biota in the vicinity of TMINS. The NRC staff compared biological sampling data upstream and downstream of the intake-discharge area and found no major differences in parameters measured that could be causally related to construction activities. The staff concluded that construction impacts were temporary and localized to the intake-discharge area and did not result in any irreversible adverse impacts to the local or river-wide ecosystem. Impacts associated with decommissioning are expected to be similar and bounded by those experienced during the initial construction.

Exelon has determined that it may be necessary to obtain fill from outside of the operational area but within the boundaries of the TMINS. In a discussion of controls employed to limit construction impacts, the original FES noted that borrow pits were sited and engineered to ensure that eroded soil was carried toward the pit rather than toward the river. A similar strategy would be employed by Exelon during decommissioning should it be necessary to mine fill dirt from outside of the operational area. This should reduce the potential for impacts to aquatic biota from obtaining fill dirt from areas outside of the operational area. The ground disturbance would be governed by local and state NDPES regulations to minimize runoff and sedimentation to protect surface water resources as discussed in Section 5.1.3. If the excavation of fill dirt could impact wetlands or other water resources, 25 Pa. Code Chapter 105, Dam Safety and Waterway Management, as well as the Clean Water Act (CWA) Section 404 permit requirements would apply. Given that these activities outside the operational area would be conducted in compliance with applicable regulations to protect surface water quality, impacts to aquatic communities would be small.

In conclusion, Exelon has determined that impacts of TMI-1 decommissioning on aquatic resources, including those outside of the operational area, would be small. Hence, Exelon concludes that such impacts are bounded by the analysis in the GEIS when they occur within the operational area. Impacts associated with activities outside the operational area would be similar to those experienced during construction of the station and are bounded by the analyses in the FES and Final Supplement to the FES.

### **5.1.6 Terrestrial Ecology**

Section 4.3.6 of the GEIS maintains that “(f)or facilities where habitat disturbance is limited to operational areas, the impacts on terrestrial ecology (i.e., plant and animal communities) are not detectable or destabilizing,” primarily because most vegetation and wildlife habitat in the operational area was removed during plant construction, which causes the terrestrial habitat to be of low quality during plant operation and decommissioning (Reference 4 ). NRC staff concluded



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that, “for such facilities ... potential impacts to terrestrial ecology are small” and no further mitigation measures are warranted. Site-specific analysis is only required of licensees when decommissioning activities are likely to occur outside of the operational area, or if protected species are inhabiting portions of the operational area at the time of decommissioning (see Section 5.1.7).

Terrestrial habitats in the vicinity of TMI-1 are described in the site-specific environmental assessments listed in Section 5.0, the 2005 Wildlife Habitat Council's Site Assessment and Wildlife Management Opportunities Report (Reference 21), and the more recent Three Mile Island Wildlife Management Plan (Reference 22). Before station construction, much of Three Mile Island (approximately 270 acres of high, level ground) was leased to a farmer who cultivated corn and tomatoes. Low-lying areas along the river were, depending on elevation and frequency of flooding, occupied by either bottomland hardwood forest or stream terrace hardwood forest. All farming on the island ceased in 1968 when construction work began on TMINS.

Approximately 200 acres of natural habitat remain on the island, mostly on its southern half. The Wildlife Management Plan describes three primary habitats in the southern half of the island: wetland, grassland, and forest land. Wetlands include forested riparian (“fringe”) wetlands along the river's edge, former borrow pits (dug during construction) that now have the appearance and function of natural wetlands, and seasonal/ephemeral wetlands. Grasslands and meadows are found in the southern half of the island in some of the areas where crops were once cultivated. Three forest community types are present: bottomland hardwoods, stream terrace hardwoods, and black locust forest. The mix of upland and wetland habitats that developed over a period of 40 years now provide important habitats for an array of amphibians, reptiles, small and large mammals, songbirds, wading birds, and waterfowl.

As noted earlier in this section, NRC staff concluded in the Decommissioning GEIS that when decommissioning activities are limited to operational areas impacts to terrestrial resources are expected to be small. Site-specific analysis is only required of licensees when decommissioning activities are likely to occur outside of the operational area.

Exelon has determined that it may be necessary to obtain fill from outside of the operational area but within the boundaries of the TMINS. Should this be necessary, every effort would be made to obtain fill from previously disturbed areas and avoid high-value habitats (wetlands, mature hardwood stands, grasslands). Earth-moving and digging activities associated with excavation of fill outside of the operational area could have both direct impacts (some smaller, less-mobile amphibians and reptiles could be crushed by equipment or buried by fill dirt) and indirect impacts (noise from heavy equipment could disturb birds and larger mammals in the vicinity). With several pieces of equipment operating simultaneously, noise levels can be relatively high at locations within several hundred feet of active construction sites. But construction noise attenuates rapidly over relatively short distances, particularly if dense vegetation is present. Based on noise levels known to elicit a startle response in wildlife (> 75 dBA), the zone of disturbance generally extends only 400-800 feet from a construction site. Any disturbance associated with excavating fill material would be temporary, measured in days or weeks or months rather than years, and would have no lasting impact on any ecologically important species. Excavation of fill and restoration activities would, to the extent practicable, be scheduled so as to minimize impacts to nesting birds in compliance with the Migratory Bird Treaty Act.

The FES and the Final Supplement to the FES summarized impacts of construction of station

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facilities on terrestrial communities. Impacts included permanent loss of native vegetation (wildlife habitat) and noise-related disturbance of wildlife. Impacts associated with excavating fill from outside the operational area to support the decommissioning activities would be similar to those observed during construction of the station and described in the FES (and Supplement) but less severe, because the area disturbed would be much smaller.

In the Decommissioning GEIS, the NRC concluded that impacts from decommissioning on terrestrial resources are small provided these activities take place within the operational area, which is assumed to have minimal value as wildlife habitat. Outside of a grassy (mowed) field and adjacent patch of woods between the North Access Road and northern end of the island and another small woodlot southeast of the TMI-2 cooling towers, the TMI-1 operational area contains very little wildlife habitat. This field and the patches of woods provide habitat for small mammals and songbirds that can tolerate relatively high levels of human activity and noise and are sometimes collectively referred to as “backyard wildlife.” Most of the operational area is occupied by industrial facilities (buildings and cooling towers) and gravel-covered parking lots and equipment storage areas. Exelon has conducted a site-specific analysis of impacts of obtaining fill from outside the operational area and determined impacts to terrestrial resources would be negligible, provided sensitive habitats are avoided and construction BMPs are employed. Impacts associated with activities outside the operational area would be similar to those experienced during construction of the station and are bounded by the analyses in the FES and the Final Supplement to the FES. Therefore, Exelon concludes that impacts of TMI-1 decommissioning on terrestrial resources are small and bounded by the GEIS and previous TMINS environmental impact statements.

### **5.1.7 Threatened and Endangered Species**

The GEIS lists stabilization, large component removal, decontamination and dismantlement (removal of contaminated soil), and structure dismantlement as activities with potential to impact threatened and endangered species. The GEIS did not make a generic determination on the impact of decommissioning on threatened and endangered species but noted that impacts to these species are expected to be minor and non-detectable when activities are confined to the site operational area. Impacts are to be determined on a site-specific basis, paying particular attention to activities outside of the developed operational area. Noise and dust generation from construction activity and increased truck traffic, rather than direct impacts such as habitat destruction, are the primary concerns.

Exelon has compiled a list of special-status species that have been documented on or near (in the case of some aquatic plants discovered in Susquehanna River shoals) Three Mile Island (see Table 5.1) based on a review of pertinent environmental impact statements; surveys conducted in support of NRC and Federal Energy Regulatory Commission (for the York Haven Hydroelectric Project) licensing actions; evaluations prepared by biologists employed by the Wildlife Habitat Council, which provided recommendations on managing Three Mile Island’s natural areas; and less formal monitoring conducted by TMI-1 Environmental Department personnel and employees involved in natural resources management. In every case, the species’ regulatory status was confirmed or updated through early 2018 by checking the website of the agency responsible for its protection (Pennsylvania Department of Conservation and Natural Resources for plants, Pennsylvania Game Commission for birds) and the Pennsylvania Natural Heritage Program website, which serves as a clearinghouse for all state agencies tasked with protecting rare and



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sensitive species.

**Table 5.1:  
Protected Species Documented in the Three Mile Island Vicinity Through Early 2018**

Scientific Name	Common Name	Federal Status	State Status
<b>Plants</b>			
<i>Boltonia asteroides</i>	Aster-like boltonia	NL	PE
<i>Eleocharis compressa</i>	Flat-stemmed spike rush	NL	PE
<i>Ellisia nyctelea</i>	Ellissia	NL	PT
<b>Birds</b>			
<i>Falco peregrinus</i>	Peregrine falcon	NL	PE
<i>Haliaeetus leucocephalus</i>	Bald eagle	NL*	NL
<i>Nyctanassa violacea</i>	Yellow-crowned night heron	NL	PE
<i>Nycticorax nycticorax</i>	Black-crowned night heron	NL	PE

NL=not listed; PE=Pennsylvania Endangered; PT=Pennsylvania Threatened \*Bald and Golden Eagle Protection Act

With respect to conservation efforts at TMINS, three species are particularly noteworthy: bald eagle, peregrine falcon, and osprey.

