TMI-2 SOLUTIONS

March 28, 2024
TMI2-RA-COR-2024-0005

10 CFR 50.51
10 CFR 50.82(a)(7)

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

Three Mile Island, Unit 2
NRC Possession Only License No. DPR-73
NRC Docket No. 50-320

Subject: Notification of "Amended Post-Shutdown Decommissioning Activities Report (PSDAR) for Three Mile Island, Unit 2 in Accordance with 10 CFR 50.82(a)(7)," Revision 6

References:

1) Letter TMI2-RA-COR-2021-0004 from van Noordennen, G. P. (TMI-2 Solutions) to Document Control Desk (U.S. NRC), "Notification of 'Amended Post-Shutdown Decommissioning Activities Report' (PSDAR) for Three Mile Island, Unit 2 in Accordance with 10 CFR 50.82(a)(7), Revision 4," dated March 17, 2021 (ML21084A229)
2) Letter TMI2-RA-COR-2022-0022 from Lackey, M. B. (Energy*Solutions*) to Document Control Desk (U.S. NRC), "Notification of 'Amended Post-Shutdown Decommissioning Activities Report' (PSDAR) for Three Mile Island, Unit 2 in Accordance with 10 CFR 50.82(a)(7),' Revision 5," dated October 27, 2022 (ML22306A051)
3) Letter from van Noordennen, G. P. (Energy*Solutions*) to Document Control Desk (U.S. NRC), "License Amendment Request – Three Mile Island, Unit 2, Decommissioning Technical Specifications," dated February 19, 2021 (ML21057A046)
4) E-Mail from Snyder, A. M. (U.S. NRC) to Devik, T. (TMI-2 Solutions), "Three Mile Island Nuclear Station, Unit No. 2 – Request for Additional Information Related to the Amended Post-Shutdown Decommissioning Activities Report (EPID No. L-2022-DPS-0002)," dated June 29, 2023 (E-Mail: ML23187A020; RAI Enclosure: ML23187A033)
5) Letter TMI2-RA-COR-2023-0014 from Devik, T. (TMI-2 Solutions) to Document Control Desk (U.S. NRC), "Response to Requests for Additional Information for the TMI-2 Post-Shutdown Decommissioning Activities Report, Rev. 5," dated August 8, 2023 (ML23221A140)

6) Letter TMI2-RA-COR-2023-0022 from Lynch, J. R. (Energy*Solutions*) to Document Control Desk (U.S. NRC), "Response to Request for Additional Information for the TMI-2 Post-Shutdown Decommissioning Activities Report, Rev. 5," dated December 20, 2023 (ML23354A211)
7) Letter TMI2-RA-COR-2023-0003 from Hazelhoff, A. C. (Energy*Solutions*) to Document Control Desk (U.S. NRC), "License Amendment Request – Three Mile Island, Unit 2, Historic and Cultural Resources Review," dated February 12, 2023 (ML23058A064)
8) Letter TMI2-RA-COR-2024-0004 from Lynch, J. R. (Energy*Solutions*) to Document Control Desk (U.S. NRC), "Response to Request for Additional Information for the TMI-2 Post-Shutdown Decommissioning Activities Report, Rev. 5," dated March 14, 2024 (ML24074A392)
9) Letter TMI2-RA-COR-2024-0002 from Hazelhoff, A. C. (Energy*Solutions*) to Document Control Desk (U.S. NRC), "License Amendment Request – Three Mile Island, Unit 2, Historic and Cultural Resources Review, Response to Request for Additional Information," dated February 12, 2024 (ML24044A009)

In Reference 1, TMI-2 Solutions submitted Revision 4 of the TMI-2 Post-Shutdown Decommissioning Activities Report (PSDAR) following transfer of the TMI-2 Possession-Only License from GPU Nuclear to TMI-2 Solutions. In Reference 2, TMI-2 Solutions submitted Revision 5 of the TMI-2 PSDAR incorporating information from the DECON License Amendment Request (Reference 3) and supplements to the LAR, descriptions of decommissioning plans, and updates to the evaluation of potential environmental impacts regarding Historic, Cultural, and Archaeological Resources (PSDAR Section 6.1.14).

In Reference 4, the NRC issued a Request for Additional Information to support review of the PSDAR, Revision 5. TMI-2 Solutions provided responses in References 5 and 6, including updated information from the February 2023 License Amendment Request for Historic and Cultural Resource Review (Reference 7). In Reference 8, TMI-2 Solutions provided an updated Decommissioning Project Schedule (Table 5-1) and stated its plans to submit Revision 6 of the TMI-2 PSDAR to the NRC no later than March 28, 2024.

This letter submits Revision 6 of the TMI-2 PSDAR. TMI-2 Solutions has prepared this PSDAR revision (Attachment 1) in accordance with the requirements of 10 CFR 50.82, "Termination of license," paragraph (a)(4)(i). This revision includes:

- Revised Section 6.1.14 "Cultural, Historic, and Archaeological Resources" to reflect information in the February 2023 License Amendment Request and as previously submitted in Reference 6;
- Updated Table 5-1, "TMI-2 Decommissioning Project Schedule" as previously submitted in Reference 8;
- Updated List of Threatened and Endangered Species (Section 6.1.7) and descriptions of TMI-2 Solutions' plans to ensure that any potential impact to terrestrial or aquatic ecologies, as well as any threatened or endangered species observed on or near the TMI-2 operational area, are avoided, as previously submitted in Reference 9;

- Updated Table 5-2, TMI-2 Decommissioning Cost Summary;
- Information about TMI-2 Solutions' plans for use of innovative technologies and chemical decontamination methods;
- Added Section 3.1.3, "Transition Activities;" and
- Edits to reflect TMI-2 Solutions' updated plans to acquire backfill from an offsite source rather than potentially sourcing from Three Mile Island outside the operational area, as was previously stated in the PSDAR.

Attachment 2 includes the Regulatory Commitments contained in this submittal.

If the NRC has any questions with respect to the content of this document or wishes to obtain any additional information, please contact me at jrlynch@energysolutions.com or 508-728-1421.

Sincerely,

Joseph R. Lynch Digitally signed by Joseph R. Lynch
Date: 2024.03.28 07:25:21 -04'00'

Joseph R. Lynch
Director, D&D Licensing/Regulatory Affairs
Energy*Solutions*

Attachments**:**

Attachment 1 – Three Mile Island Nuclear Power Station, Unit 2 Post-Shutdown Decommissioning Activities Report, Revision 6
Attachment 2 – List of Regulatory Commitments

cc: w/Attachments

NRC Regional Administrator – Region I
NRC Lead Inspector – Three Mile Island Nuclear Station – Unit 2
NRC Project Manager – Three Mile Island Nuclear Station – Unit 2
Director, Bureau of Radiation Protection – PA Dept of Environmental Protection
Chief, Division of Nuclear Safety, Bureau of Radiation Protection – PA Dept of Environmental Protection
Chairperson, Board of County Commissioners – Dauphin County
Manager – Londonderry Township

ATTACHMENT 1 TO LETTER NUMBER TMI2-RA-COR-2024-0005

THREE MILE ISLAND NUCLEAR POWER STATION, UNIT 2
POST-SHUTDOWN DECOMMISSIONING ACTIVITIES REPORT (PSDAR)
REVISION 6

THREE MILE ISLAND NUCLEAR POWER STATION, UNIT 2

NRC POSSESSION ONLY LICENSE NO. DPR-73

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REVISION HISTORY

Revision Number	Revision Description
0	Initial Issue (June 2013).
1	Incorporated information to update Table 1 to 2012 dollars (November 2013) Chang are on Pages 1, 2, 14, and 15.
2	Incorporated information resulting from 2014 Decommissioning Cost Analysis, revised information on the post-defueling monitored storage agreement, and incorporated various administrative clarifications. (December 2015) Changes are on Pages 1, 2, 5 through 15, and 25.
3	Revised section I "Introduction" with general information pertaining to transfer of ownership of TMI-2 and accelerated decommissioning. Revised section II "Background" to include information that addresses transfer of Possession Only License No. DPR-73 from FirstEnergy to TMI-2 Solutions; Revised section III "Description of Decommissioning Activities" to address activities following license transfer to TMI-2 Solutions, updated the project organization, and replaced decommissioning "periods" with decommissioning "phases." Revised section IV "Schedule of Decommissioning Activities," and section V "Estimated Cost of Decommissioning Activities," with updated detailed schedule and decommissioning cost information. Changes are on pages throughout.
4	Revised to reflect transfer of license from GPUN to TMI-2 Solutions and transition of TMI-2 from its PDMS state to DECON. Updated Section III to provide a description of decommissioning activities. Updated Section VI "Environmental Impacts" to present the results of the evaluation of potential environmental impacts upon TMI-2. Changes are on pages throughout therefore revision bars are not included.
5	Incorporated information from DECON LAR supplements and updated References list accordingly. Replaced "Debris Material" with "Fuel Bearing Material" throughout. Added Section 3.3.1 "Decommissioning Preparation Activities." Added descriptions on use of technology for decommissioning, updated strategy for the TMI-2 Reactor Building and Reactor Vessel, the Interim Waste Storage Facility and Decommissioning Support Building. Added description of TMI-2 SNM management in Section 3.3.3. Added Table 5-1 summarizing the TMI-2 Decommissioning Project Schedule. Updated Section 6 "Environmental Impacts" to reevaluate previous impact conclusion on cultural, historic and archaeological resources and incorporate updated accident analysis information. Added planned LTP submittal date. Editorial enhancements. Changes are on pages throughout and designated with revision bars.
6	Revised Section 6.1.14 "Cultural, Historic, and Archaeological Resources." Updated Table 5-1, "TMI-2 Decommissioning Project Schedule." Updated List of Threatened and Endangered Species (Section 6.1.7) and descriptions of TMI-2 Solutions' plans to ensure that any potential impact to terrestrial or aquatic ecologies, as well as any threatened or endangered species observed on or near the TMI-2 operational area, are avoided. Updated Table 5-2, TMI-2 Decommissioning Cost Summary. Added Section 3.1.3, "Transition Activities." Edits to reflect TMI-2 Solutions' plans to acquire backfill from an offsite source. Significant changes on pages throughout are designated with revision bars. Revision bars were not provided for editorial enhancements (e.g., updating in-text references).

1. INTRODUCTION

GPU Nuclear, Metropolitan Edison Company, Jersey Central Power & Light Company, Pennsylvania Electric Company, and TMI-2 Solutions, LLC, submitted an "Application for Order Approving License Transfer and Conforming License Amendments" for TMI-2 to the NRC for review in a letter dated November 12, 2019 (Reference 1). TMI-2 Solutions requested that the Order authorize the license transfer to take place at any time up to one year after date of issuance. The license transfer application was approved by the NRC in Reference 2. TMI-2 Solutions became the TMI-2 licensee on December 18, 2020, following the closing of the transaction specified in the October 15, 2019, Asset Purchase and Sale Agreement among the Applicants (the "Closing"). TMI-2 Solutions maintains responsibility for all licensed activities at the TMI-2 site, including responsibility under the License to complete radiological decommissioning pursuant to NRC regulations.

By letter dated August 14, 2012 (Reference 3), GPU Nuclear informed the NRC of the status of TMI-2 relative to the 1996 decommissioning rule changes in 10 CFR 50.51, "Continuation of license," and 10 CFR 50.82, "Termination of license." The letter stated the intent to submit a Post-Shutdown Decommissioning Activities Report (PSDAR) that describes the planned decommissioning activities, schedule, cost estimates, and the environmental impacts of the TMI-2 facility decommissioning. In a letter dated February 13, 2013 (Reference 4), the NRC stated that September 14, 1993, is considered the date of TMI-2's cessation of operations, coinciding with the issuance of amendment No. 45 which converted the TMI-2 operating license into a Possession Only License (POL) (Reference 5). Although the POL was issued on September 14, 1993, the TS in amendment No. 45 were not compatible with the Post-Defueling Monitored Storage (PDMS) condition. The PDMS TS could not be implemented until the final phases of the current cleanup effort were completed, the NRC staff had verified the implementation of the PDMS requirements and commitments, and GPU Nuclear had satisfied the PDMS license conditions. Amendment 48 was issued December 28, 1993 (Reference 6) with the PDMS TS after the PDMS requirements and commitments were satisfied and all the license conditions were met.

