UNITED STATES NUCLEAR REGULATORY COMMISSION

TMI-2 SOLUTIONS, LLC

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 2

DOCKET NO. 50-320

ENVIRONMENTAL ASSESSMENT AND

FINDING OF NO SIGNIFICANT ENVIRONMENTAL IMPACT

1.0 INTRODUCTION

By letter dated September 29, 2022, Attachment 2, (Agencywide Document Access and Management System (ADAMS) Accession No. ML22276A024), TMI-2 Solutions, LLC (TMI-2 Solutions, or Licensee) requested an exemption from Title 10 of the *Code of Federal Regulations* (10 CFR) Section 70.24, "Criticality accident requirements" for Three Mile Island Nuclear Station, Unit No. 2 (TMI-2). The requested exemption would exempt TMI-2 Solutions from the requirement to maintain a radiation monitoring system in each area where licensed special nuclear material (SNM) is handled, used, or stored that would energize clearly audible alarm signals if accidental criticality occurred. The request exemption would also exempt TMI-2 Solutions from the requirement to maintain associated emergency procedures.

On June 15, 1992, the U.S. Nuclear Regulatory Commission (NRC, or Commission) granted the Licensee an exemption from 10 CFR 70.24, with certain restrictions (ADAMS Package ML20210D728). That exemption, however, only covered the initial cleanup of TMI-2 fuel debris. With TMI-2 currently progressing to radiological decommissioning that 1992 exemption will no longer apply. Therefore, TMI-2 requested an exemption from 10 CFR 70.24 that will extend through the radiological decommissioning phase and until license termination.

According to TMI-2 Solutions, the exemption request is supported by an updated calculation regarding safe fuel mass limit (SFML) at TMI-2. TMI-2 Solutions explained that the updated calculation takes credit for impurities and actual enrichment based on the results of physical samples taken during the defueling effort and demonstrates that criticality is not credible even if all the remaining material at TMI-2 is moved or relocated. Therefore, with no credible risk of criticality remaining at TMI-2, TMI-2 Solutions contends that the exemption from the 10 CFR 70.24 criticality alarm requirement is appropriate for the remainder of time TMI-2 Solutions is actively decommissioning the site.

In its September 29, 2022, exemption request (ML22276A024), the Licensee pointed out that the NRC granted TMI-2 an exemption from the requirements of 10 CFR 70.24, criticality accident requirements for SNM storage areas, on June 15, 1992 (Pkg). The Licensee further noted that the June 15, 1992, exemption states(ML20210D729):

> "... it is appropriate to request an exemption from 10 CFR 70.24 if an evaluation. determines that a potential for criticality does not exist, as for example where the quantities or form of special nuclear material make criticality practically impossible or where geometric spacing is used to preclude criticality."

The 1992 exemption was granted based on the lack of a credible criticality hazard related to the storage of fissionable material. Specifically, within the PDMS condition at TMI-2, the NRC determined that the SFML was 93 kg UO_2 (see Inspection Report 50-320/90-03, dated June 14, 1990 (ML20043G083)). An administrative SFML applied a 25% conservatism at 70 kg and further administrative controls were applied on geometric separation distances. At the time of the 10 CFR 70.24 exemption, the defueling activities had concluded that 99% of the fuel material had been removed from the core leaving a balance of 1097 kilograms (kg) UO_2 of fuel bearing material (described in the PDMS SAR) (ML21236A288). Because the balance of fuel bearing material remaining on site was greater than the SFML at the time (93 kg UO_2), additional administrative controls (i.e., geometric controls) were necessary to preclude criticality.

In a letter dated February 13, 2013 (ML12349A291), the NRC stated that September 14, 1993, is considered the date of TMI-2's cessation of operations. Cessation of operations and defueling from the reactor core (i.e., removal of approximately 99% of TMI-2 fuel debris) marks the beginning of a reactor entering decommissioning. The September 14, 1993, date coincides with the issuance of License Amendment No. 45, which converted the TMI-2 operating license into a POL (ML20029E532). As part of the review for the POL license, the NRC staff took into consideration that the TMI-2 debris cleanup was completed to ALARA.

1.1 Proposed Action:

The proposed action that is being considered by the Commission is an exemption from the requirements of 10 CFR 70.24 for a monitoring system capable of detecting a criticality accident in SNM storage areas and the maintenance of associated emergency procedures during radiological decommissioning and through the termination of the POL. The Licensee submitted the application for this exemption on September 29, 2022 (Attachment 2 of ML22276A024).

1.2 Purpose of and Need for the Proposed Action

10 CFR 70.24 requires, in relevant part, that each licensee authorized to possess SNM in certain quantities, shall maintain in each area in which such licensed SNM is handled, used, or stored a criticality accident alarm system. The purpose of 10 CFR 70.24 is to ensure that if a criticality were to occur during the handling of SNM, personnel would be alerted to that fact and would take appropriate action.