Bald eagles first nested on Three Mile Island in 2010 but were seen foraging in the area for two or three decades prior to this date. Bald eagles were delisted by the USFWS in 2007 (Federal Register Volume 72, No. 130, July 9, 2007) and were subsequently delisted by the Commonwealth of Pennsylvania in 2014 (44 Pa.B. 1429, March 15, 2014). Although no longer listed under the Endangered Species Act, they are fully protected under another federal statute, The Bald and Golden Eagle Protection Act. There are two active bald eagle nests on Three Mile Island, one in the wooded area at the northern end of the operational area, north of the North Access Road, and one in a forested area south of the operational area. Both nests have been active for several years, notwithstanding their proximity to a busy, noisy industrial facility. The north nest is exposed to noise from commuting workers' vehicles that peaks during shift changes as well as noise from delivery/service vehicles. The south nest is adjacent to the South Access Road, which is used infrequently by TMI-1 employees but is exposed to high levels of noise and activity during refueling outages, when the South Access Road is used by visiting outage workers for 3-4 weeks. Given that bald eagles have nested successfully on Three Mile Island since 2010 in spite of relatively high levels of disturbance (road noise, night lighting, PA system) associated with both normal plant operations and refueling outages, there is no reason to believe that a similar level of disturbance during decommissioning would prevent eagles from nesting or from rearing and fledging young.

Peregrine falcons first nested on the roof of the TMI-1 reactor building in 2002 and have produced two or three offspring annually since. Attempts to lure the nesting pair to other locations have been unsuccessful. Peregrine falcons are known to exhibit a high degree of nest fidelity, returning to the same breeding territory and nest location year after year. Should peregrine falcons (several generations of falcons) continue to nest on the TMI-1 Reactor Building and be at risk because the schedule for demolishing the building coincides with the falcon nesting season, Exelon would consult peregrine falcon experts to determine if there is a feasible way to prevent the falcons from

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nesting on the structure without harming them.

Ospreys have nested on the TMI-1 met tower since 2005. They also nest on two platforms erected on the south end of the island. Ospreys were delisted by the Commonwealth of Pennsylvania in 2017 (47 Pa.B. 1467, March 11, 2017). They continue to be protected by the Pennsylvania Game and Wildlife Code (Title 34, Pennsylvania Consolidated Statutes), like all raptors in the Commonwealth, but are not afforded the same level of protection as listed (threatened or endangered) species.

No aquatic species listed by the Commonwealth of Pennsylvania or the USFWS (or proposed for listing by the USFWS) has been observed or collected in Lake Frederic and there is no protected or critical habitat present. Therefore, none of the decommissioning activities should affect a protected aquatic species. Exelon will consult with state and federal resource agencies before major decommissioning activities commence to ensure that no listed aquatic species has been discovered in the intervening years and that no species previously documented in Lake Frederic has, in the intervening years, been afforded state or federal protection.

Decommissioning activities with greatest potential for directly and indirectly affecting terrestrial plant and animal communities are those scheduled for late phases, when major reactor structures are to be demolished and the TMI-1 cooling towers are to be taken down using explosives. As discussed in Section 5.1.1, land within the operational area is sufficient to provide space for laydown yards, equipment or materials storage, temporary offices, and other decommissioning support areas or structures. Current parking facilities have been adequate to support refueling and maintenance outages over the years and are assumed to be adequate to support decommissioning. Because there is ample open space to support TMI-1 decommissioning operations, there would be no reason to clear any land outside of the operational area. Therefore, there would be no direct impacts to the habitat of any threatened or endangered species. Excluding the mining of fill dirt, all decommissioning activities will be confined to the operational area, which does contain a large (approximately 14-acre) field (met tower area) and two small (4- and 8-acre) patches of woods, but these habitats are adjacent to roads and facilities, thus exposed to a constant level of noise and human activity.

Demolition of TMI-1 powerblock structures and cooling towers appears more likely to disturb wildlife, including nesting eagles and peregrine falcons. Demolition of buildings and structures will likely involve large cranes, excavators, pneumatic drills, concrete and rebar saws and other extremely noisy equipment. These demolition and dismantlement activities are likely to take weeks or months. Although birds and small mammals on Three Mile Island have apparently become accustomed to traffic noise, diesel generator startup noise, PA system noise, and an array of other industrial noises, they are not routinely exposed to noise from the heavy equipment used in demolition work. Taking down the cooling towers with explosives would appear to be less of a concern, because animals would be exposed to elevated sound and pressure levels for a very brief period, perhaps seconds. The cleanup of cooling tower rubble is expected to create more of a disturbance than the implosion/explosion.

All of the activities expected to generate high noise levels will take place in areas well removed from the highest-quality wildlife habitat on the island, the grasslands, wetlands, and forests in the southern portion of the island. The TMI-1 Reactor Building is 0.75-1.0 mile from the closest of these habitats. As noted in Section 5.1.6, the zone of disturbance generally extends only 400-800 feet from a construction site. The northern eagle nest is approximately 1,000 feet from the closest

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structure that will be demolished, the northern-most TMI-1 cooling tower. Exelon will consult with appropriate state and federal resource agencies when a decision is reached on timing and method of cooling tower removal to ensure that agency concerns are addressed.

All decommissioning activities at TMI-1 (with the possible exception of mining fill material) will take place within the site operational area, which was disturbed during construction of the facility and contains only isolated patches of wildlife habitat. The potential impacts of mining fill material outside of the operational area on (non-protected) terrestrial resources were considered in depth in Section 5.1.6 and could, depending on the site chosen, include (1) removal of vegetation, (2) displacement and/or elimination of smaller, less-mobile animals, and (3) noise or activity-related disturbance of birds and larger mammals. Based on current information regarding known occurrences of special-status species, no federally listed species would be affected by this activity. Any of the four state-listed birds known to occur in the Three Mile Island vicinity (see Table 5.1) could be disturbed by excavation work but would be expected to simply move away from the sources of disturbance (workers, vehicles, earth-moving equipment).

NRC has determined that potential impacts of decommissioning on threatened and endangered species must be evaluated on a site-specific basis. Exelon has determined that none of the planned decommissioning activities at TMI-1 would eliminate or degrade the natural habitat of any state or federally-listed species. The TMI-1 reactor building, which has been used by nesting peregrine falcons since 2002, would be razed, however. Any indirect (disturbance-related) impacts from construction noise and human activity would be localized, of short duration, and ecologically insignificant. Birds and mammals that are intolerant of noise and human activity are expected to simply avoid (or move away from) noisy construction sites. Exelon therefore concludes that adverse impacts to threatened and endangered species from TMI-1 decommissioning activities would be small.

Based on the site-specific findings summarized in this section, Exelon concludes that TMI-1 decommissioning activities are unlikely to adversely affect any threatened or endangered species and will have no effect on any designated critical habitat. However, in the future, when TMI-1 decommissioning activities, such as demolition or disturbance of land areas that could affect a protected species have been finally determined and scheduled, Exelon will update the site-specific assessment of environmental impacts to protected species in the PSDAR. To comply with its continuing obligation under 10 CFR 50.82(a)(6) to assure that no decommissioning activity that would result in significant environmental impacts would be performed without NRC review, the results of the assessment would be provided to the NRC in accordance with applicable NRC regulations.

### **5.1.8 Radiological**

The GEIS considered radiological doses to workers and members of the public when evaluating the potential consequences of decommissioning activities and concludes that radiological impacts of decommissioning activities are small.

#### **5.1.8.1 Occupational Dose**

One conclusion of Section 4.3.8.3 of the GEIS is that, based on decommissioning experience, occupational dose during decommissioning is similar to or lower than that observed during routine operations at the same or comparable facilities. Therefore, Exelon evaluated TMI-1 operational

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dose data and compared it to that of other PWRs and established that TMI-1 operating collective dose is typical of U.S. PWRs. Furthermore, Exelon calculated occupational collective dose expected during the decommissioning period using methodology from NUREG/CR-5884, *Revised Analyses of Decommissioning for the Reference Pressurized Water Reactor Power Station* (Reference 17). The calculated decommissioning collective dose was lower than that reported in NUREG/CR-5884 for the reference PWR. Thus, TMI-1 decommissioning occupational dose is expected to be within the range of doses presented in the GEIS. There are no unique characteristics at TMI-1 that would invalidate this conclusion.

Exelon selected a deferred decommissioning strategy (SAFSTOR), ensuring that most exposure scenarios will result in lower occupational doses than those during operations due to the fact that the plant has been defueled and a period of radioactive decay has reduced the radiological inventory. The TMI-1 As Low as Reasonably Achievable (or ALARA) program and regulatory limits on dose will remain in effect during decommissioning.

