



Michael P. Gallagher
Exelon Nuclear
Vice President
License Renewal and Decommissioning

200 Exelon Way
Kennett Square, PA 19348

610 765 5958 Office
610 765 5658 Fax
www.exeloncorp.com
michaelp.gallagher@exeloncorp.com

10 CFR 50.90
10 CFR 50.54(q)

TMI-19-041

July 1, 2019

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

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

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

Subject: License Amendment Request - Proposed Changes to the Three Mile Island Emergency Plan for Permanently Defueled Emergency Plan and Emergency Action Level Scheme

Reference:

1. Letter from J. Bradley Fewell (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Certification of Permanent Cessation of Power Operations for Three Mile Island Nuclear Station, Unit 1," dated June 20, 2017 (ML17171A151)
2. Letter from U.S. Nuclear Regulatory Commission to Bryan C. Hanson, (Exelon Generation Company, LLC), "Three Mile Island Nuclear Station, Units 1 and 2 – Issuance of Amendment No. 296 for Unit 1 RE: Changes to Emergency Plan for Post-Shutdown and Permanently Defueled Condition (EPID L-2018-LLA-0073), dated April 18, 2019 (ML19065A114)
3. Letter from Michael P. Gallagher, (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission – "Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR Part 50, Appendix E," dated July 1, 2019 (ML19182A104)

Pursuant to 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (Exelon) requests an amendment to Renewed Facility Operating License Number DPR-50 for Three Mile Island Nuclear Station (TMI), Unit 1 (TMI-1). The proposed amendment would revise the site emergency plan (SEP) and Emergency

Action Level (EAL) scheme for the permanently defueled condition. The proposed changes are being submitted to the U.S. Nuclear Regulatory Commission (NRC) for approval prior to implementation, as required under 10 CFR 50.54(q)(4) and 10 CFR Part 50, Appendix E, Section IV.B.2.

Three Mile Island, Unit 2 (TMI-2), has a possession only license and is currently maintained in accordance with the NRC approved SAFSTOR condition (method in which a nuclear facility is placed and maintained in a condition that allows it to be safely stored and subsequently decontaminated) known as Post-Defueling Monitored Storage (PDMS). Exelon maintains the emergency planning responsibilities for TMI-2, which is owned by First Energy Corporation, through a service agreement. This License Amendment Request (LAR) does not impact Exelon's ability to maintain the service agreement.

By letter dated June 20, 2017 (Reference 1), in accordance with 10 CFR 50.82(a)(1)(i), Exelon certified that TMI-1 would permanently cease power operations on or about September 30, 2019. In Reference 2, the NRC issued the approved changes to the TMI SEP to support the planned permanent cessation of operation and permanent defueling at the TMI-1 reactor. The approved changes will revise the TMI SEP emergency response organization (ERO) on-shift and augmented staffing, commensurate with the reduced spectrum of credible accidents for a permanently shutdown and defueled nuclear power reactor facility.

The proposed Permanently Defueled Emergency Plan (PDEP) and Permanently Defueled EAL scheme are commensurate with the significantly reduced risk associated with the spent fuel stored in the spent fuel pool after it has sufficiently decayed such that the radiological impact of accidents is not expected to result in radioactive releases that exceed U.S. Environmental Protection Agency (EPA) Protective Action Guidelines (PAGs) beyond the site boundary. The proposed changes are necessary to properly reflect the conditions of the facility while continuing to preserve the TMI-1 Decommissioning Trust Fund and the effectiveness of the emergency plan.

The proposed PDEP and Permanently Defueled EAL scheme are predicated on approval of requests for exemptions from portions of 10 CFR 50.47(b), 10 CFR 50.47(c)(2) and 10 CFR Part 50, Appendix E, Section IV, previously submitted in Reference 3. The proposed PDEP reduces the scope of offsite and onsite emergency planning commensurate with the permanently defueled condition. Additionally, the proposed PDEP states that classification of an emergency declaration will be made within 30 minutes after the availability of indications to operators that an EAL threshold has been reached and notification to State authorities will be made within 30 minutes after declaring an emergency. The proposed PDEP and Permanently Defueled EAL scheme satisfy the applicable standards of 10 CFR 50.47(b) and the requirements of 10 CFR Part 50, Appendix E for a permanently defueled reactor, exempted as requested per Reference 3.