GPU Nuclear maintained TMI-2 in the PDMS state since the NRC provisions for cleanup were met on December 28, 1993, until TMI-2 Solutions obtained the license in December 2020 (Reference 2). The TMI-2 POL was maintained by TMI-2 Solutions in accordance with the PDMS condition until the facility's transition to DECON following issuance of amendment 67 to the TMI-2 POL on March 31, 2023 (Reference 7). TMI-2 Solutions has developed this PSDAR revision for TMI-2 in accordance with the requirements of 10 CFR 50.82, "Termination of license," paragraph (a)(4)(i) and the applicable guidance of Regulatory Guide 1.185 "Standard Format And Content For Post-Shutdown Decommissioning Activities Report," Revision 1.

2. BACKGROUND

TMI-2 is located on the northern-most section of Three Mile Island near the east shore of the Susquehanna River in Dauphin County, Pennsylvania. The station is comprised of two pressurized water reactors. The TMI Nuclear Station includes Unit 1, owned by Constellation Energy Generation, LLC (Constellation), which has permanently ceased power operations and consistent with 10 CFR 50.82(a)(ii) removed the fuel from the reactor vessel, and the shutdown and defueled Unit 2 owned by TMI-2 Solutions.

TMI-2 was a non-operational pressurized water reactor that was rated at a core thermal power level of 2772 megawatt-thermal with a corresponding turbine-generator gross output of 959 megawatt-electric. TMI-2 employed a two loop pressurized water reactor nuclear steam supply system designed by Babcock and Wilcox Corporation. The Reactor Coolant System is housed within a steel-lined, post-tensioned concrete structure (Reactor Building), in the shape of a right, vertical cylinder with a hemispherical dome and a flat, reinforced concrete basemat. A welded steel liner plate, anchored to the inside face of the Reactor Building, serves as a leak-tight membrane. The TMI-2 cooling towers are located at the southern end of TMI adjacent to the TMI-2 turbine building.

GPU Nuclear was issued an operating license for TMI-2 on February 8, 1978, with commercial operation declared on December 30, 1978. On March 28, 1979, the unit experienced an accident initiated by interruption of secondary feedwater flow. The lack of secondary feedwater resulted in the reduction of primary-to-secondary heat exchange that caused an increase in the reactor coolant temperature, creating a surge into the pressurizer, and an increase in system pressure. The pressure operated relief valve (PORV) opened to relieve the pressure but failed to close when the pressure decreased. The reactor coolant pumps were turned off and core heat-up began as the reactor coolant system water inventory continued to decrease resulting in a reactor vessel water level below the top of the core. This led to a core heat up that caused fuel damage. Some of the damaged fuel material travelled down through the region of the southeastern assemblies and into the core bypass region. A portion of the fuel material passed around the bypass region and migrated down into the lower internals and lower head region, but overall reactor vessel integrity was maintained throughout the accident.

As a result of this accident, small quantities of spent nuclear fuel, damaged core material, and high level waste (collectively referred to as “Fuel Bearing Material”) were transported through the Reactor Coolant System and the Reactor Building.[1] In addition, a small quantity of Fuel Bearing Material (FBM) was transported to the Auxiliary and

[1] TMI-2 Solutions uses the term Fuel Bearing Material (FBM), defined as any component or pieces of components associated with pressurized water reactor operations that have been contaminated by used nuclear fuel and/or the associated isotopes in used nuclear fuel. FBM is synonymous with other legacy terms such as Debris Material, Core Debris, or Fuel Bearing Waste which describe the inseparable mixture of ~1% of UO_2 fuel inventory remaining after the completion of defueling and removal of core structural materials, plant components, and control rod materials.

Fuel Handling Buildings (AFHB). Further spread of the material also occurred as part of the post-accident water processing cleanup activities.

The quantity of fuel remaining at TMI-2 is a small fraction of the initial fuel load; approximately 99 percent (%) was successfully removed in the defueling. Additionally, large quantities of radioactive fission products that were released into various systems and structures were removed as part of the waste processing activities during the TMI-2 Cleanup Program. The cleanup to meet the NRC post-accident safe storage criteria was completed and accepted by the NRC with TMI-2 entering into PDMS in December 1993.

NUREG-0683, the Programmatic Environmental Impact Statement (PEIS) and its three Supplements (References 8, 9, 10, and 11) provide an overall evaluation of the environmental impacts that could result from decontamination and disposition of radioactive wastes beginning from when plant conditions were stabilized after the accident and continuing through completion of the cleanup from the accident. A discussion of the PEIS relative to TMI-2 environmental impacts is presented in Section 6 “Environmental Impacts of Decommissioning Activities.”

Approximately 99% of the fuel was removed and shipped to the Idaho National Engineering and Environmental Laboratory (INEEL) under the responsibility of the U.S. Department of Energy (DOE). The reactor coolant system was decontaminated to the extent practical to reduce radiation levels to as low as is reasonably achievable (ALARA). As part of the decontamination effort, water was removed to the extent practical from the reactor coolant system and the fuel transfer canal, and the fuel transfer tubes were isolated. Radioactive wastes from the major clean-up activities have been shipped off-site or has been packaged and staged for shipment off-site.

Following the decontamination activities, only the Reactor Building and a few areas in the AFHB continued to have general area radiation levels higher than those of an undamaged reactor facility nearing the end of its operating life.

GPU Nuclear maintained TMI-2 in the PDMS state while successfully operating TMI-1 until AmerGen (a joint venture between Philadelphia Energy Company and British Energy) purchased the operating TMI-1 from GPU Nuclear in 1998. The sale of TMI-1 included the TMI-1 buildings, structures, and the majority of the site property; however, GPU Nuclear maintained ownership of TMI-2.

FirstEnergy acquired GPU Nuclear and ownership of TMI-2 in 2001 as part of a larger acquisition of GPU. In December 2003, Exelon Corp. acquired sole ownership of TMI-1. A monitoring agreement between GPU Nuclear and Exelon provided for Exelon performing certain functions at TMI-2, on behalf of GPU Nuclear, while TMI-2 was in PDMS. These functions include maintenance and testing, radiological and environmental controls, security and safety functions and licensing activities required by the PDMS Technical Specifications and PDMS Final Safety Analysis Report. In December 2020 TMI-2 Solutions acquired ownership of TMI-2, and with that the monitoring agreement between GPU Nuclear and Exelon transferred to TMI-2 Solutions and Constellation.

A 2004 cost analysis for decommissioning TMI-2 assumed a delayed DECON scenario, which deferred the decontamination and dismantling (D&D) activities at TMI-2 until they are synchronized with TMI-1 such that the licenses for both units are terminated concurrently (Reference 12). This scenario assumed a 10-year dormancy period for TMI-2, following the TMI-1 original license expiration in 2014, with decommissioning preparation to begin in 2024. The initial schedule assumed decommissioning operations would begin in 2026 and would be completed over a 10-year period with site restoration projected in 2036. Since that time, a 20-year extension to the TMI-1 operating license was granted by the NRC. This warranted a revision to the decommissioning cost analysis for TMI-2.

A 2014 cost analysis for TMI-2 evaluated a DECON scenario that assumes TMI-1 would commence decommissioning upon cessation of operations in 2034 and that the decommissioning programs for both units would run independently from each other (Reference 13). PSDAR revision 2, section IV “Schedule of Decommissioning Activities,” established the schedule for the decommissioning of TMI-2 to commence following the expiration of the TMI-1 Operating License on April 19, 2034, with TMI-2 license termination occurring in 2053. However, with the approval of the application and transfer of the License to TMI-2 Solutions (Reference 2), TMI-2 Solutions assumed all authorities provided for and responsibilities under the License, including possession, maintenance, and eventual radiological decommissioning of TMI-2 and associated buildings and structures. Thereafter, following completion of all necessary engineering and licensing actions and NRC approval of the DECON License Amendment Request (Reference 14) in March 2023 (Reference 7), TMI-2 Solutions transitioned into DECON with the goal to accelerate the decommissioning of TMI-2. Table 5-1 provides the current TMI-2 decommissioning project schedule.

2.1 Summary of Decommissioning Alternatives

The NRC has evaluated the environmental impacts of three general methods for decommissioning power reactor facilities in NUREG-0586, “Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Supplement 1, Volumes 1 and 2, Regarding the Decommissioning of Nuclear Power Reactors,” (GEIS) (Reference 15). 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 reducing the quantity 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 TMI-2 Solutions is the DECON method. Following NRC approval of the License Amendment Request in March 2023 (Reference 7), TMI-2 Solutions transitioned the plant from the PDMS state to DECON. The decommissioning strategy for the project is to initiate prompt decommissioning with a project goal of achieving unrestricted release of the TMI-2 site, except for the ISFSI (Independent Spent Fuel Storage Installation).

3. DESCRIPTION OF DECOMMISSIONING ACTIVITIES

The objective of decommissioning TMI-2 is to safely perform all the activities associated with decontamination and dismantlement of the remaining plant SSC's and facilities in compliance with applicable federal, state, and local rules and regulations.

No major decommissioning activities were performed while in the PDMS condition.[2] The PDMS state was established following the accident to ensure an inherently stable and safe condition of the facility such that there was no risk to the public health and safety. The PDMS state was approved by the NRC (Reference 5) and governed by the PDMS Safety Analysis Report, PDMS Technical Specifications, and PDMS Quality Assurance Program.

The PDMS Technical Specification requirements to monitor and survey radiological conditions were established and maintained from 1993 until TMI-2 transitioned to DECON. TMI-2 Solutions has established a TMI-2 Materials Security plan implemented as a contracted service by Constellation which owns and maintains the TMI-1 facility (Reference 16).

As discussed in the TMI-2 PDMS Safety Analysis Report:

- There is no credible possibility of nuclear criticality.

- Fuel and core debris removed from the reactor vessel and associated systems has been shipped offsite.

[2] 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 10 CFR 61.55."

- Any potential for significant release of radioactivity has been eliminated.

- Water has been removed to the extent practical from the reactor coolant system and fuel transfer canal, and fuel transfer tubes have been isolated. The treatment and processing of accident generated water has been completed.

- Radioactive waste from the major cleanup activities has been shipped off-site or has been packaged for shipment off-site.

- Radiation within the facility has been reduced, as necessary, consistent with ALARA principles to levels that will allow necessary plant monitoring activities, the performance of required maintenance, and any necessary inspections.

TMI-2 Solutions holds title to and ownership of the TMI-2 power block; any TMI-2 improvements at the site; easements for other portions of the site; and any FBM within the TMI-2 facility. TMI-2 Solutions maintains responsibility for developing NRC compliant storage and disposal plans for any remaining FBM until title to the FBM is transferred to the DOE for disposal. Refer to Section 3.3.3 “Radioactive Waste Management” for a discussion related to disposal of low-level radioactive waste (LLRW). TMI-2 Solutions assumes responsibility for all licensed activities at the TMI-2 site, including responsibility under the license to complete radiological decommissioning pursuant to NRC regulations.

TMI-2 Solutions submitted a License Amendment Request (LAR) for NRC review (Reference 12) which proposed to remove or revise certain license conditions and technical specification (TS) requirements to reflect TMI-2 facility conditions during DECON. The changes proposed the elimination of those TS no longer applicable based on current plant radiological conditions and updated safe fuel mass limits (SFML) (Reference 17). The DECON LAR was supplemented by References 17 through 29. Upon issuance in March 2023 (Reference 7), this proposed amendment modified the 10 CFR Part 50 License and the TS to support entry into DECON.

After taking the necessary engineering actions and upon receipt of NRC approval of the LAR, thereby allowing major decommissioning activities to proceed, TMI-2 Solutions commenced decommissioning of TMI-2 and will complete all activities necessary to terminate the license and release the TMI-2 site.

Decommissioning activities will be performed in accordance with approved programs and associated implementing procedures. Radiological and environmental programs will be maintained throughout the decommissioning process to ensure occupational, public health and safety, and environmental compliance with all applicable laws and regulations.

The decommissioning of TMI-2 has been divided into multiple phases as described below and presented in Table 3-1.

Phase 1 is comprised of Phase 1a and Phase 1b. The focus of Phase 1a is preparation for decommissioning which includes activities such as decommissioning planning, engineering and regulatory activities, performance of radiation surveys, including the use of remote technologies, procurement of long lead equipment, installation of shielding and monitoring equipment, restoration of lighting and cranes, and limited decontamination activities consistent with the PDMS Safety Analysis Report. The focus of Phase 1b is the recovery, packaging, and storage of FBM and the reduction of the overall radiological source term at TMI-2 to levels that are generally consistent with a nuclear plant toward the end of its operational life that has not experienced a core-damage accident. Major decommissioning activities will occur under Phase 1b and Phase 2.