### **5.1.8.2 Public Dose**

Section 4.3.8 in the GEIS states that radionuclide emissions in gaseous and liquid effluents are reduced in facilities undergoing decommissioning. Given that TMI-1 public doses during operations were well within the NRC-established public dose limits, it is reasonable to expect that public doses during decommissioning would also be well within such limits. Annual reports of environmental monitoring at TMI-1 for the years from 2013 through 2017 demonstrate that radioactivity levels in the offsite environment are not measurably increasing, and controls on potential radiological releases will continue to be applied during decommissioning.

### **5.1.8.3 Conclusion**

Exelon concludes that radiological impacts of TMI-1 decommissioning are small for the following reasons:

- The GEIS generic evaluation of radiological impacts applies to a typical PWR. Both occupational dose and public dose from normal TMI-1 operations are like those of other PWR plants, indicating that TMI-1 doses are typical.
- The TMI-1 collective worker dose estimate for the decommissioning periods is lower than that predicted by NUREG/CR-5884.
- Deferred or delayed decommissioning allows for radionuclides to decay over time, resulting in less dose at the time of decommissioning.
- Public doses during TMI-1 operations have been well within the NRC-established public dose limits and are reasonably expected to decrease during decommissioning.

Therefore, Exelon further concludes that the radiological impacts of TMI-1 decommissioning are bounded by the analysis in the GEIS.

### **5.1.9 Radiological Accidents**

Section 4.3.9 in the GEIS examined a range of radiological accidents hypothetically possible during the decommissioning period. These included anticipated operational occurrences, non-nuclear fuel-related accidents, and nuclear fuel-related accidents. NRC determined that many of

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these accidents had been previously analyzed in environmental reviews for the operation of the plant. The GEIS concludes that impacts of radiological accidents of all types applicable to decommissioning activities are small.

Given their potential to result in offsite doses, the GEIS considered spent fuel accidents of most concern for decommissioning. Once in dry cask storage, however, spent fuel management is no longer within the scope of decommissioning environmental review because NRC evaluated the environmental impacts of continued spent fuel storage for all nuclear power plants in NUREG-2157, *Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel* (Reference 18). Consequently, the only accidents of importance to offsite doses during decommissioning are those involving spent nuclear fuel in the spent fuel pool. Spent fuel pool accidents would no longer be applicable after the spent fuel is moved to dry cask storage. The most significant of the spent fuel accidents, in terms of consequences and probability, involves spent fuel pool drainage leading to a zirconium fire. However, NRC, in both NUREG-2157 and the GEIS, determined that the risk of a zirconium fire is very low (but, should it occur, the consequences could be high).

Spent nuclear fuel at TMI-1 will, at a minimum, remain in the spent fuel pool for as long as is required for cooling before being moved to dry storage. During that time, a zirconium fire accident in the spent fuel pool may be possible (but very improbable). The Updated Final Safety Analysis Report (UFSAR) describes the abnormal operational transients and design basis accident (DBA) scenarios that are applicable during plant operations. Exelon has concluded that most of the accident scenarios postulated in the UFSAR will no longer apply after TMI-1 is in the permanently defueled condition (Reference 19).

The UFSAR accidents that will remain applicable to TMI-1 in its permanently shutdown and defueled condition are the fuel handling accident in the spent fuel pool, cask drop accident in the spent fuel pool, and the waste gas tank rupture accident. The UFSAR concludes that the doses associated with these accidents would be within the limits specified in 10 CFR Part 100. Exelon will respond to events at TMI-1 in the reduced spectrum of credible accidents in the permanently defueled condition and retain the ability to promptly implement the spent fuel pool mitigation actions.

Exelon concludes that radiological accident impacts of decommissioning activities at TMI-1 would be small and are thus bounded by the analysis in the GEIS because (1) a zirconium fire accident is very improbable during the time that spent fuel will remain in the spent fuel pool after permanent shutdown, and (2) Exelon knows of no unique features or conditions at TMI-1 that would lead to a conclusion concerning radiological accidents different than that reached in the GEIS.

### **5.1.10 Occupational Issues**

Section 4.3.10 of the GEIS concluded that impacts due to occupational issues would be small for all plants based on strict adherence to Occupational Safety and Health Administration (OSHA) safety standards, practices, and procedures.

TMI-1 decommissioning will be conducted under a comprehensive non-radiological safety and health program meeting OSHA, NRC, and Exelon procedural requirements. Exelon facilities have lower rates of injuries and illness than the national average for electrical utilities, and historically, the nuclear power industry has lower rates of injuries and illnesses than other industries.



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Demolition of the TMI-1 cooling towers would involve the use of explosives. NRC considered the use of explosives during decommissioning and specifically mentioned the hazards of fugitive dust and noise levels from blasting in Sections O.1.3 and O.1.14 of the GEIS. As discussed in Section 5.1.4, PADEP regulates the use of explosives, requiring their use be designed to minimize hazards to workers and the public. Blasting activities would take place under the control of licensed personnel and the blasting activities would be subject to state issued permits that ensure the activity can be conducted safely. OSHA regulations for worker protection would also ensure that the appropriate worker protection programs such as a respiratory protection plan and hearing protection plan were in place.

The TMI-1 site-specific decommissioning plan poses no unique hazards from what was evaluated in the GEIS. Accordingly, Exelon concludes that anticipated impacts resulting from non-radiological occupational issues during TMI-1 decommissioning are small and thus bounded by the analysis in the GEIS.

### **5.1.11 Cost**

A site-specific decommissioning cost estimate is summarized in Section 4.0 and has been provided to the NRC in Reference 7.

### **5.1.12 Socioeconomics**

The GEIS evaluated changes in workforce and population, changes in local tax revenues, and changes in public services for decommissioning. NRC considered the decreases in workforce and tax payments related to the cessation of operations outside the scope of decommissioning. The GEIS concluded that socioeconomic impacts are neither detectable nor destabilizing and that mitigation measures are not warranted.

As TMI-1 ceases operation and transitions through the phases of decommissioning, an overall decrease in plant workforce and tax payments will occur. The changes during decommissioning would primarily impact Dauphin and Lancaster counties where the majority (66 percent) of the plant workforce resides and Lower Dauphin County School District, Dauphin County, and Londonderry Township which receive approximately 69, 27, and 4 percent of TMI-1's property tax payments, respectively. The largest station workforce reduction (during decommissioning) would result in a 0.2 percent decrease in Dauphin County's population and a 0.1 percent decrease in Lancaster County's population. TMI-1 is not a major source of tax revenue for state and local government. Plant property tax payments during operation have been approximately 2 to 3 percent of Lower Dauphin County School District's total property tax revenue and less than 1 percent of Dauphin County's and Londonderry Township's. Compared with the existing property tax base, the anticipated decrease in tax revenues (TMI-1 property taxes) as a result of decommissioning is likely to be small.

Based on the findings summarized above, Exelon concludes that impacts to socioeconomic resources from TMI-1 decommissioning would be small and thus bounded by the analysis in the GEIS.

### **5.1.13 Environmental Justice**

Section 4.3.13 of the GEIS determined environmental justice to be an environmental impact area



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for which no generic conclusion could be determined due to its site-specific nature. Therefore, the GEIS indicates that site-specific assessments for each decommissioning nuclear power plant must be prepared.

Exelon prepared a site-specific assessment of environmental justice as it relates to the effects of TMI-1 decommissioning. Exelon examined the geographic distribution of minority and low-income populations within a 50-mile radius of the TMI-1 site using the 2012-2016 American Community Survey 5-year estimates. Census block groups containing minority populations were identified and were concentrated in the larger metropolitan areas of Harrisburg, Reading, Lancaster, Lebanon, and York. The nearest minority population blocks are located southeast of Harrisburg, about 5-6 miles northwest of TMI-1. Census block groups containing low-income populations were concentrated in the cities of Harrisburg, Reading, Lancaster, and York. The nearest low-income populations are located southeast of Harrisburg, about 5-6 miles northwest of TMI-1.

Exelon determined that decommissioning impacts to all resource areas would be small, indicating that the effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. Because no member of the public will be substantially affected, there can be no disproportionately high and adverse impact or effects on minority and low-income populations resulting from the decommissioning of TMI-1. Based on these site-specific findings, Exelon concludes that the impacts of decommissioning TMI-1 on minority and low-income populations are small. Even so, after decommissioning plans mature and before decommissioning activities occur that could be potentially impactful to minority and low-income populations or would be otherwise inconsistent with those actions or activities described in the PSDAR, Exelon will notify the NRC in writing and seek appropriate environmental review in accordance with applicable NRC regulations.

### **5.1.14 Cultural, Historical, and Archaeological Resources**

Section 4.3.14 of the GEIS determined that potential effects of decommissioning on cultural, historical and archaeological resources would be small for all plants when the decommissioning activities are confined to the operational area. However, impacts outside the operational area “must be determined through site-specific analysis.” Exelon anticipates that decommissioning activities will take place within the TMI-1 operational area, except for the possible excavation of fill from onsite areas outside of the operational area to backfill the foundations of buildings and structures after demolition.