Specifically, the proposed action would exempt the Licensee from the requirements of 10 CFR 70.24, which requires a monitoring system that will energize clear audible alarms if accidental criticality occurs in each area in which SNM is handled, used, or stored. The proposed action would also exempt the Licensee from the requirements to maintain emergency procedures for each area in which licensed SNM is handled, used, or stored to ensure that all personnel withdraw to an area of safety upon the sounding of the alarm, to familiarize personnel with the evacuation plan, and to designate responsible individuals for determining the cause of the alarm, and to place radiation survey instruments in accessible locations for use in such an emergency. The Licensee states that the exemption is appropriate because the analysis presented in TMI-2 Solutions' License Amendment Request (LAR), submitted on February 19, 2021(ML21057A047), as supplemented, demonstrates that there is not enough UO_2 at TMI-2 to

assemble an optimal critical configuration; thus, the criticality accident alarm system and associated emergency procedures are not needed.

1.3 Scope of the Proposed Action

The NRC has evaluated the potential environmental impacts associated with the proposed action and no-action alternative and has documented the results of the evaluation in this Environmental Assessment (EA). The NRC performed this review in accordance with the requirements of 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," and staff guidance found in NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS (Nuclear Material Safety and Safeguards) Programs" (ML032450279).

The following documents were reviewed and considered in the development of this EA:

- Information contained in TMI-2 Solutions' Exemption Request, September 29, 2022 submittal, Attachment 2 (ML22276A024)
- Information contained in previous NRC environmental review document for TMI-2's 1992 Criticality Exemption with Restrictions ("Environmental Assessment and Finding of No Significant Impact re util 870521 request for exemption from 10CFR70.24 re criticality accident requirements for irradiated SNM samples. EIS (Environmental Impact Statement) will not be prepared" (ML20210D733)
- "Three Mile Island Station, Unit No. 2, Safety Evaluation, Criticality and Spent Fuel Mass Limit Docket No. 50-320," dated April 20, 2023 (ML23094A269)
- Three Mile Island, Unit 2, Notification of "Amended Post-Shutdown Decommissioning Activities Report" (PSDAR) in Accordance with 10 CFR 50.82(a)(7)," Revision 5, dated October 27, 2022 (ML22306A051)

The requested exemption would not be a change to the property boundaries and would not involve construction or ground disturbing activities. Therefore, the NRC anticipates that there would be no environmental impacts to the land, air, or water. There would be no dust or noise generated as part of the proposed action. Therefore, the air quality and noise conditions would be unaffected. There would be no physical barriers being created or moved. Similarly, there would be no surface or groundwater used, and no river or stream habitat would be affected. There would be no impacts on cultural or historic preservation activities since no work is being conducted. Overall, there would be no direct, indirect, or cumulative effects in the following environmental resource areas:

- Land Use
- Visual and Scenic Resources/Aesthetics
- Climatology, Meteorology, and Air Quality
- Noise
- Geology and Soil
- Water
- Ecological Resources
- Historical and Cultural Resources
- Socioeconomics
- Transportation and Traffic
- Waste Generation and Management

2.0 AFFECTED ACTION AND ALTERNATIVES

2.1 Proposed Action

TMI-2 Solutions is requesting an exemption from the requirements of 10 CFR 70.24 for radiological decommissioning activities, through termination of the POL.

2.2 Alternatives

In this section the NRC describes the no-action alternative. The no-action alternative would be for the NRC to deny the Licensee's exemption request.

2.2.1 No-Action Alternative

The no-action alternative would be NRC's denial of TMI-2 Solutions' request for an exemption from the requirements of 10 CFR 70.24 for the remainder of TMI-2's radiological decommissioning activities through POL termination. If the NRC were to deny the exemption request, TMI-2 would be required to meet the requirements of 10 CFR 70.24 during radiological decommissioning. This alternative would have a larger environmental impact than the proposed action because it would increase occupational radiation exposure to personnel using radiation sources to calibrate the criticality monitors.

3.0 AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL IMPACTS

3.1 Occupational Health

Risks to occupational health and safety can include exposure to radiological and non-radiological hazards. Three Mile Island Nuclear Station, Unit No. 1's (TMI-1) Licensee, Constellation Generation LLC (Constellation), conducts environmental monitoring (e.g., (ML22117A006) and annual effluent monitoring (ML22117A005) of the Three Mile Island Nuclear Station (TMI Site), which includes TMI-2 and the surrounding area under the site-wide environmental monitoring program and provides an annual radioactive effluent release report to the NRC under 10 CFR 72.44(d). The most recent report stated that, in 2022, TMI-2 released no radionuclides to the environment by liquid or gaseous effluents (ML22117A005).