Phase 2 includes the decommissioning and dismantlement of the TMI-2 site to a level that permits the release of the site, except for an area to be set aside for storage of FBM on the ISFSI and the License Termination Plan (LTP) as well as site restoration activities.

Phase 3 refers to the management of the FBM on the ISFSI. Activities associated with Phase 3 include providing security and maintenance for the ISFSI as well as decommissioning the ISFSI.

Table 3-1 specifies the relationship between the Phases and the activities performed in each Phase. A description of the activities associated with each Phase is provided in the following sections.

Table 3-1
Phase Activities

Phase	Activities
Phase 1	Planning, Engineering, Remediation
Phase 1a	Preparation for Decommissioning
Phase 1b	Fuel Bearing Material Recovery and Source Term Reduction
Phase 2	Typical Decommissioning and Dismantlement Site Remediation LTP and Site Restoration
Phase 3	Fuel Bearing Material Management

3.1 Phase 1a Decommissioning Planning

While in Phase 1a, TMI-2 remained in the PDMS state during which preparations for decommissioning occurred. Phase 1a included planning, engineering, and regulatory activities, performance of radiation surveys, including the use of remote technologies,

procurement of long lead equipment, installation of shielding and monitoring equipment, restoration of lighting and cranes, and limited decontamination activities.

3.1.1 Phase 1a Activities

The types of activities performed during Phase 1a included the following:

- Radiological and non-radiological characterization of the site and the surrounding environs.
- Identification of transport and disposal requirements for radioactive waste and hazardous waste.
- Development of program plans and procedures which govern the conduct of the decommissioning in areas such as Radiological Protection, Waste Management, Safety & Health, Environmental Management, Training, and QA (Quality Assurance).
- Design, fabrication and installation of temporary shielding.
- Maintenance of contamination control envelopes.
- Procurement of specialty tooling and equipment.
- Procurement of radioactive waste shipping containers, specialized waste containers and boxes, casks, liners, and industrial packages for packaging.
- Shipment of radioactive liquid waste
- Removal of non-contaminated components/materials/structures
- Removal of non-installed LLRW materials
- ISFSI and Dry Cask Storage System (DCSS) design
- Removal of or modifications to deactivated passive systems, structures, and components (SSCs) as described in the PDMS Safety Analysis Report
- Evaluating decontamination and dose reduction techniques
- Design, development, installation and maintenance of temporary facilities, or temporary modifications to existing facilities to support D&D activities such as:
    - Establishment of a temporary D&D electrical distribution system.
    - Repair and upgrade of the site infrastructure including roads, railroad spurs, bridges, and facilities.
    - Design and maintenance activities associated with restoration of cranes.
    - Establishment of a temporary liquid radioactive waste processing system.
    - Establishment of temporary High Efficiency Particulate Air (HEPA) ventilation system(s) or maintenance of existing HEPA ventilation system(s).

- Design, development, installation, and maintenance of an Interim Waste Storage Facility (IWSF).
- Design, development, and construction of a Decommissioning Support Building (DSB).

Some of the activities listed above will also be performed during Phase 1b in accordance with the requirements of the DECON license basis and Defueled Safety Analysis Report (DSAR) (Reference 30).

3.1.2 Phase 1b: Fuel Bearing Material Recovery and Source Term Reduction

Following Phase 1a TMI-2 will enter Phase 1b. The purpose of Phase 1b is to perform the activities associated with FBM recovery and source term reduction necessary to reduce radiological conditions at TMI-2 to levels that are generally consistent with a plant at the end of its operational life. Major decommissioning activities associated with Phase 1b commenced following NRC approval of the TMI-2 Solutions issued LAR (Reference 7) that revised the License by deleting the TS, Limiting Conditions for PDMS, and Surveillance Requirements that are not applicable during decommissioning. Phase 1b will continue until the radiological source term at TMI-2 is reduced to levels that are consistent with a nuclear plant toward the end of its operational life that has not experienced a core-damage accident and FBM is packaged and stored on the ISFSI. FBM recovery and source term reduction activities that will be performed in Phase 1b include:

- FBM recovery and source term reduction of the reactor coolant system including the reactor pressure vessel, steam generators, pressurizer, and piping
- Dose reduction and decontamination of locked High Radiation Areas
- Removal and disposition of material necessary to minimize occupational dose to workers while maintaining As Low As Reasonably Achievable (ALARA) requirements
- FBM recovery and source term reduction activities associated with the Reactor Building and AFHB
- Recovery, packaging, and storage of the remaining FBM
- Packaging and transportation of LLRW as required
- ISFSI and DCSS related construction

Section 3.3.2 “Major Decommissioning Activities” discusses activities that will be performed in Phase 1b necessary to facilitate source term reduction and FBM removal.

The results of radiological surveys performed during Phase 1b will be used to determine which SSCs are removed as part of Phase 2 decommissioning. Similarly, ALARA considerations may provide the basis to perform removal of SSCs in Phase 1b.

3.1.3 Transition Activities

The TMI-2 Decommissioning Project Schedule allows for a transition period between Phase 1b and Phase 2 with the following types of activities:

- Phase 2 Planning and Project Management,
- Procurement of long lead equipment required for Phase 2,
- TMI-2 Site Maintenance and Security, and
- ISFSI Operations and Security.

TMI-2 Solutions plans to provide future updates regarding the transition period as part of the annual financial assurance report required per 10 CFR 50.82(a)(8)(v) as necessary.

3.2 Phase 2 Decommissioning

Phase 2 includes the decommissioning, license termination and site restoration activities described below.

At the commencement of Phase 2 decommissioning, the TMI-2 facility will generally be in a similar radiological condition as would a plant at the end of its operational life. The overall goal of Phase 2 is decommissioning of the TMI-2 site to a level that permits the release of the site, except for the ISFSI. Decommissioning activities that will be performed in Phase 2 include:

- Removing, packaging, and disposing of any remaining radioactive components, structural elements, and equipment in preparation for structural demolition.
- Demolishing plant structures to nominally three feet below grade.
- Backfilling the site of the existing grade elevation.

3.2.1 License Termination

Also included in Phase 2 is the preparation and execution of the License Termination Plan (LTP) and site restoration activities. The LTP will be prepared in accordance with the requirements of 10 CFR 50.82(a)(9) and will be submitted at least two years prior to the anticipated date of license termination. The LTP will include a site characterization, description of remaining dismantling activities, plans for site remediation, updated cost estimate to complete the decommissioning, any associated environmental impacts, designation of the end use of the site, and the procedures for the final radiation survey. The LTP will be developed following the guidance contained in Regulatory Guide 1.179, “Standard Format and Content of License Termination Plans for Nuclear Power Reactors.” As described in Regulatory Guide 1.179 (Reference 31), the LTP will use the guidance contained in NUREG-1575, “Multi-Agency Radiation Survey and Site

Investigation Manual (MARSSIM)" (Reference 32), to develop the final radiological survey plan and survey methods. The use of MARSSIM to develop the final radiological survey plan and survey methods will demonstrate compliance with the requirements 10 CFR 20, Subpart E, "Radiological Criteria for License Termination." Once the LTP is approved, the final remediation of the site facilities and services can commence. These activities include, but are not limited to:

- Removal of remaining plant systems, structures and components as they become nonessential to the decommissioning program, or worker health and safety (for example, waste collection and processing systems, electrical power, and ventilation systems)
- Removal of contaminated yard piping and any contaminated soil

Use of the NUREG-1575 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 final survey is complete, the results are provided to the NRC. The NRC will terminate the license if it determines that site remediation has been performed in accordance with the LTP, and that the final status radiation survey and associated documentation demonstrate that the facility is suitable for release.

3.2.2 Site Restoration

Site Restoration activities are planned to be performed during Phase 2. TMI-2 Solutions currently assumes that remaining clean 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.

3.3 GENERAL DECOMMISSIONING CONSIDERATIONS

3.3.1 Decommissioning Preparation Activities

While still in PDMS, periodic entries were made to inspect, monitor, and maintain the Reactor Building and AFHB. Entries were also made to acquire additional data to support decommissioning preparations. In the event that changing conditions were indicated, an evaluation was performed as to the need for, and form of, corrective actions to be taken. In general, areas were assessed on a case-by-case basis with the deciding factors being the area's impact on personnel exposure and the possibility of a release to the environment.

The project uses a 3-dimensional digital Building Information Model (BIM) of TMI-2 which will support various efforts including but not limited to planning work, training craft through environment familiarization without exposure to dose rates, tracking decommissioning progress as SSCs are removed, and quantifying waste take offs for shipping and estimation purposes. Additionally, TMI-2 will use remote technology

including robots equipped with gamma scanners, cameras, and 3D model scanners to collect data in the TMI-2 Reactor Building basement as well as the 305’ and 347’ elevations to create a heat map locating hot spots. TMI-2 will also use advanced analysis software to model source term reduction utilizing full removal or shielding elements.

The reconfiguration and modification of site structures and facilities will be performed to support decommissioning operations. Modifications to the Reactor Building 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 are described below.

The Decommissioning Support Building (DSB) is a proposed free-standing enclosure planned for construction west of the TMI-2 Reactor Building. The DSB is located such that equipment and material can travel from the Reactor Building’s Equipment Hatch and into this structure for processing, decontamination, and packaging. The DSB incorporates and partially envelopes the existing Containment Air Control Envelope (CACE) structure, which is constructed adjacent to the Equipment Hatch. The DSB will be a separate low-dose facility to segment, decontaminate and package radiological waste without exposing workers to high dose rates within the TMI-2 Reactor Building.

To facilitate equipment and waste transport into and out of the Reactor Building it will be necessary to remove the Reactor Building equipment hatch and expand the size of the hatch opening. The equipment hatch is approximately 8 feet deep and 23 feet in diameter and contains a personnel hatch. The existing access opening could be enlarged in multiple ways including squaring off the side and top to create a 25’-0” wide x 25’-0” high opening. This approach would take advantage of the flat face of the exterior 8’-0” thick wall. The existing opening can also be resized to accommodate larger dimensions.

The Interim Waste Storage Facility (IWSF) is a proposed in-plant interim storage area that will contain concrete storage containers and liners filled with A, B, and C waste materials, pending specific campaigns to send them to a final disposal facility. The IWSF will be located in an area of the Turbine Building (TB) operating deck that immediately surrounds the former Main Generator and Main Turbines. The TB Operating Deck is serviced by the TB Crane which has sufficient capacity to handle the liner transfer shield and the On-Site Storage Containers (OSSCs) that will provide shielded storage of the liners.

3.3.2 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 10 CFR 61.55.”

Prior to starting a major decommissioning activity, the affected components will be surveyed and plans developed to maintain occupational dose As Low As Reasonably Achievable (ALARA) and below the occupational dose limits in 10 CFR Part 20 during decommissioning. Note the approaches described below may be altered for ALARA and/or cost efficiency purposes in accordance with the TMI-2 Radiological Protection Program.

Decontamination of components and piping systems will be performed as required to minimize worker exposure. The removal, packaging, and disposal of all piping and components that are no longer essential to support decommissioning operations will be performed. This includes the removal, packaging, and disposal of SSCs attached to the reactor vessel.

Major decommissioning activities will take place in Phase 1b and Phase 2. This includes the removal and disposal of contaminated and activated major components and structures. The following discussion provides a general summary of the major decommissioning activities currently planned for TMI-2.

Decommissioning of the TMI-2 Reactor will start with Reactor Vessel Isolation. Due to the existing dose rates, the Reactor Coolant System (RCS) cannot be isolated from the Reactor Vessel (RV) using conventional methods. TMI-2 Solutions will isolate the RCS by flooding the vessel and installing and welding tapered plugs into all nozzles using the shielded work platform (SWP) previously utilized during post-accident cleanup. After the plug welds have been inspected and accepted, the water level will be raised up to the reactor vessel flange elevation. After the RV RCS Isolation is complete, the SWP will be removed in preparation for Reactor Vessel Internal (RVI) segmentation.

The segmentation effort required to prepare the RVI for packaging will be performed underwater. Mechanical segmentation technologies will be applied which includes use of slow rotating saw blades with a surface pattern that generates “easy to collect” shaped chips (no coiling).