Exelon conducted a review of available information including data on locations of inventoried resources from plant documentation and Pennsylvania State Historic Preservation Office (PA SHPO) about cultural, historical, and archaeological resources for the TMI-1 site and an approximately 6-mile radius. Currently, no historic properties, including prehistoric and historic archaeological sites, above-ground historic structures or traditional cultural properties eligible for listing or listed on the National Register of Historic Places (NRHP) lie within the TMI-1 operational area. However, in 2016 the PA SHPO determined that one archaeological site on Three Mile Island outside of the TMI-1 operational area is eligible for the NRHP. The site is at the south end of the island near the South Access Road, which is within the TMINS boundaries. Beyond Three Mile Island within the 6-mile radius, there are 13 properties currently listed on the NRHP and 32 NRHP-eligible properties. One property, a section of the Pennsylvania Railroad Main Line linear historic district, lies 0.4 miles away from TMI-1 and the remaining properties are more than 1 mile away. One archaeological site within the TMI-1 operational area is believed to remain intact. The

### **Three Mile Island Nuclear Station, Unit 1 Post-Shutdown Decommissioning Activities Report**

site is north of the access road at the northern end of the operational area. The PA SHPO categorizes its eligibility for listing on the NRHP as undetermined due to insufficient information, presumably due to uncertainty about its current condition. Six archaeological sites (including the 2016 NRHP-eligible site) are located on the central and southern portions of Three Mile Island outside the TMI-1 operational area but within the TMINS boundaries. One site is immediately south of the operational area, in an area used for staging and soil borrowing during construction of the station and was likely removed during those activities. The PA SHPO has determined one site is not eligible for listing and considers three sites unevaluated due to insufficient information.

Exelon developed a map assessing the archaeological potential of the entirety of Three Mile Island. The map depicts much of the island as either disturbed due to construction of the station or as having low potential due to distance from river channels and reduced likelihood of deep, Holocene epoch alluvial deposits. The perimeter of the island, including the northern end within the TMI-1 operational area where one site is located, and the southern end, where four sites occur, has high archaeological potential. Away from the shoreline, the southern end of the island has moderate archaeological potential, including areas adjoining the TMI-1 operational area along the South Access Road.

In 2009, Exelon developed a Cultural Resources Protection Plan and an Archaeological Resources Erosion Monitoring Plan. These plans provide protocols for ensuring continued stewardship of cultural resources on Three Mile Island during the final operational years of TMI-1 and into the post-operational SAFSTOR period. Exelon 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. Moreover, Exelon maintains site-specific policies and procedures to address unanticipated discoveries of cultural resources. Should an unanticipated discovery be made during decommissioning of TMI-1, Exelon would implement its procedures to address the discovery.

The GEIS determined that impacts on cultural, historic, and archaeological resources from decommissioning activities within operational areas would be small. Decommissioning activities taking place within the previously disturbed TMI-1 operational area will not impact cultural resources now listed in or determined eligible for the NRHP. Also, in accordance with the Cultural Resources Protection Plan, Exelon intends to avoid ground disturbances during decommissioning in the area of high archaeological sensitivity at the northern end of the operational area (north of the access road) and to follow corporate procedures to protect cultural resources that may be inadvertently discovered during decommissioning.

Use of explosives for demolition of the natural draft cooling towers will be in accordance with applicable PADEP regulations (25 Pa. Code § 211) and BMPs and will seek to minimize the generation of fugitive dust, avoiding possible adverse effects to historic properties. The PADEP regulations for use of explosives also limit peak particle velocities to minimize ground vibration that could damage structures. The regulatory limit is set to prevent cosmetic damage to plaster walls and thus would also avoid major cracking of interior walls, foundation damage, or other structural damage. By designing the demolition by implosion to yield peak particle velocities below regulatory limits, vibrations associated with the explosions and controlled collapse of the towers are not expected to adversely affect currently identified historic properties.

In Section 4.3.14.2 of the GEIS, NRC noted the potential for the nuclear facility itself to be potentially eligible for inclusion in the NRHP, especially if it is older than 50 years and represents

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a significant historic or engineering achievement. TMI-1 was completed and began energy production in 1974 and will reach 50 years of age during the SAFSTOR period. TMI-1 is a typical mid-twentieth century light water reactor. The design, engineering processes, and construction of TMI-1 are unexceptional and lacking any major engineering innovations. The engineering drawings from the station will be archived by Exelon records management until decommissioning is complete.

No Historic American Buildings Survey/Historic American Engineering Record documentation of TMI-1 has been prepared to date, and although it is well known that the plant is destined for decommissioning, there has been no request from the PA SHPO or other agencies to do so. If Exelon becomes aware of a previously unidentified proposal for mitigation of a historic resource at the TMI-1 site due consideration will be given to the proposal at that time.

PA SHPO evaluated the possible NRHP eligibility of the island as the site of the accident-damaged TMI-2 in 1983 but at that time determined that the island was not NRHP-eligible. As of 2018, the PA SHPO is not known to be actively reconsidering this issue. TMI-2 is owned by FirstEnergy Corporation and since 1993 has been in a SAFSTOR condition known as “post-defueling monitored storage” pending decommissioning at some future time. The TMI-2 structures are intermingled with those of TMI-1; however, the decommissioning of TMI-2 and TMI-1 are independent actions.

Exelon contacted the PA SHPO in January 2019 requesting input from the SHPO regarding concerns that should be considered in preparation of this PSDAR. The PA SHPO responded that based on the information provided, the decommissioning project would have no effect on historic properties or on archaeological resources. These letters are attached to this PSDAR.

Prior to excavating fill outside of the operational area, Exelon will evaluate the area's archaeological sensitivity, and implement its protocols discussed earlier for ensuring continued stewardship of cultural resources on Three Mile Island. Should an unanticipated discovery be made, Exelon procedures to address the discovery would be implemented. This same approach to ensure that impacts are avoided through implementation of protocols including site investigations and consultation with the PA SHPO as needed formed the basis of NRC's assessment of refurbishment activities in the license renewal SEIS (Reference 16). Consistent with the NRC's conclusion of small impacts in the SEIS, Exelon concludes that impacts to cultural and historical resources from decommissioning activities outside the operational area but within the TMINS boundaries would be small.

Based on the findings discussed above, Exelon concludes that impacts of TMI-1 decommissioning to cultural, historical, and archaeological resources, including those from possible excavation of fill material within the TMINS boundaries but outside of the operational area, are small and thus bounded by the analyses in previously issued environmental impact statements.

### **5.1.15 Aesthetic Issues**

In Section 4.3.15 of the GEIS, the NRC singles out structure dismantlement and entombment as the only activities that may have impacts on aesthetic resources. The aesthetic impacts of decommissioning fall into two categories: (a) impacts, such as noise, associated with decommissioning activities that are temporary and cease when decommissioning is complete and

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(b) the changed appearance of the site when decommissioning is complete. NRC drew the generic conclusion that for all plants, the potential impacts from decommissioning on aesthetics are small and that the removal of structures is generally considered beneficial to the aesthetics of the site.

During TMI-1 decommissioning, the impact of noise and dust would be temporary and controlled to minimize impacts. The appearance of TMI-1 will be altered as the buildings and structures are dismantled. There are clear views of the plant from the Susquehanna River and of the taller structures from the mainland. The visual intrusion during dismantlement would be temporary and would serve to reduce the aesthetic impact of the site. Therefore, Exelon concludes that the impacts of TMI-1 decommissioning on aesthetics are small and generally considered beneficial. Thus, such impacts are bounded by the analysis in the GEIS.

### **5.1.16 Noise**

Section 4.3.16 of the GEIS generically examined noise during decommissioning, concluding that noise impacts would be small.

Decommissioning activities would be comparable to the initial construction of the plant. Section 4.3 of the operations phase Environmental Report (ER) for TMI-1 (Reference 20) characterizes the construction activity as normal sounds from heavy equipment and the work accompanying a large construction project. The ER notes that the remote location of the site minimizes the effect of noise on the public.

NRC also considered the higher noise levels of demolition methods including use of pneumatic drills or explosives and concluded that environmental effects may be minimized by proper scheduling due to the short duration and isolated use of such methods. The consideration of these higher noise activities in Section O.1.4 of the GEIS did not alter NRC's conclusion that it is unlikely that the noise associated with most decommissioning activities will be of sufficient strength to be environmentally detectable or to destabilize the environment. In addition, PADEP has established regulatory limits for airblast (i.e., audible and in-audible airborne vibration energy) from the use of explosives, requires a PADEP-issued permit for blasting, and requires that blasting activities take place under the control of licensed personnel.