Reference 3 includes an analysis that shows that 488 days following shutdown of the TMI-1 reactor, the spent fuel stored in the spent fuel pool will have decayed to the point where the requested exemptions, PDEP, and Permanently Defueled EAL scheme may be implemented. Following the final TMI-1 shutdown, which is expected to occur by the end of September 2019 (Reference 1), 488 days after shutdown is expected to be about January 30, 2021.

The proposed changes have been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c), and Exelon has determined that this change involves no significant hazards consideration. Exelon has also determined that the proposed SEP changes satisfy the criteria for categorical exclusion in accordance with 10 CFR 51.22(c)(10) and do not require an environmental review. Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is required.

The description, technical and regulatory evaluation, significant hazards determination, and environmental considerations evaluation for the proposed amendment are contained in Attachment 1. Attachment 2 provides the proposed PDEP. Attachment 3 provides the Permanently Defueled EALs and Bases Document. Attachment 4 provides a comparison of the proposed Permanently Defueled EAL Bases Document to the corresponding information contained in NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6. Attachment 5 contains the Commonwealth of Pennsylvania acknowledgement of their review and acceptability regarding the proposed changes.

Exelon requests review and approval of the proposed license amendment by August 30, 2020, and a 60-day implementation period from the effective date of the amendment. Exelon requests that the approved amendment become effective 488 days following the permanent shut down of TMI-1. Once effective, implementation will occur within the 60 days, as noted, but will not exceed August 31, 2021. Approval of these changes by August 30, 2020, will allow TMI-1 adequate time to implement the changes to the emergency plan and EAL scheme by the requested effective date.

In accordance with 10 CFR 50.91 "Notice for public comment; State consultation" paragraph (b), Exelon is notifying the Commonwealth of Pennsylvania of this application for license amendment by transmitting a copy of this letter and its attachments to the designated State Official.

In support of this license amendment numerous discussions have been held with the Commonwealth of Pennsylvania and local response organizations. On May 30, 2019, the Commonwealth of Pennsylvania – Department of Environmental Protection Bureau of Radiation Protection (PA-BRP) received the draft proposed changes of the TMI Permanently Defueled Emergency Plan and EAL scheme. On June 24, 2019, the PA-BRP and Pennsylvania Emergency Management Agency (PEMA) met with representatives of TMI-1 and provided comments on the PDEP and associated EALs. Attachment 5 contains acknowledgement from the Commonwealth of Pennsylvania confirming that they completed their review of the proposed TMI Emergency Plan/EALs and comments were resolved to their satisfaction.

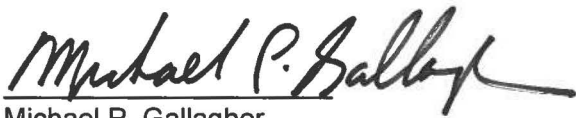
U.S. Nuclear Regulatory Commission
TMI-1 Proposed Changes to the Emergency Plan
Docket Nos. 50-289
July 1, 2019
Page 4

This letter contains no new regulatory commitments.

If you have any questions concerning this submittal, please contact Leslie Holden at (630) 657-2524.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 1st day of July 2019.

Respectfully,



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

- Attachments:
1. Description and Evaluation of Proposed Changes
 2. Permanently Defueled Emergency Plan
 3. Permanently Defueled Emergency Action Levels and Bases Document
 4. Comparison Matrix for Permanently Defueled EALs Based on NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6
 5. Acknowledgement from the Commonwealth of Pennsylvania Regarding the Acceptability of the Permanently Defueled Emergency Plan