The current plans for RVI are to perform in-vessel segmentation. This process will reduce or eliminate any potential risk of pulling the core support barrels that may have been impacted by the accident. The Plenum located in the cavity will be moved and placed on a volume reduction station (VRS) turntable where it will be cut to the appropriate size to fit into an FBM or LLRW liner. Water filtration and chip collection systems will be installed to keep dose rates low and visibility high during the project. Segmentation of each of the RVI components will be done in accordance with a predetermined segmentation plan designed to maximize the packing factor in the designated containers.

In preparation of reactor vessel (RV) segmentation, the reactor cavity sealing surface around the RV will be removed to make the gap between bio shield and RV accessible.

The free-standing thermal insulation will be removed and disposed of. The RV nozzles will be cut and capped after the inside of the RV is cleaned and dewatered. Measures to cut and cap in-core instrumentation penetrations under the RV will be taken. If additional obstacles or recesses are present in the gap, they will also be removed. At this point the vertical cuts on the RV flange section will be performed.

Tenting of the cutting area will be used to add a layer of contamination control, as required. The packaging of segments can be performed in the reactor cavity deep end or on the operating floor as appropriate for the exposure rates associated with the segments. Once the RV has been cut and packaged except for the hemispherical bottom head (HBH), the inner part of the shielding plate will be removed and the same torch cutting equipment will be used to cut the RV support skirt after the HBH is attached to the polar crane. The HBH can either be disposed of in one piece or positioned in the refueling pool for manual separation into halves. If dose rates disallow for manual segmentation, a torch guide rack can perform the separation cut while the support skirt provides stability.

Other major decommissioning activities that would be conducted include the removal and disposal of the pressurizer, steam generators, reactor coolant piping, reactor coolant pumps and motors, spent fuel pool support equipment, and contaminated concrete or metals. TMI-2 will utilize innovative technologies and chemical decontamination methods through coordination with specialty vendors to execute some major decommissioning activities. Information about technology being implemented by the decommissioning project during Phase 1b is described in Reference 33. TMI-2 Solutions plans to provide updates to the NRC and key stakeholders as the most effective technologies and chemical decontamination methods to perform Phase 1b activities are determined.

In addition to the reactor and large components discussed above, other plant components will be removed from the Reactor Building, AFHB, Turbine Building, and associated support buildings radiologically surveyed and dispositioned appropriately.

3.3.3 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 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.

LLRW generated from TMI-2 D&D activities will be managed in accordance with approved procedures and with the intent of complying with commercial disposal facility requirements. This includes the characterization of contaminated materials, packaging, transporting and disposal at a licensed LLRW disposal facility.

3.3.4 Radioactive Waste Management

A major component of the decommissioning work scope for TMI-2 is the packaging, transportation and disposing of contaminated/activated equipment, piping, concrete, and soil. A waste management plan has been developed consistent with regulatory requirements and disposal/processing options for each waste type at the time of the D&D activities (Reference 34) satisfying the Regulatory Commitment provided in Reference 35 and revised in Reference 36. LLRW will be disposed of at Energy*Solutions* Clive, Utah LLRW disposal facility assuming it meets the waste acceptance criteria(s) (WAC) for the facility. Class B and Class C LLRW will be stored in an onsite storage area until it can be transported and disposed of at the Waste Control Specialists (WCS) facility in Andrews, Texas, or other options available at that time.

LLRW from TMI-2 will be packaged to meet Department of Transportation (DOT) criteria for shipment and transported by licensed transporters. The waste management plan is 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 WAC.

Transportation will be largely by railroad in standard and specialty bulk packages, such as intermodal containers, and gondola type rail cars.

TMI-2 Solutions has developed a program to ensure proper accounting of Special Nuclear Material (SNM) is conducted throughout the decommissioning process, meeting the applicable requirements of 10 CFR 74, with applicable exemptions. Current estimates of radionuclide content will be refined using LLRW characterizations and the site final status surveys.

3.3.5 Removal of Mixed Waste

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

3.3.6 Site Characterization

To supplement the plant historical knowledge base, site characterization activities will be performed prior to and during the decommissioning process. The characterization will further the identification, categorization, and quantification of radiological, regulated, and hazardous wastes. Surveys will be conducted as required, 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 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 timeframe) in accordance with 10 CFR Part 61, "Licensing requirements for land disposal of radioactive waste." The results of the analysis inform the basis of the plans for removal, segmentation, packaging and disposal. Other reactor plant components may be classified as FBM based upon the type of material adhered to it. Disposal of these reactor plant components will be in accordance with applicable regulatory requirements.

3.3.7 Groundwater Protection and Radiological Decommissioning Records Program

Constellation manages the groundwater (GW) protection program for the TMI site in consideration of the site monitoring agreement between Constellation and TMI-2 Solutions in accordance with the Nuclear Energy Institute (NEI) Technical Report 07-07, "Industry Groundwater Protection Initiative - Final Guidance Document" (Reference 37). This program is controlled by procedures and will continue during decommissioning, and TMI-2 Solutions will ensure the GW protection program is properly managed for the site.

Records of leaks, spills and remediation efforts are retained and are retrievable to meet the requirements of 10 CFR 50.75(g). These records are used to determine area classification for purposes of performing surveys.

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.”

3.4 Phase 3: Fuel Bearing Material Management

A separate ISFSI storage pad, within the existing security boundary of the TMI ISFSI, is planned to allow for dry storage of all TMI-2 related FBM. The FBM will remain on the ISFSI until it is transferred to the DOE which retains ultimate authority and responsibility for disposal of debris material pursuant to Standard Contract DECR01-83NE44477. The ISFSI will be staffed by a security force. In addition, personnel will be assigned to maintain the ISFSI and comply with the ISFSI license commitments. Shipping of FBM will be performed when repositories for this type of waste are developed by the DOE or other disposal options are available. Following the removal of the FBM, the ISFSI site will be decommissioned, remediated, and surveyed per the NRC-approved License

Termination Plan. Following the final site survey and NRC approval, license termination will occur.

3.5 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 of decommissioning will be subject to appropriate Technical Specification, Quality Assurance Program and Emergency Plan requirements. These staffing levels do not include contractor staffing which may be used to carry out future FBM movements, plant modifications, 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.

4. SCHEDULE OF DECOMMISSIONING ACTIVITIES

Table 5-1 below provides the current TMI-2 decommissioning project schedule, which was previously provided to the NRC in Reference 38. The schedule begins with the date of license transfer and ends with the estimated date associated with completing Phase 2.

Table 5-1

Three Mile Island Unit 2 Decommissioning Project Schedule			
Description	**Start**	**End**	**Approx. Duration (years)**
Phase 1 – Planning, Engineering, Source Term Reduction			
*License Transfer Approved	12/2020	12/2020	-
*Contract Closing & Asset Transfer	12/2020	12/2020	-
*DECON License Amendment Request Approval • Begin Phase 1b	02/2021	03/2023	2
Infrastructure Upgrades	07/2022	12/2027	5.5
Decommissioning Electrical & Temporary Power Upgrades	07/2022	10/2026	4.5
Large Components Removal	05/2023	12/2027	5
Field Waste Preparations • Liquid Radwaste & Water Processing	02/2023	07/2025	2
Rad Building Interior/Systems D&D	05/2023	01/2029	6

Fuel Debris Material Program • ISFSI Design & Construction • Procure Debris Material Casks • Debris Material Transfer Operations	05/2023	10/2028	5.5
Reactor Vessel (RV) • RV Isolation • RV Internals Segmentation & Removal • RV Segmentation & Removal	10/2023	01/2028	4
Phase 1b Field Work Complete • Finish Reactor Building Source Term & Debris Material Removal	03/2029		-
Phase 2 – Decommissioning & License Termination			
Planning & Transition Activities	2029	2031	3
TMI-2 Rad Building Demo • Auxiliary/Fuel Handling Building • Reactor Building	2032	2035	3
Field Waste Operations • Class B/C Waste Loadout	2035	2037	1.5
Site Restoration • Clean Building Demo • Cooling Tower Demo	2032	2034	2.5
Final Status Surveys	2036	2037	1.5
Phase 2 Field Work Complete	2037		-

*Completed

Phase 3 (FBM Management) will commence following loading of the final cask containing TMI-2 FBM onto the TMI-2 ISFSI and will continue in parallel with and following the completion of Phase 2 until final disposal. TMI-2 Solutions developed a storage and disposal plan for any remaining FBM until title to the FBM is transferred to the DOE for disposal. The long-term management of FBM is addressed in the TMI-2 Solutions "Plan for Management of Debris Material" (Reference 34). The costs associated with Phase 3 are included in the Decommissioning Cost Estimate presented in Table 2.

5. ESTIMATED COSTS OF DECOMMISSIONING ACTIVITIES

As presented in PSDAR Revision 3 (Reference 35), the decommissioning cost analysis completed in December 2018 was utilized to obtain site-specific commodity quantities, and then Energy*Solutions* applied its weights and estimated unit cost factors, which take into consideration the Energy*Solutions* execution strategy and the methods and schedule discussed in Section 4 above, to arrive at an updated estimated cost to decommission TMI-2 which was provided in Reference 39. Energy*Solutions* also utilized

the latest available industry experience (e.g., information from the Zion and La Crosse projects, and 25 years of experience in planning and engineering for other facilities, including complex decommissioning).

In Reference 40, the NRC requested an updated site-specific Decommissioning Cost Estimate, which TMI-2 Solutions provided in Reference 41. The cost estimate in Table 5-2 recognizes the present state of TMI-2 decontamination, contingency for unknown or uncertain conditions, the availability of low- and high-level radioactive waste disposal sites, and site remediation requirements. The methodology used to develop the cost estimate follows the basic approach developed by the Atomic Industrial Forum (now the Nuclear Energy Institute) in AIF/NESP-036, “Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates.”

The status of TMI-2 decommissioning funding will continue to be reported to the NRC in accordance with 10 CFR 50.75(f)(1) and 10 CFR 50.82(a)(8)(v). This report will include, at a minimum, the assumptions used in the rates of escalation of decommissioning costs and rates of earnings used in funding projections. Additionally, TMI-2 Solutions, in accordance with 10 CFR 50.82(a)(7), will inform the NRC in writing (with a copy sent to 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. TMI-2 Solutions will also include an updated site-specific estimate of remaining decommissioning costs in the License Termination Plan in accordance with 10 CFR 50.82(a)(9)(ii)(F). The annual 10 CFR 50.75(f)(1) reports continue to demonstrate that the current fund balances are adequate to cover the expected future cost of decommissioning. If future estimated costs or funding levels change significantly, TMI-2 Solutions will make the necessary adjustments to ensure that sufficient funds remain available for decommissioning.

Table 5-2

Three Mile Island Unit 2 Decommissioning Cost Summary ** (thousands of 2024 dollars)	
Description	**Total Cost**
Planning & Transition	-
Engineering & Procedures	-
Site Upgrades & Preparations	44,628
Large Component & Building Source Term Reduction	80,456
Waste Packaging Transportation & Disposal	78,004
Other Direct Costs	69,555
Undistributed Costs *	175,648
Estimate To Go (ETC)	**448,291**
Contingency	52,988
PHASE 1 TOTAL - SOURCE TERM REDUCTION	**501,278**
Planning & Transition	2,438
Engineering & Procedures	-
Large Component Removal & Building Demolition	39,942
Waste Packaging, Transportation & Disposal	230,666
Final Surveys & License Termination	8,151
Site Restoration	33,253
Other Direct Costs	9,116
Undistributed Costs *	70,157
Estimate To Go (ETC)	**393,723**
Contingency	85,779
PHASE 2 TOTAL - DECOMMISIONING & LICENSE TERMINATION	**479,502**
ISFSI Security & Operations	67,175
Debris Material Transfer	3,841
ISFSI Decontamination & Demolition	3,260
Undistributed Costs *	20,504
Estimate To Go	**94,780**
Contingency	9,869
PHASE 3 TOTAL – DEBRIS MATERIAL STORAGE, DOE TRANSFER & ISFSI DECOMMISSIONING	**104,649**
TOTAL PROJECT	**1,085,429**

*Undistributed Costs may also be referred to as "Allocated Support Costs"
**Total Project Cost does not include estimated DOE Reimbursements that were assumed in the funding analysis.