Decommissioning activities will be primarily limited to previously disturbed land surrounding the power block and isolated from both wildlife and members of the public. The noise levels associated with the decommissioning activities are not expected to be any more severe than during the initial construction of the station or refueling outages and are not expected to present an audible intrusion on the surrounding community and environment. Higher noise levels may occur during the demolition of the cooling towers, but that activity will be limited in duration.

Therefore, because TMI-1 decommissioning activities are of the type previously considered by NRC and TMI-1 has no site-specific conditions that would alter the NRC's prior findings, Exelon concludes that the noise impacts from decommissioning activities would be small and thus bounded by the analysis in the GEIS.

### **5.1.17 Transportation**

In Section 4.3.17 of the GEIS, NRC states that its "...regulations are adequate to protect the public



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against unreasonable risk from the transportation of radioactive materials.” Therefore, the effects of transportation of radioactive waste on public health and safety are considered to be neither detectable nor destabilizing. Exelon will comply with NRC and Department of Transportation regulations for shipments of radioactive waste from TMI-1 decommissioning.

The GEIS analyzes radiological shipments of waste from decommissioning and calculates incident-free doses and latent cancer fatalities to crew, the public along the route, and onlookers. The GEIS also calculates the collective dose for radiological accidents during transportation. The calculated impacts are closely related to the distance shipped, volumes shipped, and activity levels. The estimated volumes of radioactive waste associated with TMI-1 decommissioning are summarized in Table 5.2 using waste types from the GEIS and waste volumes from the TMI decommissioning cost estimate (References 4 and 7, respectively).

**Table 5.2:  
Estimated Radioactive Waste Associated with TMI-1 Decommissioning**

<b>Waste Type</b>	<b>Volume (ft<sup>3</sup>)</b>
High-activity waste	
Class B and C	1,770
Class A	28,152
Low-activity waste (Class A)	3,373
Very low-activity waste (Class A)	316,251

Exelon considered a bounding scenario in which the Class A wastes are shipped to the EnergySolutions disposal site in Utah and Class B and C wastes are shipped to the Waste Control Specialists Facility in Texas. All wastes were assumed to be shipped via truck. Transportation impacts would be reduced to the extent waste is shipped to the disposal site via rail.

For the following reasons, if radiological impacts alone are considered, the conclusions in the GEIS would bound the impacts of transportation of radioactive waste from TMI-1 decommissioning. The TMI-1 waste shipments would travel shorter distances than were analyzed in the GEIS. For TMI-1, the volumes would be lower for both high-activity and low-activity waste than the waste volumes NRC considered in the GEIS analysis. In the GEIS evaluation, the low-activity waste shipments were assumed to exhibit lower external dose rates (i.e., one-tenth of regulatory limits) and for very low-activity waste are sufficiently small that the activity may be neglected in evaluating the radiological impacts of transportation. Very low-activity waste is expected to comprise 90 percent of the overall TMI-1 waste volume and would have negligible radiological impacts.

Section 4.3.17 of the GEIS recognizes non-radiological impacts of transportation to include increased traffic, wear and tear on area roadways, and increased traffic accidents from both radiological and non-radiological transport, including that for hazardous waste. NRC concluded that transporting materials to and from a decommissioning site would not significantly impact the overall traffic volume or compromise the safety of the public. TMI-1's waste shipments are not expected to be large enough in number to have a detectable or destabilizing effect on traffic flow or road wear. The number of workers during the decommissioning phases is expected to be considerably less than the current onsite workforce and well below the temporary workers during

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refueling outages. Consequently, challenges to the existing transportation infrastructure are not expected. Furthermore, the combination of radioactive shipments, non-radioactive shipments, and other transportation will occur over an extended time and will not result in significant changes to public safety or the transportation infrastructure.

The GEIS concludes that both non-radiological and radiological impacts of decommissioning transportation are small. No unique features or site-specific conditions are present at TMI-1 that would alter these NRC prior findings. Therefore, Exelon concludes that transportation impacts of TMI-1 decommissioning are small and thus bounded by the analysis in the GEIS.

### **5.1.18 Irreversible and Irretrievable Commitment of Resources**

Section 4.3.18 of the GEIS generically concluded that the impacts of decommissioning on irreversible and irretrievable commitments of resources are small. Given that TMI-1 would be decommissioned to radiological standards for unrestricted release, the land will be available for other uses. Furthermore, the materials and fuel consumed during TMI-1 decommissioning would be minor. The decommissioning of TMI-1 would generate radioactive waste and non-radiological waste requiring land disposal. Land devoted to radioactive waste disposal sites or industrial landfills was not within the scope of the GEIS because such commitments are addressed in the licensing documents for the disposal sites. Therefore, Exelon concludes that the impacts of TMI-1 decommissioning on irreversible and irretrievable commitments of resources would be small and thus bounded by the analysis in the GEIS.

## **5.2 ENVIRONMENTAL IMPACTS OF LICENSE TERMINATION – NUREG-1496**

A LTP for TMI-1 will be developed and submitted to NRC approximately two years prior to the anticipated license termination date. The LTP will include a supplemental review of environmental impacts describing any new information or significant environmental change associated with the proposed termination activities. Although the LTP, including a supplemental environmental review, need not be prepared and submitted until a minimum of two years prior to the anticipated license termination date, as required by 10 CFR 50.82(a)(9), the absence of any unique site-specific factors, significant groundwater contamination, unusual demographics, or impediments to achieving unrestricted release indicate that impacts resulting from TMI-1 license termination will be similar to those evaluated in NUREG-1496 (Reference 12).

## **5.3 DISCUSSION OF DECOMMISSIONING IN THE SEIS**

Decommissioning was addressed in Chapter 7 of the SEIS for TMI-1 license renewal (Reference 16). The NRC did not identify any new and significant information during their review and, therefore, NRC concluded that there would be no impacts beyond those discussed in the 1996 GEIS for License Renewal of Nuclear Plants, NUREG-1437, Revision 0 and the 1999 Addendum 1 to the GEIS. For all of the Category 1 issues applicable to decommissioning, NRC concluded that the impacts would be small. There are no contemplated decommissioning activities that would alter that conclusion.

## **5.4 ADDITIONAL CONSIDERATIONS**

The following considerations are relevant to concluding that TMI-1 decommissioning activities prior to license termination will not result in significant environmental impacts not previously



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reviewed:

- 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 adherence to ALARA principles during decommissioning and compliance with occupational dose limits
- Continued compliance with applicable regulations and permit conditions
- Continued storage of spent fuel in accordance with license conditions and plant procedures

### **5.5 CONCLUSIONS**

Exelon evaluated the site-specific impacts anticipated from decommissioning of TMI-1 for each environmental resource area in the same manner and context as used by NRC in its GEIS. This evaluation indicates that TMI-1 decommissioning activities fall within the range of decommissioning activities considered by NRC in the GEIS. There are no unique aspects of the plant or the expected decommissioning techniques that would invalidate the applicability to TMI-1 of the GEIS conclusions. The evaluation indicates that the impacts of TMI-1 decommissioning are bounded by the GEIS's assessment for those environmental issues for which NRC made generic determinations. For the areas where a site-specific assessment was required, the anticipated impacts from TMI-1 decommissioning were determined to be small and bounded by the plant's FES or similar to the potential for impacts during refurbishment assessed in the SEIS for license renewal. In addition, after decommissioning plans mature and before decommissioning activities occur that either could be potentially impactful to an environmental resource for which a site-specific assessment was required or would be otherwise inconsistent with those actions or activities described in the PSDAR, Exelon will notify the NRC in writing and seek appropriate environmental review in accordance with applicable NRC regulations.

**Three Mile Island Nuclear Station, Unit 1  
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**6    REFERENCES**

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14. U.S. Nuclear Regulatory Commission, "Final Supplement to the Final Environmental Statement related to Operation of Three Mile Island Nuclear Station Unit 2," NUREG-0112, December 1976 (ADAMS Accession No. ML080090250)
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17. U.S. Nuclear Regulatory Commission, NUREG/CR-5584 (PNL-8742), "Revised Analyses of Decommissioning for the Reference Pressurized Water Reactor Power Station," November 1995 (ADAMS Accession No. ML14008A187)
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19. Letter from Michael P. Gallagher (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission – "License Amendment Request – Proposed Defueled Technical Specifications and Revised License Conditions for Permanently Defueled Condition," dated July 25, 2018 (ADAMS Accession No. ML18206A545)
20. Metropolitan Edison Company, Jersey Central Power & Light Company, and Pennsylvania Electric Company, "Three Mile Island Nuclear Station Unit 1, Environmental Report – Operating License Stage, Amendment No. 1," March 6, 1972
21. Wildlife Habitat Council, "Site Assessment and Wildlife Management Opportunities Report for Exelon Corporation's Three Mile Island Generating Station," October 2005
22. Exelon Corporation, TMI Environmental Department, "Three Mile Island Wildlife Management Plan," 2015

## **Appendix**

### **Correspondence with Pennsylvania State Historic Preservation Office**

#### **Letters**

Michael P. Gallagher (Exelon) to Andrea L. MacDonald,  
Pennsylvania State Historic Preservation Office, January 17, 2019