On March 28, 1979, TMI-2 experienced an accident initiated by interruption of secondary feedwater flow.[1] Since TMI-2 was permanently shut down in 1979, following the accident, significant radioactive decay has occurred resulting in greatly reduced occupational dose to plant workers. TMI-2 Solutions' Radiation Protection Program meets the requirements of 10 CFR Part 20, "Standards for Protection Against Radiation," by maintaining radiation doses as ALARA to minimize radiation exposure to site personnel, visitors, and the public. In addition, in the TMI-2 PSDAR, Rev. 5, TMI-2 Solutions states that it will utilize advances in technology to manage occupational dose during radiological decommissioning. Examples of technology and methods for consideration to achieve ALARA include robotics, remote dismantling of systems and components, remote visual monitoring, and remote radiological monitoring. TMI-2 Solutions uses an ALARA program to minimize radiation exposure to site personnel, visitors, and the

[1] More details about the accident is found at the Nuclear Regulatory Commission (NRC) Fact Sheet, "Three Mile Island Accident" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082560250).

public. The requirement to maintain ALARA and meet 10 CFR Part 20 dose limits apply to reactors in decommissioning.

TMI-2 Solutions' PSDAR, Rev. 5 (ML22306A051) explains that 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 pressurized water reactor (PWR) plants of 560-1215 person-rem provided in Table 4-1 (ML023470304) of the Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities (GEIS), NUREG-0586, Vol. 1, Supplement 1, (ML023470304 and ML023470323). At the commencement of Phase 2 of decommissioning at TMI-2, the 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 Pressured Water Reactors 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 decommissioning that would invalidate this conclusion. The NRC staff agrees with this assessment.

Based on the NRC staff's evaluation (ML23094A269), the NRC staff determined that the Licensee's proposed decommissioning activities do not present any credible criticality hazards. Because there are no credible criticality hazards related to the Licensee's proposed decommissioning activities and because all activities will be conducted such that subcriticality is assured under normal and all credible abnormal conditions, the NRC staff concludes that the Licensee's program will provide reasonable assurance of adequate protection of the health and safety of workers and the public. Further, the NRC staff also determined that there would be no impact to the physical protection plan, emergency preparedness, environmental monitoring, effluent monitoring, or material control and accountability programs.

The requested exemption does not change the surveillance and maintenance activities onsite or the expected occupational dose. During PDMS, criticality monitoring was not conducted because the NRC granted an exemption for PDMS status. During decommissioning activities, there may be occupational dose to workers. These decommissioning activities would be performed in accordance with the occupational dose limits specified in 10 CFR 20.1201. Licensees must also have in place and follow a Radiation Protection Program consistent with 10 CFR 20.1101. Therefore, the NRC staff concludes that the radiological impacts on workers would not be significant. However, if the NRC were to grant the exemption request, individual and cumulative occupational radiation exposure would decrease slightly as the need to use radioactive sources to periodically calibrate the criticality monitors would be obviated.

3.2 Dose to Public

TMI-2 Solutions explains in its PSDAR, Rev. 5 (ML22306A051), that Section 4.3.8 of the GEIS, Supplement 1, Vol. 1 (ML023470304) 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 the Three Mile Island Site 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 set in 10 CFR Part 20. Therefore, TMI-2 Solutions concludes that the impacts of TMI-2 decommissioning on public dose are small and are bounded by the GEIS. Radiological doses to the public from the proposed action would not change from those expected from decommissioning because TMI-2 Solutions is required to meet 10 CFR Part 20 requirements by

use of administrative and engineering controls. Therefore, the dose to the public would not be significant. The NRC staff agrees with TMI-2 Solutions' conclusions.

The NRC staff determined that the Licensee's proposed decommissioning activities do not present any credible criticality hazards (ML23094A269). Therefore, the staff determined, with reasonable assurance, that the Licensee has described a program that will provide adequate protection for the health and safety of workers and the public against credible criticality hazards related to the Licensee's proposed decommissioning activities, and that the proposed activities will be conducted such that subcriticality is assured under normal and all credible abnormal conditions.

Based on the NRC staff's safety evaluation and the fact that decommissioning will be conducted in accordance with TMI-2 Solutions' license and the NRC radiation protection requirements in 10 CFR 20, the NRC staff concludes that the radiological impacts on the public would not be significant under the no-action alternative. However, if the NRC were to grant the exemption request, public radiation exposure would similarly not endanger the public in terms of radiation doses.