6. ENVIRONMENTAL IMPACTS OF DECOMMISSIONING ACTIVITIES

To support the PSDAR environmental impacts review, the environmental effects of decommissioning activities planned for TMI-2 were evaluated to determine if potential environmental impacts are bounded by previously issued environmental impact statements. 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-2 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 15) (Referred to as the Decommissioning GEIS or GEIS), dated November 2002.

- NUREG-1496, Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities (Reference 42), dated July 1997.

- Atomic Energy Commission, Final Environmental Statement Related to the Operation of Three Mile Island Nuclear Station, Units 1 and 2 (Reference 43) (Referred to as the FES), dated December 1997.

- NUREG-0112, Final Supplement to the FES Related to the Operation of Three Mile Island Nuclear Station, Unit 2 (Reference 44) (Referred to as the Final Supplement to the FES), dated December 1997.

- NUREG-0683, Final Programmatic Environmental Impact Statement Related to Decontamination and Disposal of Radioactive Wastes Resulting from March 28, 1979 Accident Three Mile Island Nuclear Station, Unit 2 Volumes 1 and 2 (Reference 8), dated March 1981.

- NUREG-0683, Supplement No. 1, Final Report, Programmatic Environmental Impact Statement Related to Decontamination and Disposal of Radioactive Wastes Resulting from March 28, 1979 Accident Three Mile Island Nuclear Station, Unit 2, Final Supplement Dealing with Occupational Radiation Dose, October 1984 (Reference 9), dated October 1984.

- NUREG-0683, Supplement No. 2, Final Report, Programmatic Environmental Impact Statement Related to Decontamination and Disposal of Radioactive Wastes Resulting from March 28, 1979 Accident Three Mile Island Nuclear Station, Unit 2, Final Supplement Dealing with Disposal of Accident Generated Water, June 1987 (Reference 10), dated June 1987.

- NUREG-0683, Supplement 3, Programmatic Environmental Impact Statement Related to Decontamination and Disposal of Radioactive Wastes Resulting from March 28, 1979 Accident Three Mile Island Nuclear Station, Unit 2, Final Supplement Dealing with Post Defueling Monitored Storage and Subsequent Cleanup, August 1989 (Reference 11), dated August 1989.

As required, site-specific impact assessments were conducted for threatened and endangered species and environmental justice. Site-specific assessments were also performed for decommissioning activities beyond the "operational area," as that term is defined in the Decommissioning GEIS (Reference 15). Although the TMI-2 site boundary is the area under the ownership and control of TMI-2 Solutions, for the purpose of assessing decommissioning environmental impacts, the operational area at TMI-2 is considered to consist of the larger Three Mile Island site, including 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.

The levels of significance assigned to site-specific environmental impacts are classified as small, moderate, or large, as defined in the decommissioning GEIS (Reference 11).

TMI-2's decommissioning plans are consistent with the methods assumed by NRC in NUREG 0683, “Programmatic Environmental Impact Statement” and associated supplements (References 8, 9, 10, and 11) and the Decommissioning GEIS (Reference 15). No unique site-specific features or additional unique aspects of the planned decommissioning have been identified beyond those discussed in the PEIS and the associated supplements. Also, TMI-2 Solutions has concluded that the environmental impacts associated with planned TMI-2 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.

As presented in Section 3, “Description of Decommissioning Activities,” administrative, regulatory, and engineering planning will occur as part of Phase 1a, while TMI-2 remains in PDMS. Upon entry into DECON, major decommissioning activities begin with Phase 1b, which entails activities necessary to complete the cleanup from the March 28, 1979 accident (i.e., source term reduction and FBM removal). Phase 1b decommissioning activities are evaluated against the potential environmental impacts analyzed in the PEIS. The objective of Phase 1b decommissioning is to achieve building and equipment decontamination to the point where general area dose rates approximate those of an undamaged reactor nearing the end of its operating life. At the completion of Phase 1b, TMI-2 will prepare for Phase 2 decommissioning which entails typical D&D activities. Decommissioning activities performed in Phase 2 are assessed against the GEIS.

6.1 Environmental Impact of TMI-2 Decommissioning

The following is a summary of the reasons for reaching the conclusions that the environmental impacts of decommissioning TMI-2 are (1) bounded by the PEIS and supplements and 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. Each environmental resource evaluated in the GEIS is addressed. Further, no unique site-specific environmental features or unique aspects of the planned decommissioning activities have been identified.

6.1.1 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.

On-site 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. TMI-2 Solutions anticipates that backfill for the demolished building and structure foundations would be procured locally from an offsite source. 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). TMI-2 Solutions will comply with state regulations regarding the use of fill materials and will obtain permits as needed.

TMI-2 Solutions has determined that onsite land to be used to support decommissioning at TMI-2 has been previously disturbed and decommissioning activities at TMI-2 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. TMI-2 Solutions concludes that anticipated onsite land use impacts are bounded by the GEIS.

6.1.2 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.

Onsite groundwater wells are provided by TMI-1, these wells supply water for water consumption at TMI-2.

Since the shutdown of TMI-2 and entry into PDMS, the demand for water has decreased significantly below the demand during operation. The operational demand for cooling water, makeup water, and service water has ceased. The demand for water needed to conduct plant decommissioning activities (flushing piping, hydro-lasing, dust abatement, etc.) will be less than the demand for industrial water supply during operation.

Because TMI-2 Solutions expects water use during TMI-2 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-2's design, location, configuration, operating history, or decommissioning plans that would alter or contradict this generic conclusion, TMI-2 Solutions concludes that decommissioning water use impacts for TMI-2 are bounded by the analysis in the GEIS.

6.1.3 Water Quality

Decommissioning activities with potential for impacting surface water quality include FBM 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-2 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 regulatory agencies, and guided by PADEP approved Erosion and Sediment Control BMPs. TMI-2 Solutions 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. TMI-2 Solutions 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-2 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 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 of 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-2's design, location, configuration, operating history, or decommissioning plans that would alter or contradict this generic conclusion and TMI-2 Solutions would comply with regulatory and permit requirements to protect surface water and groundwater resources, TMI-2 Solutions has determined that impacts of decommissioning on water quality would be small and bounded by the analysis in the GEIS.

6.1.4 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-2 decommissioning, reasonable and appropriate control measures such as wetting of soil piles and concrete structure demolition by hammering, 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, TMI-2 Solutions will maintain existing air permits for equipment that will continue to be used during TMI-2 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.

Demolition of the TMI-2 cooling towers may 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-2 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-2 '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, TMI-2 Solutions concludes that air quality impacts from TMI-2 decommissioning activities are bounded by the analysis in the GEIS.

6.1.5 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-2 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.

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). 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.

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. Prior to removal of the TMI-2 owned and controlled buildings and structures, TMI-2 Solutions will ensure processes are in place such that any potential impacts to aquatic species are avoided (Reference 45). Therefore, the GEIS concluded that aquatic impacts from decommissioning activities would be small.

Ground disturbances would be governed by local and state NPDES regulations to minimize runoff and sedimentation to protect surface water resources as discussed in Section 6.1.3. 25 Pa. Code Chapter 105, Dam Safety and Waterway Management, as well as the Clean Water Act (CWA) Section 404 permit requirements would apply for potential impacts to wetlands or other water resources. Given that these activities would be conducted within the operational area and in compliance with applicable regulations to protect surface water quality, impacts to aquatic communities would be small.

In conclusion, TMI-2 Solutions has determined that impacts of TMI-2 decommissioning on aquatic resources would be small.

6.1.6 Terrestrial Ecology

Section 4.3.6.4 of the GEIS maintains that “for 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 11). NRC staff concluded 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 6.1.7).

Terrestrial habitats in the vicinity of TMI-2 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 46), and the more recent Three Mile Island Wildlife Management Plan (Reference 47). 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.

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-2 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. Prior to the removal of the TMI-2 owned and controlled buildings and structures, TMI-2 Solutions will ensure that processes are in place such that any potential impacts to terrestrial species are avoided (Reference 45). Therefore, TMI-2 Solutions concludes that impacts of TMI-2 decommissioning on terrestrial resources are small and bounded by the GEIS.

6.1.7 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.

The species in Table 6-1 below are federally listed or proposed as endangered or threatened in Dauphin, Lancaster or York counties. No bog turtles, Northeastern bulrushes, Northern long-eared bats, dwarf wedgemussels, Indiana bats, or Atlantic sturgeons have been observed on or immediately adjacent to TMI.

Table 6-1
Federally Protected Species in Dauphin, Lancaster, and York Counties, PA

County	Scientific Name	Common Name	Federal Status*	State Status**
Dauphin, Lancaster, York	*Acipenser oxyrinchus*	Atlantic sturgeon (Fish)	LE	PaE
Dauphin	*Scirpus ancistrochaetus*	Northeastern bulrush (Flowering Plant)	LE	PaE
Lancaster , York	*Alasmidonta heterodon*	dwarf wedgemussel (Clam)	LE	PaE
Dauphin, Lancaster York	*Myotis sodalist*	Indiana bat (Mammal)	LE	PaE
Dauphin, Lancaster	*Myotis septentrionalis*	Northern long-eared bat (Mammal)	LE	PaE
Lancaster, York	*Glyptemys muhlenbergii*	bog turtle (Reptile)	LT	PaE
Dauphin, York, Lancaster	*Lasmigona subviridis*	green floater (Clam)	PT	No current State status
Dauphin, York, Lancaster	*Danaus plexippus*	monarch butterfly (Insect)	Candidate	No current State status
Dauphin, York, Lancaster	*Perimyotis subflavus*	tricolored bat (Mammal)	PE	PaE

*LE – Listed Endangered, LT – Listed Threatened, PE – Proposed Endangered, PT – Proposed Threatened
** PaE – Pennsylvania Endangered, DL – Delisted
Data from USFW Environmental Conservation Online System (ECOS) & Pennsylvania Natural Heritage Program, 2024

The U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) tool identifies the following species as potentially occurring on or near the TMI site: Indiana bat, northern long-eared bat, tricolored bat, green floater, monarch butterfly, and northeastern bulrush (Reference 48). TMI-2 Solutions requests reviews from the Pennsylvania Natural Diversity Inventory (PNDI) if a decommissioning activity requires a new permit or revision to an existing permit as determined by the TMI-2 Environmental Screening Assessment process, or at least prior to expiration of the most recent PNDI review obtained, whichever is sooner, to ensure that agency determinations and responses remain valid for ongoing and near-term planned decommissioning activities. If the presence of the Indiana bat, northern long-eared bat, tricolored bat, green floater, monarch butterfly, or northeastern bulrush is observed on or near the TMI site prior to

the removal of TMI-2 owned and controlled buildings, TMI-2 Solutions will consult with appropriate State and Federal resource agencies to ensure that agency concerns are addressed such that any potential impact to these species is avoided (Reference 45).

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. Historically there have been active bald eagle nests on Three Mile Island, notwithstanding their proximity to a busy, noisy industrial facility. 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, public address 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. Since June 2021, two deceased peregrine falcons have been identified onsite. TMI-2 Solutions promptly notified the Pennsylvania Game Commission and took the necessary actions to dispose of the falcons in accordance with the Commission’s direction and the TMI-2 Environmental Management Program. Peregrine falcons are known to exhibit a high degree of nest fidelity, returning to the same breeding territory and nest location year after year. If the peregrine falcons continue to nest on the TMI-2 Reactor Building and present a risk of effecting the schedule for demolishing TMI-2 structures during the falcon nesting season, TMI-2 Solutions plans to contract with specialists prior to building demolition to determine the most feasible method to prevent the falcons from nesting on the structure without harming them and attempt to relocate their nesting site.

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. TMI-2 Solutions will consult with state and federal resource agencies before Major decommissioning

activities in water 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.

The American holly (*Ilex opaca*), state listed as threatened, was observed in the southern portion of the island during a Site Assessment and Wildlife Opportunities Report carried out for TMI-1 license renewal. With the exception of the bald eagle, peregrine falcon, osprey, and American holly, no additional known occurrences of state-listed species are known on TMI.

Decommissioning activities with greatest potential for directly and indirectly affecting terrestrial plant and animal communities are those scheduled, when major reactor structures are to be demolished such as the TMI-2 cooling towers using either explosives or mechanical means. As discussed in Section 6.1.1, above, 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-2 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. 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 the TMI-2 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 hammers, concrete and rebar saws and other extremely noisy equipment. These demolition and dismantlement activities are likely to take several weeks or months at a time. Although birds and small mammals on Three Mile Island have apparently become accustomed to traffic noise, diesel generator startup noise, public announcement 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 zone of disturbance generally extends only 400-800 feet from a construction site. The northern eagle nest is approximately 2200 feet from the closest structure that will be demolished, the TMI-2 auxiliary building.