Douglas C McLearen, Pennsylvania State Historic Preservation  
Office, to Michael P Gallagher February 19, 2019



**Michael P. Gallagher**  
Exelon Nuclear  
Vice President  
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January 17, 2019

Andrea L. MacDonald  
Deputy State Historic Preservation Officer  
Pennsylvania Historical and Museum Commission  
State Historic Preservation Office  
Commonwealth Keystone Building, Second Floor  
400 North Street  
Harrisburg, PA 17120-0093

**Subject:** Three Mile Island Nuclear Station Unit 1 Decommissioning, Request for Information on Historic and Archaeological Resources

Dear Ms. MacDonald:

Exelon Generation Company, LLC (Exelon) is preparing to permanently shut down and decommission its Three Mile Island Nuclear Station Unit 1 (TMI-1). On May 30, 2017, Exelon publicly announced that it intended to shutdown TMI-1 on or about September 30, 2019. Exelon is preparing a Post-Shutdown Decommissioning Activities Report (PSDAR) to be submitted to the U.S. Nuclear Regulatory Commission (NRC). Although the NRC's review of the PSDAR involves no federal action that would mandate NRC consultation with the Advisory Council on Historic Preservation (ACHP) pursuant to Section 106 of the NHPA (54 U.S.C. § 306108; 36 CFR 800.16(y)), the NRC requires that the PSDAR include an updated assessment of potential impacts of decommissioning on cultural, historical and archaeological resources. Accordingly, Exelon is preparing the required assessment in support of the TMI-1 PSDAR, and the purpose of this letter is to request input from the State Historic Preservation Office (SHPO) regarding concerns that should be considered in the assessment.

Attachment 1 to this letter describes the TMI-1 decommissioning project and summarizes Exelon's updated review of cultural and historic resources in the site vicinity. As Attachment 1 indicates, Exelon does not expect TMI-1 decommissioning activities to adversely affect cultural resources.

However, after your review of the attached information, we would appreciate receiving your input by March 15, 2019, detailing any concerns you may have about the effects of TMI-1 decommissioning activities on cultural resources, or confirming that TMI-1 decommissioning activities are unlikely to adversely affect cultural resources. Receiving your input by March 15th will enable us to meet our PSDAR preparation schedule. Exelon will include a copy of this letter and your response in the TMI-1 PSDAR.

If you have questions concerning this submittal, please contact Paul Bonnett at (610) 765-5264.

Respectfully,

A handwritten signature in black ink, reading "Michael P. Gallagher". The signature is fluid and cursive, with a horizontal line drawn underneath the name.

Michael P. Gallagher  
Vice President, License Renewal & Decommissioning  
Exelon Generation Company, LLC

Attachment 1: TMI-1 Decommissioning Project Description and Summary of Cultural and  
Historic Resources Review



## **ATTACHMENT 1**

### **TMI-1 Decommissioning Project Description and Summary of Cultural and Historic Resources Review**

#### **Project Features**

Three Mile Island Unit 1 (TMI-1) is located in the Londonderry Township of Dauphin County approximately 10 miles southeast of Harrisburg, Pennsylvania. The TMI-1 structures are located on Three Mile Island, an island in an impounded portion of the Susquehanna River known as Lake Frederic. The island is located at approximately river mile 58 (Reference 1).

The Three Mile Island Nuclear Station (TMINS) site encompasses approximately 440 acres including Three Mile Island and adjacent islands on the north end, a strip of land on the mainland along the eastern shore of the river, and the area on the eastern shore of Shelley Island that is within the exclusion area (a 2,000-foot radius from a point equidistant between the centers of the Reactor Buildings). TMI-1 structures are located on the northern end of Three Mile Island. Undeveloped land on the island is found south of the TMI-1 facilities. Most of this undeveloped land lies under the 10-year flood level. The southern part of the island also contains wetlands formed from borrow pits created during construction of the station.

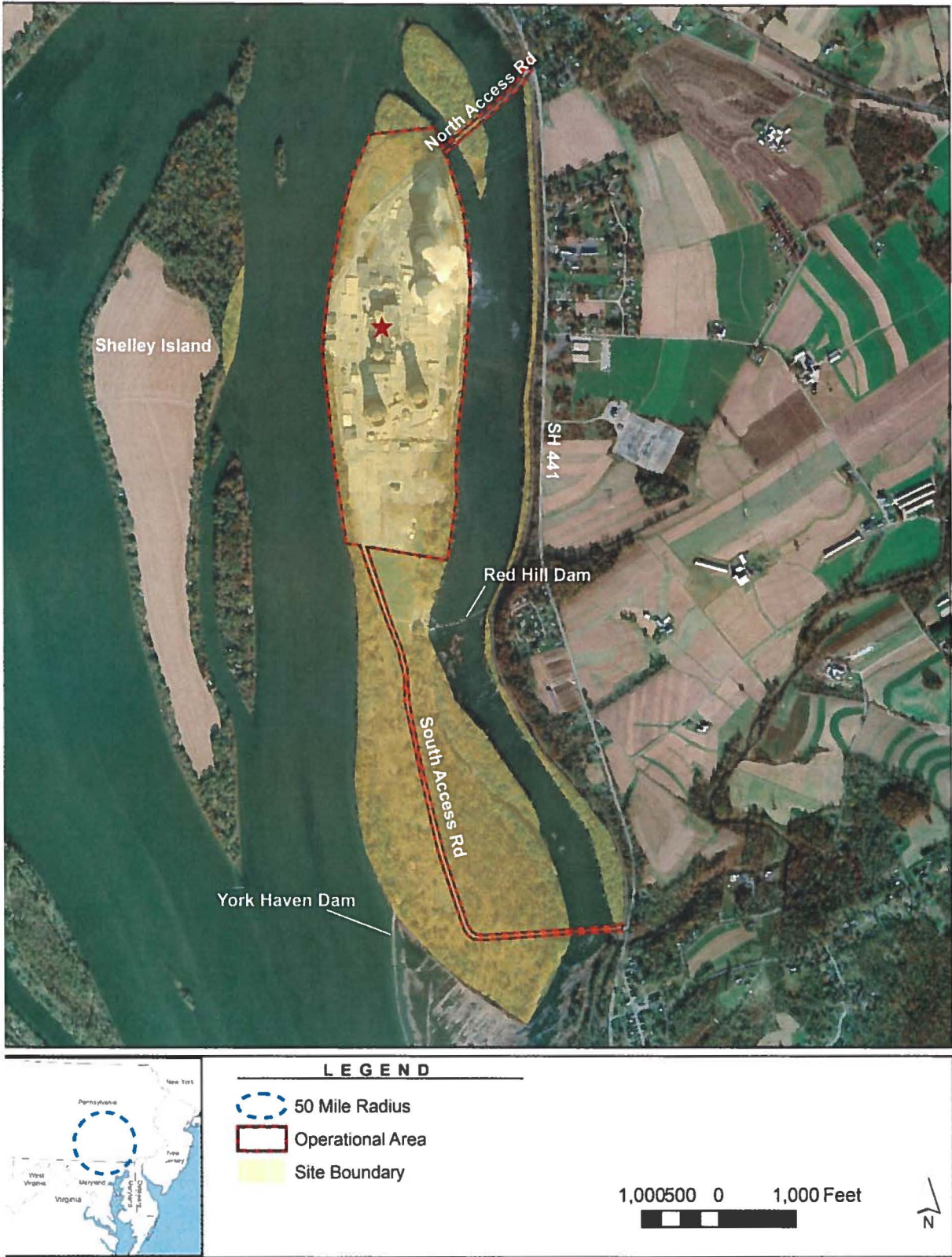
The TMINS site also includes a second unit (TMI-2) owned by FirstEnergy Corporation (FirstEnergy). TMI-2 has been shut down since the accident in 1979 and since 1993 has been in a SAFSTOR condition known as "post-defueling monitored storage" pending decommissioning at some future time (Reference 2). The TMI-2 structures are intermingled with those of TMI-1; however, the decommissioning of TMI-2 and TMI-1 are independent actions.

In the Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Section 4.1.2 (Reference 3), confinement of decommissioning activities to the "operational area" was considered to be a key discriminator for ecological and cultural impacts, with only small impacts expected to occur within the operational area. NUREG 0586 Supplement 1 defines the term "operational area" as follows:

"The operational area is defined as the portion of the plant site where most or all of the site activities occur, such as reactor operation, materials and equipment storage, parking, substation operation, facility service, and maintenance. This includes areas within the protected area fences, the intake, discharge, cooling, and associated structures as well as surrounding paved, graveled, maintained landscape, or other maintained areas."

Current planning anticipates that TMI-1 decommissioning activities will be limited to the TMI-1 operational area, except for the possible excavation of fill from onsite areas outside of the operational area to backfill the foundations of buildings and structures after demolition.

Figure 1 depicts the TMINS site location and the approximate TMI-1 operational area boundary.