3.2 Environmental Justice

Under Executive Order 12898 (59 FR 7629) dated February 11, 1994, Federal agencies are responsible for identifying and addressing potential disproportionately high and adverse human health and environmental impacts on minority and low-income populations. On August 24, 2004, the Commission issued Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (69 FR 52040). The environmental justice impact analysis evaluates the potential for disproportionately high and adverse human health and environmental effects on minority and low-income populations that could result from activities associated with the proposed action. Such effects may include human health, biological, cultural, economic, or social impacts. Minority and low-income populations are subsets of the public residing in the vicinity of TMI-2, and all are exposed to the same health and environmental effects generated from activities at TMI-2.

NUREG-1748, appendix C states that "if it is determined that a particular action will have no significant environmental impact, then there is no need to consider whether the action will have disproportionately high and adverse impacts on certain populations" (ML032450279). There are no significant environmental impacts in connection with the exemption request. Therefore, a detailed environmental justice review is not necessary for this action.

The Commission has completed its evaluation of the proposed action and concludes that there would be no significant environmental impact if the exemption is granted.

4.0 CONSULTATION AND COORDINATION

4.1 Commonwealth of Pennsylvania

On April 04, 2023, the NRC staff consulted with Commonwealth of Pennsylvania regarding the environmental impacts of the proposed action. The Commonwealth official responded on April 14, 2023 (ML23107A223), stating:

> "The Pennsylvania Department of Environmental Protection's Bureau of Radiation Protection has completed its review of the DRAFT Environmental Assessment (EA) and

Finding of No Significant Environmental Impact (FONSI) regarding the request for exemption from requirements of 10 CFR 70.24 for Three Mile Island Nuclear Station, Unit 2. We concur with the NRC that the proposed exemption would not have any adverse impact on the environment and that there are no significant radiological impacts associated with the proposed action. And thus, we concur with the NRC's FONSI determination."

4.2 National Historic Preservation Act Section 106 Consultation

The National Historic Preservation Act requires the NRC to determine whether historic properties are present, and if present, whether the undertaking would have an adverse effect upon such properties. The requested exemption is a passive, benign activity and does not include changes to any physical barriers, construction, or ground disturbing activities. The exemption will not alter any of the current characteristics of the site. Accordingly, the NRC staff finds that, under 36 CFR 800.3(a)(1), the undertaking does not have the potential to cause effects on historic properties, assuming such historic properties are present.

4.3 Endangered Species Act Section 7 Consultation

The requested exemption from criticality monitoring is a passive, benign activity that does not perform any physical work, construction, or require any water resources. The exemption would not generate or release any radiological or non-radiological effluents or waste. The Endangered Species Act requires the NRC to ensure the exemption is not likely to jeopardize the continued existence of any endangered or threatened species or destroy or adversely modify any critical habitat for such species. The exemption will not affect a listed species or habitat; therefore, the exemption request will have "no effect" on any species or habitat.

5.0 CONCLUSION AND FINDING OF NO SIGNIFICANT IMPACT

The NRC has prepared this EA as part of the NRC's review of TMI-2-Solutions' exemption request. TMI-2-Solutions proposes to continue to be exempt from the criticality monitoring requirements of 10 CFR 70.24 during radiological decommissioning through POL termination. The previous exemption only applied to the POL while in PDMS status.

Based on the NRC staff's review, in accordance with the requirements of 10 CFR part 51, the NRC staff has determined granting the Licensee's exemption request would not affect the quality of the human environment. The basis for this finding is that the approval of the exemption request would not result in any new construction and would produce no liquid or gaseous effluents.

The proposed action will have no environmental impact as it only affects the requirement to have criticality monitors in SNM storage areas or any areas where decommissioning would be conducted, and to have certain emergency procedures. Thus, the proposed action will not change the types of, or allow an increase in, the amounts of effluents that may be released to the environment. Therefore, the Commission concludes that there are no significant radiological impacts associated with the proposed action.

Because the proposed exemption involves features located entirely within the restricted area as defined in 10 CFR Part 20, the Commission concludes that the proposed exemption does not result in any significant non-radiological environmental impacts. Therefore, the NRC staff has

determined that, under 10 CFR 51.31, preparation of an environmental impact statement is not required, and pursuant to 10 CFR 51.32, a finding of no significant impact (FONSI) is appropriate. A copy of this EA shall be made available to the public via ADAMS and published in the *Federal Register*.

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Based upon the EA, the Commission concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the Commission has determined not to prepare an environmental impact statement for the proposed action.

6.0 LIST OF PREPARERS

This EA was prepared by staff in the Office of Nuclear Material Safety and Safeguards.

Contributors

Amy Snyder, Senior Project Manager, Reactor Decommissioning
Jeremy Munson, Nuclear Process Engineer

Date: April 24, 2023