The removal of TMI-2 buildings and structures will be performed in accordance with the TMI-2 Environmental Management Program, which ensures that decommissioning activities are conducted in a manner that avoids or minimizes adverse impacts to the environment in compliance with applicable permits and environmental authorizations. TMI-2 Solutions will consult with State and Federal resource agencies during the planning process for removal of the TMI-2 owned and controlled buildings and structures to ensure that agency concerns are addressed. TMI-2 Solutions will ensure processes are in place such that any potential impacts to terrestrial or aquatic species, as well as any threatened or endangered species observed on or near the TMI operational area, are avoided (Reference 45).

NRC has determined that potential impacts of decommissioning on threatened and endangered species must be evaluated on a site-specific basis. TMI-2 Solutions has determined that none of the planned decommissioning activities at TMI-2 would eliminate or degrade the natural habitat of any state or federally listed species. The TMI-2 Reactor Building, which has been used by nesting peregrine falcons for the last several years would be razed. Any indirect (disturbance-related) impacts from construction noise and human activity related to TMI-2 decommissioning 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. TMI-2 Solutions therefore concludes that adverse impacts to threatened and endangered species from TMI-2 decommissioning activities would be small but addressed in accordance with appropriate regulations.

Based on the site-specific findings summarized in this section, TMI-2 Solutions concludes that TMI-2 decommissioning activities are not likely to adversely affect any threatened or endangered species and will have no effect on any designated critical habitat. However, in the future, when TMI-2 decommissioning activities, such as demolition or disturbance of land areas that could affect a protected species have been finally determined and scheduled, TMI-2 will update the site-specific assessment of environmental impacts to protected species in the PSDAR, as needed. To comply with its continuing obligation under 10CFR 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.

6.1.8 Radiological

The GEIS considered radiological doses to workers and members of the public in Section 4.3.8 when evaluating the potential consequences of decommissioning activities.

6.1.8.1 Phase 1b Occupational Dose

Phase 1b includes source term reduction and decontamination of the plant to the point where general area dose rates approximate those in an undamaged reactor facility nearing the end of its operating life. Phase 1b is considered a continuation of the

cleanup that was not completed prior to entry into PDMS. In other words, it meets the definition of the delayed cleanup alternative defined by NRC staff in PEIS Supplement 3 (Reference 11).

PEIS, Supplement 3, Table 3.18 “Occupational Radiation Dose Estimate for Delayed Cleanup,” provided estimated occupational dose ranges for remaining cleanup activities. The occupational radiation dose from placing the TMI-2 facility in PDMS, maintaining PDMS for 33 years, and then completing cleanup is estimated to be 1300 to 3300 person-rem. These doses are in addition to the occupational dose already received and the dose required to complete defueling.

As discussed in PEIS Supplement 3, the estimates were based on a task-by-task analysis of the work to be done and were presented as a range of values because of uncertainties in the cleanup process, the technology that will be available when post-storage cleanup is performed as well as the location and depth of penetration of the contamination. For example, it is not known if workers would need to enter the basement during decontamination, and if waste would have to be manually packaged when removed from the basement. A discussion of the methodology used to calculate the occupational doses is found in PEIS Supplement 3, Appendix H.

Phase 1b corresponds to approximately 33 years from the date of publication of PEIS Supplement 3 and has a scheduled duration of approximately 6.5 years which makes it reasonable to assume an occupational dose estimate for remaining cleanup activities in Phase 1b of 1300 to 3300 person-rem.

Since the 1979 accident, significant radioactive decay has occurred resulting in greatly reduced impacts of occupational dose to plant workers. The TMI-2 Radiation Protection Program and associated implementing procedures will incorporate ALARA principles into work activities to manage occupational dose to the workforce and minimize radiation exposure to the extent practicable. In addition, advances in technology since entry into PDMS will be implemented in order to manage occupational dose. Examples of technology and methods for consideration to achieve ALARA goals include robotics, remote dismantling of systems and components, remote visual monitoring and remote radiological monitoring.

LLRW will be disposed of at Energy*Solutions* Clive, Utah LLRW disposal facility assuming it meets the waste acceptance criteria(s) (WAC) for the facility. Class B and Class C LLRW will be disposed of at the Waste Control Specialists (WCS) facility in Andrews, Texas.

Occupational dose will be limited to 5 rem/year total effective dose equivalent (TEDE) as required by 10 CFR 20.1201(a)(1)(i) and will be administratively controlled as specified in the Radiation Protection Program to a lower value to ensure that personnel do not exceed regulatory limits. TMI-2 Solutions has developed a Radiation Protection Program that addresses occupational dose administrative limits. The implementation of administrative limits ensures compliance with regulatory limits for occupational dose. It

is also anticipated that administrative practices will result in equitable distribution of dose among available qualified workers to ensure collective dose to the work force is maintained ALARA. Dose estimates and tracking of accumulated occupational dose will be an integral part of the radiological work planning process during Phase 1b. As planning for the Phase 1b scope of source term reduction progresses, planners will develop detailed source term removal plans for each cubicle or component of the plant using current radiological survey data, plant drawings and walk down information.

TMI-2 Solutions has and will continue to evaluate occupational dose impacts as new data are collected during Phase 1b activities. Administrative controls, as well as the use of advanced technologies will ensure that potential impacts of radiological dose to workers will be small.

6.1.8.2 Phase 2 Occupational Dose

The goal of Phase 1b is to reduce source term and remove FBM to the extent where general area dose rates approximate those in an undamaged reactor facility nearing the end of its operating life. Therefore, following the completion of Phase 1b, decommissioning activities performed during Phase 2 represents an undamaged reactor decontamination and dismantlement. Because the ALARA program continues to reduce occupational doses, the 2002 GEIS is expected to bound occupational dose impacts for workers during Phase 2.

In much the same manner as Phase 1b, occupational dose to workers during Phase 2 will be limited to 5 rem/year TEDE as required by 10 CFR 20.1201(a)(1)(i) and will be administratively controlled to a lower value to ensure that personnel do not exceed regulatory limits. TMI-2 Solutions' Radiation Protection Program addresses occupational dose administrative limits. The implementation of administrative limits ensures compliance with regulatory limits for occupational dose. It is also anticipated that administrative practices will result in equitable distribution of dose among available qualified workers to ensure collective dose to the work force is maintained ALARA. Dose estimates and tracking of accumulated occupational dose will be an integral part of the radiological work planning process during Phase 2.

TMI-2 Solutions will continue to evaluate occupational dose impacts as planning for Phase 2 proceeds and as new data are collected during Phases 1b and Phase 2 activities. Administrative controls, as well as the use of advanced technologies will ensure that potential impacts of radiological dose to workers during Phase 2 will be small.

TMI-2 Solutions has elected to decommission the TMI-2 facility using the DECON method. It is expected that the occupational dose required to complete the decommissioning activities at TMI-2 will be within the range of the cumulative occupational dose estimates for decommissioning PWR plants of 560-1215 person-rem provided in Table 4-1 of the GEIS. At the commencement of Phase 2 decommissioning, the TMI-2 facility will generally be in a similar radiological condition as would a plant at

the end of its operational life. Therefore TMI-2 is bounded by the PWRs evaluated in the GEIS. The Radiation Protection Program and associated implementing procedures ensures that occupational dose is maintained ALARA and well within 10 CFR Part 20 limits. There are no unique characteristics at TMI-2 in Phase 2 that would invalidate this conclusion.

6.1.8.3 Public Dose

Section 4.3.8 of the GEIS considers doses from liquid and gaseous effluents when evaluating the potential impacts of decommissioning activities on the public. Table G-15 of the GEIS compared effluent releases between operating facilities and decommissioning facilities and concluded that decommissioning releases are lower. The GEIS also concluded that the collective dose and the dose to the maximally exposed individual from decommissioning activities are expected to be well within the regulatory standards in 10 CFR Part 20 and Part 50.

Prior to the March 28, 1979 accident at Unit 2, there was no detectable radiological impact due to the normal operation of either unit. From March 28, 1979 on, there were some transient, low level increases in the immediate radioenvironment. The increases were limited to iodine-131 in air and milk, and the gamma immersion dose. The average incremental radiological doses associated with radioactivity increases along critical pathways were:

- Inhalation of airborne iodine-131 resulted in about 1.38 mrem to the adult thyroid;
- ingestion of iodine-131 in cows' milk resulted in about 0.67 mrem to the infant thyroid, and
- the gamma immersion dose resulted in about 2.4 mrem to the adult

There were no detectable increases found in the local off-site radioenvironment due to the accident after April 12, 1979, for gamma immersion dose, May 19, 1979, for iodine-131 in cows' milk, and May 3, 1979, for iodine-131 in air.

The expected radiation dose to the public from TMI-2 decommissioning activities will be maintained within regulatory limits through the continued application of the TMI-2 Radiation Protection Program and associated implementing procedures as well as contamination controls combined with the reduced source term available in the facility.

Section 4.3.8 in the GEIS states that radionuclide emissions in gaseous and liquid effluents are reduced in facilities undergoing decommissioning. A review of the Annual Reports of environmental monitoring at TMI-2 for the years from 1979 through 2019 demonstrate that radioactivity levels in the offsite environment are not measurably increasing, and that the operation of TMINS had no adverse radiological impact on the environment. It is reasonable to expect that public doses during decommissioning would also be well within such limits. Therefore, TMI-2 Solutions concludes that the impacts of TMI-2 decommissioning on public dose are small and are bounded by the GEIS.

6.1.8.4 Conclusion

TMI-2 Solutions concludes that radiological impacts of TMI-2 decommissioning are small for the following reasons:

- During Phase 1b the TMI-2 Radiation Protection Program and associated implementing procedures will ensure that dose at the site boundary remain below regulatory limits. Implementation of these procedures take into account detailed work planning and execution of the D&D work and support activities, including measures to maintain occupational dose ALARA and below the occupational dose limits in 10 CFR Part 20 during decommissioning.
- At the conclusion of Phase 1b decommissioning, and prior to the commencement of Phase 2 decommissioning, the TMI-2 facility will generally be in a similar radiological condition as would a plant at the end of its operational life. Therefore TMI-2 is bounded by the PWRs evaluated in the GEIS. The GEIS generic evaluation of radiological impacts applies to an undamaged PWR. Both occupational dose and public dose should be similar to those of other PWR plants, indicating that TMI-2 doses in Phase 2 are typical.
- Deferred or delayed decommissioning as in the case of PDMS allows for radionuclides to decay over time, resulting in less dose at the time of decommissioning.
- Public doses during TMI-2 PDMS operations have been well within the NRC-established public dose limits and are reasonably expected to decrease during decommissioning.

Therefore, TMI-2 Solutions further concludes that the radiological impacts of TMI-2 decommissioning are bounded by the analysis in the PEIS for Phase 1b and by the GEIS for Phase 2.

6.1.9 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, nonnuclear fuel-related accidents, and nuclear fuel-related accidents. NRC determined that many of 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 49). 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.

There is no spent fuel being stored in a spent fuel pool at TMI-2. The TMI-2 facility is in a defueled condition; 99% of the fuel has been removed from the site and is being safely stored in an ISFSI at the Idaho National Laboratory. There are no design basis accidents (DBA) associated with TMI-2 and the capability to prevent or mitigate the consequences of a DBA are not applicable to TMI-2.

An unanticipated event and a radiological accident have been evaluated. The fire inside of containment unanticipated event is applicable in Phase 1a (PDMS) and a fire inside the Reactor Building with the Reactor Building ventilation and purge in operation is applicable during decommissioning in Phase 1b and Phase 2.

GPU Nuclear performed an unanticipated events analysis as presented in Appendix H, Section 8.2 of the PDMS Safety Analysis Report (SAR). The purpose of the analysis was to determine the unanticipated event that produces the bounding radiological dose at the site boundary during PDMS. This provides the measure upon which to ensure that any activity performed during PDMS will not exceed the radiological dose at the site boundary. The guidance of NUREG/CR-2601 “Technology, Safety and Costs of Decommissioning Reference Light Water Reactors following Postulated Accidents,” (Reference 50) was used as the basis for the selection of the unanticipated events that were analyzed. The results of this analysis indicate that a fire in the Reactor Building with the Reactor Building purge system in operation is the unanticipated event that produces the bounding radiological dose at the site boundary during Phase 1a (PDMS). No major decommissioning activities will occur during Phase 1a. Therefore, an unanticipated event involving a major fraction of the remaining inventory of radionuclides is not likely.