**Figure 1 : TMI-1 Approximate Operational Area Boundary**

## Identification of Historic and Archaeological Resources

Exelon has conducted an updated review of available information including data on locations of inventoried resources from plant documentation and Pennsylvania State Historic Preservation Office (PA SHPO) about cultural, historical, and archaeological resources for the TMI-1 site and an approximate 6-mile radius. Currently, no historic properties, including prehistoric and historic archaeological sites, above-ground historic structures or traditional cultural properties eligible for listing or listed on the National Register of Historic Places (NRHP) lie within the TMI-1 operational area.

One archaeological site within the TMI-1 operational area (identified on the NRHP as 36DA50) is believed to remain intact. The site is north of the access road at the northern end of the operational area. Its eligibility for listing on the NRHP is categorized as undetermined due to insufficient information, presumably due to uncertainty about its current condition.

Six archaeological sites are located on the central and southern portions of Three Mile Island outside the TMI-1 operational area but within the TMINS property boundary. In 2016, one of these archaeological sites (36DA100) was determined to be eligible for the NRHP. That site is at the south end of the island near the South Access Road. Another archaeological site (36DA98) is immediately south of the operational area in a location used for staging and soil borrowing during construction of the station, and it was likely removed by those construction activities. A third site (36DA51) has been determined to be not eligible for listing, and three more sites (36DA99, 36DA101, and 36DA235) are considered unevaluated due to insufficient information.

Beyond Three Mile Island operational area, but within a 6-mile radius, there are 13 properties currently listed on the NRHP and 32 NRHP-eligible properties. One property, a section of the Pennsylvania Railroad Main Line linear historic district, lies 0.4 miles away from TMI-1 and the remaining properties are more than 1 mile away. Table 1 contains a list of these properties.

**Table 1: Properties Listed or Eligible for Listing on the NRHP within 6 Miles of TMI-1**

Key No. or Site No. (NRIS No.) <sup>1, 2</sup>	Property Name	Location (Distance from TMI-1) <sup>3</sup>
<i>NRHP-Listed Properties</i>		
77464 (85002413)	B'nai Jacob Synagogue	Nissley and Water Sts., Middletown Borough, Dauphin Co. (3.0 mi. N)
96260 (88000795)	Bridge between East Manchester & Newberry Townships	Rte 181 (York Haven Rd./N George St. Extd.) over Conewago Creek, East Manchester Twp.; Newberry Twp., York Co. (5.0 mi. S)
Site 36DA0089 Key No. 142953 (06001256)	Calver Island Site, a multicomponent pre-Contact period archaeological site	Restricted, Dauphin Co. (>5.0 mi. NW)
501 (76001634)	Simon Cameron House & Bank	28-30 E Main St., Middletown Borough, Dauphin Co. (3.2 mi. N)

<b>Key No. or Site No. (NRIS No.)<sup>1, 2</sup></b>	<b>Property Name</b>	<b>Location (Distance from TMI-1)<sup>3</sup></b>
64394 (84003589)	GoldsBorough Historic District	Roughly bounded by North, 3rd, Fraser, and Railroad Sts., GoldsBorough Borough, York Co. (1.2 mi. W)
87197 (90000703)	Highspire High School	221 Penn St., Highspire Borough, Dauphin Co. (5.2 mi. NW)
116 (88000799)	Kise Mill Bridge	LR 66003 over Bennett Run, Newberry Twp., York Co. (5.2 mi. SW)
1119 (80003650)	Kise Mill Bridge Historic District	Junction of Kise Mill and Roxberry Roads, E of Lewisberry, Newberry Twp., York Co. (5.1 mi. SW)
518 (79002221)	Charles & Joseph Raymond Houses	37-38 N Union St., Middletown Borough, Dauphin Co. (2.9 mi. N)
521 (73001621)	Saint Peter's Kierch	31 W High St., Middletown Borough, Dauphin Co. (3.3 mi. N)
95689 (88003050)	Henry Smith Farm (AKA Hidden Spring Farm)	950 Swatara Creek Rd., Londonderry Twp., Dauphin Co. (4.1 mi. N)
79148 (00000845)	Star Barn Complex	Nissley Dr., Lower Swatara Twp., Dauphin Co. (5.4 mi. NW)
524 (76001635)	Swatara Ferry House	400 Swatara St., Middletown Borough, Dauphin Co. (2.6 mi. N)
<hr/>		
<i>NRHP-Eligible Properties</i>		
36DA0220	Unnamed multicomponent pre-Contact period archaeological site	Restricted, Dauphin Co. (>5.0 mi. NW)
140134	Unnamed bridge [Red Mill Rd. over Fishing Creek]	SR 7220, Newberry Twp., York Co. (3.9 mi. W)
140139	Unnamed bridge [Sheepbridge Rd. over Conewago Creek]	SR 4021, Newberry Twp., York Co. (4.9 mi. SW)
36LA0005	Brandt Site, a multicomponent pre-Contact and historic period archaeological site	Restricted, Lancaster Co. (>5.0 mi. SE)



<b>Key No. or Site No. (NRIS No.)<sup>1, 2</sup></b>	<b>Property Name</b>	<b>Location (Distance from TMI-1)<sup>3</sup></b>
82633	Elizabethtown State Hospital	1451 N Market St., Mount Joy Twp., Lancaster Co. (5.6 mi. E)
115304	Geyer United Methodist Church & Cemetery	S Geyers Church and Hillsdale Rds., Londonderry Twp., Dauphin Co. (1.7 mi. NE)
115302	J. Geyer Farmstead	2083 Felker Rd., Londonderry Twp., Dauphin Co. (2.2 mi. NE)
79196	Dr. Rife Gingrich Farm	Foxianna Rd., Londonderry Twp., Dauphin Co. (2.1 mi. NNE)
82182	Haldeman/Fitzkee House	Race St., Conoy Twp., Lancaster Co. (5.3 mi. SE)
200630	Martin Heisey Farm	1731 Bainbridge Rd., West Donegal Twp., Lancaster Co. (5.3 mi. ESE)
101635	A.S. Kreider Shoe Factory	160 Wilson St., Middletown Borough, Dauphin Co. (2.8 mi. N)
89500	Middletown Historic District	Vic. Union and Main Sts., Middletown Borough, Dauphin Co. (2.6 mi. N)
36LA0039	Mohr Site, a multicomponent pre-Contact period archaeological site	Restricted, Lancaster Co. (>5.0 mi. SE)
87198	John Motter Farm (AKA Spring Garden Farm)	1260 Lumber St., Lower Swatara Twp., Dauphin Co. (5.6 mi. NW)
142024	Mumma Farm	225 Oberlin Rd., Lower Swatara Twp., Dauphin Co. (4.2 mi. NNW)
86953*	Newberrytown Historic District	Old Trail / York Haven Rd. E of High St., Newberry Twp., York Co. (3.8 mi. WSW)
116689	Northern Central Railway (Fairview Township)	PA Tpk. and Marsh Run Rd., Fairview Twp., York Co. (5.3 mi. NW)
116364	Odd Fellows Home of Pennsylvania	999 W Harrisburg Pike, Lower Swatara Twp., Dauphin Co. (3.4 mi. NNW)
102143*	Pennsylvania Railroad: Enola Branch Low Grade Freight Line (Enola to Parkesburg)	Linear HD--Conoy Twp., Lancaster Co.; and York Haven Borough & East Manchester, Fairview, and Newberry Twps., York Co. (min. 1.2 mi. W)



Key No. or Site No. (NRIS No.) <sup>1, 2</sup>	Property Name	Location (Distance from TMI-1) <sup>3</sup>
<i>[Within the 6-mile radius buffer around TMI-1, this linear historic district traverses the western bank of the Susquehanna River and comprises a portion of Norfolk Southern Railway's present-day Port Road Branch, formerly known as the Enola Branch.]</i>		
105675	Pennsylvania Railroad: Main Line (Philadelphia to Harrisburg)	Linear HD--Highspire, Middletown, Royalton, and Steelton Boroughs & Londonderry, Lower Swatara, and Swatara Twps., Dauphin Co.; and Elizabethtown Borough & Conoy, Mount Joy, West Donegal Twps., Lancaster Co. (min. 0.4 mi. E)
<i>[This linear historic district consists primarily Amtrak's present-day Philadelphia to Harrisburg Main Line, which passes a minimum of 1.1 miles NE of TMI-1. It also includes lines that loop south through Royalton and Columbia between Lancaster and Harrisburg. This southerly loop comprises Norfolk Southern Railway's present-day Columbia Secondary and Royalton branches, apparently along with a short section of the Port Road Branch on either side of Marietta. The Royalton Branch follows the eastern bank of the Susquehanna River and passes a minimum of 0.4 mile E of TMI-1.]</i>		
143290	Pennsylvania Railroad: Station (Elizabethtown), associated w/Key No. 105675, PRR Main Line	Wilson Ave., Elizabethtown Borough, Lancaster Co. (6.0 mi. W)
96401	Pennsylvania Steel Company	S Front St., Steelton Borough, Dauphin Co. (5.5 mi. NW)
122695	Pennsylvania Turnpike: Philadelphia [Eastern] Extension (Carlisle to Valley Forge)	Linear HD--Highspire, Middletown, and Steelton Boroughs & Conewago, Londonderry, Lower Swatara, Swatara Twps., Dauphin Co.; Mount Joy Twp., Lancaster Co.; and Fairview Twp., York Co. (min. 3.8 mi. N)
97639	Pine Street Public School	60 Walton St., York Haven Borough, York Co. (3.3 mi. S)
115306	Jacob & Fanny Rife Farmstead	1218 Foxiana Rd., Londonderry Twp., Dauphin Co. (2.3 mi. NNE)
94119	Shettle's Farm Bridge	Red Mill Rd., Newberry Twp., York Co. (3.22 mi. W)
129266	Smuller, George House	460 N Union St., Middletown Borough, Dauphin Co. (3.2 mi. N)