The fire inside of the Reactor Building with the Reactor Building ventilation and purge in operation was evaluated by the NRC as part of the Constellation request for exemption from portions of 10 CFR 50.47 and 10 CFR 50, Appendix E (Reference 51). Per the TMI-2 Fire Protection Program Evaluation (Reference 52) which was used as an input to the exemption request, the dose at the exclusion area boundary is 13.5 mrem expressed as a bone dose. Due to the isotopic mix (e.g., negligible amounts of iodine) and the nature of potential releases (i.e., particulate matter), a more restrictive basis (i.e., the critical organ) for comparison was selected for reporting dose for TMI-2 fires.

The results of the NRC evaluation confirm the conclusions presented in the PDMS Safety Analysis Report. The TMI-2 facility would not have consequences that could potentially exceed the applicable dose limits in 10 CFR 100.11 and 10 CFR 50.67 and the dose acceptance criteria in Regulatory Guide 1.183 “Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors” (Reference 53). The analysis demonstrates that 365 days after permanent cessation of power operations, the radiological consequences of the analyzed unanticipated event will not exceed the limits of the EPA early phase Protective Action Guides (PAGs) at the Exclusion Area Boundary (EAB). The NRC approved the exemption request to eliminate

offsite emergency response (Reference 54) in part based upon the FPPE (Reference 52). As stated in Reference 54 the NRC staff concluded that granting the requested exemptions to Constellation would provide reasonable assurance that an offsite radiological release will not exceed the limits of the EPA PAGs at the site's exclusion area boundary for remaining applicable design-basis accidents. The summary of the NRC analysis of this event relative to dose at the site boundary is presented in Reference 54.

After the issuance of Reference 54, Revision 12 of the FPPE (Reference 52) was revised and reissued as Revision 13 (Reference 55). Revision 13 of the FPPE uses updated source term information which accounts for 26 years of decay (1992 through 2018) as well as accounting for additional loose contamination. Federal Guidance Reports 11 and 12 are applied for dose conversion factors. TMI-2 issued a comprehensive revision of FPPE Revision 13 to reflect the transition from Constellation to ESJ responsibility, creating Revision 0 of the new FPPE, TMI2-FP-EVA-0001 (Reference 56).

The results presented in Reference 56 indicate that the fire inside of the Reactor Building with the Reactor Building ventilation and purge in operation remains the most limiting unanticipated event and that the dose at the exclusion area boundary is 12.4 mrem expressed as a bone dose which is less than 13.5 mrem as reported in Reference 28. The dose at the site boundary does not exceed the limits presented in 10 CFR 100.11 and the EPA PAGs.

Prior to performing any major decommissioning activities, an analysis of credible accidents that may occur during Phase 1b was performed in order to determine the limiting radiological dose at the site boundary.

Reference 14 contained an evaluation of a high integrity container (HIC) fire. This evaluation considered the activity released from a HIC containing expended resins, assumed an unfiltered release for a 2-hour duration fire and 100 percent combustion of the contents of the HIC. Per Reference 20 this event is no longer possible as TMI-2 Solutions will use inorganic, thus non-combustible, media for processing water at TMI-2.

Reference 20 contains an updated TMI-2 Event Analysis which includes a variety of events selected for further review to assess a bounding event for TMI-2 during DECON. The TMI-2 Event Analysis confirms that the 100 mrem Total Effective Dose Equivalent (TEDE) at the Exclusion Area Boundary will not be exceeded, and that the most limiting event is a fire in the TMI-2 Reactor Building while the Reactor Building purge is operating at the nominal flowrate through the entire duration of the fire. All fire zones in the Reactor Building were analyzed with respect to resultant off-site dose. The calculated result of an off-site dose from a puff release without benefit of the HEPA filters was determined to be 14.6 mrem (Reference 23), less than the 25 mrem limit set by the Offsite Dose Calculation Manual.

There are no postulated accidents that can occur inside of the Reactor Building during

Phase 1b or Phase 2 that result in the dose at the site boundary exceeding the limits of 10 CFR 100.11 and the EPA PAGs including such times as when the enlarged equipment hatch is open. The D&D process includes many evolutions that will require the equipment hatch and other RB access points to be open to allow movement of equipment, waste, and other materials into and out of the Reactor Building. The Radiation Protection Program identifies the controls that will be implemented through procedures during D&D activities occurring inside of the Reactor Building. Implementation of these procedures take into account detailed work planning, and execution of the D&D work and support activities, including measures to maintain occupational dose ALARA and below the occupational dose limits in 10 CFR Part 20 during decommissioning.

TMI-2 Solutions concludes that radiological accident impacts of decommissioning activities at TMI-2 would be small and are bounded by the analysis in the GEIS. TMI-2 Solutions knows of no unique features or conditions at TMI-2 that would lead to a conclusion concerning radiological accidents different than that reached in the GEIS.

6.1.10 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-2 decommissioning will be conducted under a comprehensive non-radiological safety and health program meeting OSHA, NRC, and TMI-2 Solutions procedural requirements. Historically, the nuclear power industry has lower rates of injuries and illnesses than other industries. Demolition of the TMI-2 cooling towers may 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 6.1.4, 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-2 site-specific decommissioning plan poses no unique hazards from what was evaluated in the GEIS. Accordingly, TMI-2 Solutions concludes that anticipated impacts resulting from non-radiological occupational issues during TMI-2 decommissioning are small and thus bounded by the analysis in the GEIS.

6.1.11 Cost

A site-specific decommissioning cost analysis is presented in Section 5.0. Section 4.3.11 of the GEIS recognizes that an evaluation of decommissioning cost is not a National Environmental Policy Act (NEPA) requirement. Therefore, a bounding analysis

is not applicable.

6.1.12 Socioeconomics

Section 4.3.12 of the GEIS evaluated changes in workforce and population changes, changes in local tax revenue, and changes in public services. The GEIS concluded that socioeconomic impacts are neither detectable nor destabilizing and that mitigation measures are not warranted.

The results of the TMI-1 socioeconomic analysis state that impacts to socioeconomic resources as a result of TMI-1 decommissioning are small and bounded by the analysis in the GEIS (Reference 57). Considering TMI-2 was in PDMS for approximately 29 years the impact upon socioeconomic resources while maintaining the PDMS condition are considered small relative to the results of TMI-1 socioeconomic analysis. Furthermore, the workforce associated with TMI-2 decommissioning at its highest is small, less than 200 individuals, as compared to the last two TMI-1 refueling outages (T1R22 (2017) 936 contractors badged, T1R21 (2015) 1705 contractors badged) and not expected to destabilize housing prices or impact tax revenues as discussed in the TMI-1 socioeconomic analysis. Therefore, based on the findings summarized above, TMI-2 Solutions concludes that impacts to socioeconomic resources from TMI-2 decommissioning would be small and thus bounded by the analysis in the GEIS.

6.1.13 Environmental Justice

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

Since TMI-2 occupies the same operational area as TMI-1, and in consideration of the proximity of TMI-1 to TMI-2, it is concluded that the results of the site-specific assessment of environmental justice prepared by Constellation (Reference 57) for TMI-1 is applicable to TMI-2.

The Constellation site-specific assessment of TMI-1 examined the geographic distribution of minority and low-income populations within a 50-mile radius of TMINS 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 TMINS. 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 TMINS.

The site-specific assessment performed for TMI-1, 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.

TMI-2 Solutions concurs with the results of Constellation's analysis and therefore concludes that the effects of decommissioning TMI-2 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-2.

6.1.14 Cultural, Historic, and Archeological Resources

In Section 4.3.14.2 of the GEIS, the NRC states that impacts to cultural, historical, or archaeological resources are considered detectable if an activity has a potential to have a discernable adverse effect on the resources. The impacts are destabilizing if the activity would degrade the resource to the point that it would be of significantly reduced value to the future generations, such as physically damaging structures or artifacts or destroying the physical context of the resource in its environment. The NRC also states that the nuclear facility itself could be potentially eligible for inclusion in the National Register of Historic Places (NRHP). In this case, appropriate mitigation would be developed in consultation with the State Historic Preservation Office (SHPO). Under the National Historic Preservation Act (NHPA), mitigation is determined through the Section 106 process, which seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking.

A Historic Resource Survey Form (HRSF) was completed by the Pennsylvania Historic and Museum Commission (PHMC) in 2010 which stated that the TMI-2 Historic District above-ground resource (Key No. 156047) is eligible for the NRHP under Criterion A (properties significant for their association with event that have made a significant contribution to the broad patterns of history), and under Criterion Consideration G (properties that have achieved significance within the last 50 years), with a period of significance from March 28, 1979 – April 4, 1979 (Reference 58). A map of the TMI-2 Historic District above-ground resource as well as a boundary survey map depicting TMI-2 Solutions-owned parcels were provided to the NRC in a letter dated January 20, 2023 (Reference 59). In a letter dated July 28, 2023 (Reference 60), the PA SHPO confirmed that the TMI-2 Historic District resource remains individually eligible for listing in the NRHP.

The removal, dismantlement, and disposal of contaminated systems, structures, and components, as well as the eventual and necessary physical demolition of the facility, is imperative to protection of public health and safety and maintaining environmental welfare, and there is no viable alternative to decommissioning that achieves this goal. However, given the exceptional historical significance of the TMI-2 facility, the eventual

and necessary physical demolition of the TMI-2 Solutions-owned buildings previously deemed eligible for the NRHP is an adverse effect that requires mitigation to be developed in consultation with the PA SHPO and other consulting parties per 36 CFR 800. In accordance with the guidance set forth in the Decommissioning GEIS, TMI-2 Solutions submitted a LAR for NRC review of major decommissioning activities, as defined in 10 CFR 50.2, that would diminish the historic integrity (e.g., physical demolition) of the TMI-2 Solutions-owned buildings previously deemed eligible for the NRHP (References 59 & 61). In a letter dated March 31, 2023 (Reference 62), the NRC stated that, in order for the NRC to conduct its review and to allow appropriate mitigation to be developed, the NRC plans to initiate consultation for this undertaking under Section 106 of the NHPA. The Section 106 review will consider potential effects to above- and below-ground cultural resources within the Area of Potential Effect.

Based on the above, TMI-2 Solutions concludes that the potential environmental impacts regarding historical, cultural, and archaeological resources will be reviewed through the site-specific environmental review for the LAR.

6.1.15 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 (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-2 decommissioning, the impact of noise and dust would be temporary and controlled to minimize impacts. The appearance of TMI-2 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, TMI-2 Solutions concludes that the impacts of TMI-2 decommissioning on aesthetics are small and generally considered beneficial. Thus, such impacts are bounded by the analysis in the GEIS.

6.1.16 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-2 (Reference 63) 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-2 decommissioning activities are of the type previously considered by NRC and TMI-2 has no site-specific conditions that would alter the NRC's prior findings, TMI-2 Solutions concludes that the noise impacts from decommissioning activities would be small and thus bounded by the analysis in the GEIS.

6.1.17 Transportation

In Section 4.3.17 of the GEIS, NRC states that its "…regulations are adequate to protect the public 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. TMI-2 will comply with NRC and Department of Transportation regulations for shipments of radioactive waste from TMI-2 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 LLRW associated with TMI-2 decommissioning are summarized in Table 6-2 using waste types from the GEIS.

TABLE 6-2
Estimated Radioactive Waste Associated with TMI-2 Decommissioning

Waste Class	Volume (cf)
Class A	4,200,000
Class B & C	17,000

Class A waste will be shipped to the Energy*Solutions* disposal site in Utah and Class B and C waste will be shipped to the Waste Control Specialists facility in Andrews, Texas. Approximately 99% of all waste will be shipped to the disposal site via rail. As stated in the GEIS "shipment of spent fuel by rail reduces the radiological impacts significantly (more than a factor of 10 for shipments from the northeast to Nevada). Similar reductions would be expected in the radiological impacts of the shipment of LLW from decommissioning if shipments were made by rail rather than by truck."