Key No. or Site No. (NRIS No.) <sup>1, 2</sup>	Property Name	Location (Distance from TMI-1) <sup>3</sup>
36DA0100	Three Mile Island Site, a multicomponent pre-Contact period archaeological site	Restricted, Dauphin Co. (1 to 2 mi. S)
102239	Dorothy Wittle Property	1165 Turnpike Rd., West. Donegal Twp., Lancaster Co. (4.9 mi. E)
99211	York Haven Free Library	S Front St. & Pennsylvania Ave., York Haven Borough, York Co. (3.1 mi. S)
96657	York Haven Hydroelectric Plant	1 Hydro Park Dr., York Haven Borough, York Co. (2.9 mi. S)
116360	Zimmerman House	103-105 Rosedale Ave., Lower Swatara Twp., Dauphin Co. (3.4 mi. NNW)

Sources: NPS 2017 (Reference 4); PA SHPO 2018 (Reference 5). Data current as of 12/5/2017 and 5/1/2018, respectively.

Notes: (1) PA SHPO assigns Key Nos. (3 to 6 digits) to inventoried aboveground properties and Site Nos. to inventoried archaeological sites (36XX0000 trinomials, with 4-digit sequential numbers to facilitate digital sorting). NRIS Nos. (8 digits) are reference numbers assigned by the NPS NRHP Program upon approval of the nominated property for NRHP listing. (2) All NRHP eligibility determinations are findings by the PA SHPO, except for two marked with asterisks (\*), which are by the Keeper of the NRHP. (3) Confirmation that properties were extant as of April 2016 and are in the 6-mile buffer is based on checks using Google Earth (2018) (Reference 6).

In NUREG-0586 Supplement 1, Section 4.3.14.2, NRC noted the potential for a decommissioning nuclear facility itself to be potentially eligible for inclusion in the NRHP, especially if it is older than 50 years and represents a significant historic or engineering achievement. TMI-1 was completed and began energy production in 1974 and will reach 50 years of age during the SAFSTOR period. TMI-1 is a typical mid-twentieth century light water reactor. The design, engineering processes, and construction of TMI-1 are unexceptional and lacking any major engineering innovations. Accordingly, TMI-1 itself seems unlikely to be potentially eligible for inclusion in the NRHP, although this could be further considered at a time nearer to the actual start of decommissioning activities. The engineering drawings from the station will be archived by Exelon Records Management until decommissioning is complete.

The possible NRHP eligibility of Three Mile Island as the site of the accident-damaged TMI-2 was evaluated in 1983 (Key No. 079154), but at that time it was determined that the Island was not NRHP-eligible. In 1999, the Pennsylvania Historical and Museum Commission (PHMC) held a public history symposium and erected a "historical marker" on State Highway 441, south of the TMINS Visitor Center sign, commemorating the 20<sup>th</sup> anniversary of the TMI-2 accident. The symposium was a cooperative effort of the Pennsylvania Department of Environmental Protection (PA DEP), the PHMC, Pennsylvania State University - Harrisburg, the NRC, GPU Nuclear Incorporated, Three Mile Island Alert, Middletown Borough, and Londonderry Township.

### **Decommissioning Activities and Mitigation**

In 2009, Exelon developed a Cultural Resources Protection Plan and an Archaeological Resources Erosion Monitoring Plan. These plans provide protocols for ensuring continued stewardship of cultural resources on Three Mile Island during the final operational years of TMI-1 and into the post-operational SAFSTOR period. Exelon 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. Moreover, Exelon maintains site-specific policies and procedures to address unanticipated discoveries of cultural resources. Should an unanticipated discovery be made during decommissioning of TMI-1, Exelon would implement its procedures to address the discovery.

Backfill for demolished building and structure foundations will be sourced from onsite demolition activities. If additional clean fill is needed, it could be obtained from onsite within or beyond the operational area. Prior to excavating backfill outside of the operational area, Exelon will evaluate the area's archaeological sensitivity, and implement its protocols discussed above for ensuring continued stewardship of cultural resources on Three Mile Island. Should an unanticipated discovery be made, Exelon procedures to address the discovery would be implemented.

Use of explosives for demolition of the natural draft cooling towers will be in accordance with applicable PA DEP regulations (25 Pa. Code § 211) and best management practices and will seek to minimize the generation of fugitive dust, avoiding possible adverse effects to historic properties. The PA DEP regulations for use of explosives also limit peak particle velocities to minimize ground vibration that could damage structures. The regulatory limit is set to prevent cosmetic damage to plaster walls and thus would also avoid major cracking of interior walls, foundation damage, or other structural damage. By designing the demolition by implosion to yield peak particle velocities below regulatory limits, vibrations associated with the explosions and controlled collapse of the towers are not expected to adversely affect currently identified historic properties.

### **References**

- 1 U.S. Nuclear Regulatory Commission 2009. "Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 37, Regarding Three Mile Island Nuclear Station, Unit 1," Section 2.2.4, NUREG-1437, Supplement 37, dated June 2009 (ADAMS Accession No. ML091751063)
- 2 GPU Nuclear. 2015, "Three Mile Island Nuclear Power Station Unit 2 Post-Shutdown Decommissioning Activities Report, Rev. 2," Sections I and II, dated December 2015 (ADAMS Accession No. ML15338A222)
- 3 U.S. Nuclear Regulatory Commission 2002, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," NUREG-0586, Supplement 1, Office of Nuclear Reactor Regulation, Washington, D.C., dated November 2002 (ADAMS Accession Nos. ML023470304 (Vol 1) and ML023470323 (Vol 2))
- 4 National Park Service. 2017, National Register of Historic Places Program: Research – Data Downloads – Spreadsheet of NRHP List. Updated December 5, Accessed at [https://www.nps.gov/nr/research/data\\_downloads/national-register-listed-properties-20171205](https://www.nps.gov/nr/research/data_downloads/national-register-listed-properties-20171205). xlsx, May 6, 2018
- 5 Pennsylvania State Historic Preservation Office, 2018, "Cultural Resources Geographic Information System [CRGIS]," Available at <https://www.dot7.state.pa.us/CRGIS>, Accessed May 1, 2018

- 6 Google Earth 2018, Geoprojected Vertical Aerial Imagery in the Vicinity of Lat.-Long. 40.154167, -76.7250, April 1993 to April 2016, Electronic resource. Application available via <https://www.google.com/earth/>, accessed May 2018





## Pennsylvania State Historic Preservation Office

PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

February 19, 2019

Exelon Generation

Attn: Michael P. Gallagher, Vice President, License Renewal & Decommissioning

200 Exelon Way

Kennett Square, PA 19348

RE: ER 2007-1737-043-L – NRC: Three Mile Island Nuclear Station Unit 1 Decommissioning, Londonderry Township, Dauphin County

Dear Mr. Gallagher:

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq.(1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

### **Historic (Above Ground) Resources**

There may be above ground historic properties within the project area of potential effect. However, in our opinion, the project as proposed will have no effect on historic properties, should they exist. Should the scope and/or nature of the project change, the PA SHPO should be contacted immediately.

### **Archaeological Resources**

The act of decommissioning TMI-1 will have no effect on archaeological resources. However, the information you submitted indicates decommissioning activities will be limited to the TMI-1 operational area, except for the possible excavation of fill from onsite areas outside of the operational area to backfill the foundations of buildings and structures after demolition. If possible, please identify the locations of any such onsite areas from which fill may be taken. If the locations of these areas are currently unknown, then please continue to consult with our office once these locations are known. We appreciate your cooperation.

If you have any questions or comments concerning our review for historic resources, please contact Emma Diehl at [emdiehl@pa.gov](mailto:emdiehl@pa.gov) or (717) 787-9121. If you have any questions or comments concerning our review for archaeological resources, please contact Mark Shaffer at [mshaffer@state.pa.us](mailto:mshaffer@state.pa.us) or (717) 783-9900.

Sincerely,

Douglas C. McLearn, Chief  
Division of Environmental Review