If radiological impacts alone are considered, the conclusions in the GEIS would bound the impacts of transportation of radioactive waste from TMI-2 decommissioning. The TMI-2 waste shipments would travel shorter distances than were analyzed in the GEIS. For TMI-2, the volumes would be lower for both high-activity and low-activity waste than the waste volumes NRC considered in the GEIS analysis.

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-2'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 below the number of temporary workers supporting Exelon during TMI-1 refueling outages as noted in Section 6.1.12. 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-2 that would alter these NRC prior findings. Therefore, TMI-2 Solutions concludes that transportation impacts of TMI-2 decommissioning are small and thus bounded by the analysis in the GEIS.

6.1.18 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-2 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-2 decommissioning would be minor. The decommissioning of TMI-2 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, TMI-2 Solutions concludes that the impacts of TMI-2 decommissioning on irreversible and irretrievable commitments of resources would be small and thus bounded by the analysis in the GEIS.

6.2 Environmental Impacts of License Termination

A License Termination Plan (LTP) for TMI-2 will be developed and submitted to the 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-2 license termination will be similar to those evaluated in NUREG-1496 (Reference 42).

6.3 Additional Considerations

The following considerations are relevant to concluding that TMI-2 decommissioning activities prior to license termination will not result in significant environmental impacts not previously 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 FBM in accordance with license conditions and plant procedures.

The following considerations are also relevant to concluding that decommissioning activities will not result in significant environmental impacts not previously reviewed.

- Significant cleanup of the TMI-2 facility has already been completed with approximately 99% of the fuel debris removed and shipped to INEEL.
- Radiation protection techniques and technology have advanced since the plant entered PDMS in 1993 and are expected to significantly reduce occupational exposure.

6.4 Conclusion

TMI-2 Solutions has performed an environmental review to evaluate environmental impacts associated with decommissioning activities; confirming that the anticipated or potential impacts are within the bounds of the NRC prepared PEIS (References 8, 9, 10, and 11) during Phase 1b as well as the generic impacts that NRC described in the GEIS (Reference 15).

This evaluation indicates that TMI-2 decommissioning activities fall within the range of decommissioning activities considered by NRC in the PEIS and GEIS. There are no unique aspects of the plant or the expected decommissioning techniques that would invalidate the conclusions of the PEIS or GEIS. The evaluation indicates that the impacts of TMI-2 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-2 decommissioning were determined to be small and bounded by the plant's FES. 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, TMI-2 Solutions will notify the NRC in writing and seek appropriate environmental review in accordance with applicable NRC regulations.

7. REFERENCES

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26. Letter TMI2-RA-COR-2022-0023 from Lackey, M. B. (Energy*Solutions*) to U.S. NRC, "License Amendment Request – Three Mile Island, Unit 2, Decommissioning Technical Specifications, Response to Request for Information Regarding Radiation Protection Program Ventilation Controls," dated November 7, 2022 (ML22313A050).
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28. Letter TMI2-RA-COR-2023-0004 from Hazelhoff, A. C. (Energy*Solutions*) to U.S. NRC, "Supplement to License Amendment Request – Reply to Requests for Supporting Information," dated February 23, 2023.
29. Letter TMI2-RA-COR-2023-0008 from Hazelhoff, A. C. (Energy*Solutions*) to U.S. NRC, "Supplement to License Amendment Request – Proposed Changes to TMI-2 Possession Only License and Technical Specifications," dated March 30, 2023 (ML23090A216).
30. Letter TMI2-RA-COR-2023-0019 from Devik, T. (TMI-2 Solutions) to U.S. NRC, "Submittal of Defueled Safety Analysis Report and Decommissioning Quality Assurance Plan," dated August 1, 2023 (ML23213A234).
31. U.S. NRC, Regulatory Guide 1.179, "Standard Format and Content of License Termination Plans for Nuclear Power Reactors," dated July 2019 (ML19128A067).
32. U.S. NRC, NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)," dated August 2000 (ML003761445).
33. "Three Mile Island Station, Unit 2 – Energy*Solutions* Feb 13 Public Meeting Slides on TMI-2 Decommissioning," dated February 13, 2024 (ML24040A072)
34. Letter TMI2-RA-COR-2021-0003 from van Noordennen, G. P. (TMI-2 Solutions) to U.S. NRC, "TMI-2 Solutions Plan for Management of Debris Material," dated March 15, 2021.
35. Letter from Halnon, G.H. (GPU Nuclear) to U.S. NRC, "Notification of Amended Post-Shutdown Decommissioning Activities Report (PSDAR) for Three Mile Island, Unit 2 in Accordance with 10 CFR 50.82(a)(7), Revision 3," dated December 12, 2019 (ML20013E535).
36. Letter TMI-20-006 from Halnon, G. H. (GPU Nuclear) and van Noordennen, G. P. (Energy*Solutions*), "Notification of Revision of Commitment for 'Amended Post-Shutdown Decommissioning Activities Report' (PSDAR) for Three Mile Island, Unit 2 in Accordance with 10 CFR 50.82(a)(7)," dated March 2, 2020 (ML20066F494).
37. Nuclear Energy Institute (NEI) Technical Report 07-07, "Industry Groundwater Protection Initiative - Final Guidance Document," August 2007.
38. Letter TMI2-RA-COR-2024-0003 from Lynch, J. R. (Energy*Solutions*) to U.S. NRC, "Response to Request for Additional Information for the TMI-2 Post-Shutdown Decommissioning Activities Report, Rev. 5," dated March 14, 2024 (ML24074A392).
39. Letter TMI-19-003 from Halnon, G.H. (GPU Nuclear) to U.S. NRC, "Decommissioning Funding Status Report for the Three Mile Island Nuclear Station, Unit 2," dated March 28, 2019 (ML19087A153).
40. E-Mail from Snyder, A. M. (U.S. NRC) to Devik, T. (TMI-2 Solutions), "Subject: Three Mile Island Nuclear Station, Unit No. 2 – Request for Additional Information Related to the Amended Post-Shutdown Decommissioning Activities Report (EPID NO. L-2022-DPS0002)," dated June 29, 2023 (ML23187A020; RAI Enclosure: ML23187A033).
41. Letter TMI2-RA-COR-2023-0014 from Devik, T. (TMI-2 Solutions) to U.S. NRC, "Response to Requests for Additional Information for the TMI-2 Post-Shutdown Decommissioning Activities Report, Rev. 5," dated August 8, 2023 (ML23221A140).

42. U.S. NRC, NUREG-1496, “Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities,” July 1997 (ML042310492).
43. Atomic Energy Commission, “Final Environmental Statement Related to the Operation of Three Mile Island Nuclear Station, Units 1 and 2,” dated December 8, 1972 (Referred to as the FES).
44. NUREG-0112, “Final Supplement to the Final Environmental Statement Related to the Operation of Three Mile Island Nuclear Station Unit 2,” dated December 1976 (ML080090250) (Referred to as the Final Supplement to the FES).
45. Letter TMI2-RA-COR-2024-0002 from Hazelhoff, A.C. (Energy*Solutions*) to U.S. NRC, “License Amendment Request – Three Mile Island, Unit 2, Historic and Cultural Resources Review, Response to Request for Additional Information,” dated February 12, 2024 (ML24044A009).
46. Wildlife Habitat Council, “Site Assessment and Wildlife Management Opportunities Report for Constellation Corporation’s Three Mile Island Generating Station,” October 2005.
47. Exelon Corporation, TMI Environmental Department, “Three Mile Island Wildlife Management Plan,” 2015.
48. Snyder, A. M. (U.S. NRC), “Eco Request for Additional Information for 2023 License Amendment Request 1-11-24,” dated January 11, 2024 (ML24011A235).
49. U.S. NRC, NUREG-2157 Vol. 1, “Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel,” September 2014 (ML14196A105).
50. NUREG/CR-2601 “Technology, Safety and Costs of Decommissioning Reference Light Water Reactors following Postulated Accidents” dated December 1990 (ML14023A051).
51. Gallagher, M. P. (Exelon Generation Company) to U.S. NRC, “Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR Part 50, Appendix E,” dated July 1, 2019 (ML19182A104).
52. 90-3017, “Three Mile Island Unit No. 2 Fire Protection Program Evaluation,” Revision 12, dated May 18, 2018.
53. U.S. NRC, Regulatory Guide 1.183, Revision 0, “Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors,” dated July 2000 (ML003716792).
54. SECY-20-0041, “Request by Exelon Generation Company, LLC for Exemptions from Certain Emergency Planning Requirements for the Three Mile Island Nuclear Station,” dated May 5, 2020 (ML19311C763).
55. 90-3017, “Three Mile Island Unit No. 2 Fire Protection Program Evaluation, Revision 13, dated February 2, 2020.
56. TMI2-FP-EVA-0001, “Three Mile Island Unit 2 Fire Protection Program,” Revision 0, dated June 24, 2022.
57. Gallagher M. P. (Exelon Nuclear), “Three Mile Island Nuclear Station, Unit 1 — Post - Shutdown Decommissioning Activities Report, Revision 1,” dated April 5, 2019 (ML19095A041).
58. Nagle, C. L., “Historic Resource Survey Form, Three Mile Island Unit 2,” Pennsylvania Historical and Museum Commission Bureau for Historic Preservation, Key #156047, 2010.

59. Letter from Hazelhoff, A.C. (Energy*Solutions*) to U.S. NRC, “License Amendment Request – Three Mile Island, Unit 2, Historic and Cultural Resources Review,” dated February 12, 2023 (ML23058A064).
60. Letter from Diehl, E. (PA SHPO) to Pell, H. (TMI-2 Solutions), “ER Project #2021PR03278.010, TMI-2 Decommissioning Project, Dauphin County, Pennsylvania, Nuclear Regulatory Commission, Conoy Township, Lancaster County; Additional Information,” dated July 28, 2023 (ML23209A763).
61. Letter TMI2-RA-COR-2023-0010 from Hazelhoff, A. C. (Energy*Solutions*) to U.S. NRC, “License Amendment Request – Three Mile Island, Unit 2, Historic and Cultural Resources Review, Response to Request for Additional Information,” dated May 1, 2023 (ML23121A249).
62. Snyder, A. M. (U.S. NRC) to Sauger, J. T. (TMI-2 Solutions), “Three Mile Island, Unit 2 – Acceptance Review and Request for Additional Information for the Historic and Cultural Resources License Amendment Request – EPID: 2023-LLA-0026,” dated March 31, 2023 (ML23062A737).
63. Metropolitan Edison Company, Jersey Central Power & Light Company, and Pennsylvania Electric Company, “Three Mile Island Nuclear Station Unit 1 and 2, Environmental Report - Operating License Stage,” 1971.

ATTACHMENT 2 TO TMI2-RA-COR-2022-0022

LIST OF REGULATORY COMMITMENTS

THREE MILE ISLAND NUCLEAR POWER STATION, UNIT 2

NRC POSSESSION ONLY LICENSE NO. DPR-73

LIST OF REGULATORY COMMITMENTS

The following list identifies those actions committed to by TMI-2 Solutions in this letter and Attachment 1 ("Three Mile Island Nuclear Power Station, Unit 2 Post-Shutdown Decommissioning Activities Report"). Any other actions discussed in the submittal represent intended or planned actions by TMI-2 Solutions. They are described only as information and are not Regulatory Commitments.

	TYPE		
REGULATORY COMMITMENT	**ONE-TIME ACTION**	**CONTINUING COMPLIANCE**	**SCHEDULED COMPLETION DATE**
As part of the site characterization process, a neutron activation analysis calculation study of the reactor internals and the reactor vessel will be performed.	X		Prior to removal, segmentation, packaging and disposal of RV/RVI
The Groundwater Protection Program will continue for TMI-2 in accordance with NEI Technical Report 07-07 during decommissioning.		X	Until replaced by the LTP groundwater monitoring program
TMI-2 Solutions will consult with appropriate state and federal resource agencies during the planning process for removal of the TMI-2 owned and controlled buildings and structures to ensure that agency concerns are addressed. TMI-2 Solutions will ensure processes are in place such that any potential impacts to terrestrial or aquatic species, as well as any threatened or endangered species observed on or near the TMI operational area, are avoided.	X		Prior to removal of the TMI-2 owned and controlled buildings and structures
TMI-2 Solutions will develop an Archaeological Resources Erosion Monitoring Plan which will provide protocols for ensuring continued stewardship of cultural resources on Three Mile Island.	X		Prior to structural demolition or ground disturbances outside the operational area