cc: w/Attachments

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

ATTACHMENT 1

THREE MILE ISLAND NUCLEAR STATION

DESCRIPTION AND EVALUATION OF PROPOSED CHANGES

Attachment 1

License Amendment Request

Three Mile Island Nuclear Station

Docket No. 50-289

EVALUATION OF PROPOSED CHANGES

Subject: Permanently Defueled Emergency Plan and Emergency Action Level Scheme

1.0 SUMMARY DESCRIPTION

2.0 PROPOSED CHANGES

3.0 REASON FOR PROPOSED CHANGES

4.0 BACKGROUND

5.0 TECHNICAL EVALUATION

5.1 Accident Analysis Overview

5.2 Permanently Defueled Emergency Plan

5.3 Permanently Defueled Emergency Action Levels

5.4 Summary

6.0 REGULATORY EVALUATION

6.1 Applicable Regulatory Requirements and Guidance

6.2 Precedent

6.3 No Significant Hazards Consideration Determination

6.4 Conclusion

7.0 ENVIRONMENTAL CONSIDERATIONS

8.0 REFERENCES

1.0 SUMMARY DESCRIPTION

The proposed changes would revise the Three Mile Island (TMI) Emergency Plan and Emergency Action Level (EAL) scheme to support the permanent cessation of power operations and permanent removal of fuel from the reactor vessel of TMI-1. The Emergency Plan encompasses both Three Mile Island Unit 1 (TMI-1) and Three Mile Island Unit 2 (TMI-2). Exelon maintains the emergency planning responsibilities for TMI-2, which is owned by First Energy Corporation, through a service agreement. This amendment request does not impact Exelon's ability to maintain the service agreement.

This request contains the proposed TMI Permanently Defueled Emergency Plan (PDEP) and the Permanently Defueled EAL scheme for NRC review and approval.

The proposed PDEP and Permanently Defueled EAL scheme satisfy the applicable standards of 10 CFR 50.47(b) and the requirements of 10 CFR Part 50, Appendix E for a permanently defueled reactor, as exempted. Exelon has submitted a separate request for exemptions from portions of 10 CFR 50.47(b); 10 CFR 50.47(c)(2); and 10 CFR Part 50, Appendix E by letter dated July 1, 2019 (Reference 8.1). Reference 8.1 contained an analysis that demonstrated that 488 days after permanent cessation of power operations, the spent fuel stored in the spent fuel pool (SFP) will have decayed to the extent that the requested exemptions, PDEP, and Permanently Defueled EAL scheme may be implemented. Implementation is based on 488 days after the permanent shut down, which is scheduled to be no later than September 30, 2019 (Reference 8.2) and NRC approval of the previously submitted requests for exemption (Reference 8.1).

2.0 PROPOSED CHANGES

The proposed amendment would modify the TMI-1 license by revising the Site Emergency Plan (SEP) and the associated EAL scheme to reflect the pending permanent cessation of operation and permanent defueling of the TMI-1 reactor at the end of the current operating cycle and anticipated conditions following 488 days of decay of the spent fuel.

In a permanently defueled condition, the number and severity of potential radiological accidents is significantly less than when the plant is operating. Therefore, the offsite radiological consequences of accidents possible at TMI are substantially lower. The analyses of the potential radiological impact of accidents while the plant is in a permanently defueled condition indicate that no design basis accident or reasonably conceivable beyond design basis accident will be expected to result in radioactive releases that exceed U.S. Environmental Protection Agency (EPA) Protective Action Guidelines (PAGs) (Reference 8.3) beyond the site boundary. Exelon will maintain the version of the EPA PAGs as specified in the current and proposed TMI Emergency Plan.

The slow progression rate of postulated event scenarios indicates sufficient time is available to initiate appropriate mitigating actions to protect the health and safety of the public (Reference 8.1). Therefore, the proposed PDEP states that classification of an emergency declaration will be made within 30 minutes after the availability of indications to operators that an EAL threshold has been reached and notification to State authorities will be within 30 minutes after declaring an emergency. The proposed PDEP reduces the scope of offsite and onsite emergency planning commensurate with the spectrum of credible accidents that can occur in a permanently defueled condition. The proposed PDEP meets the applicable standards of 10 CFR 50.47(b) and requirements of 10 CFR Part 50, Appendix E, considering the previously submitted requests for

exemption (Reference 8.1).

The current EAL scheme is based on the guidance presented in NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6, (Reference 8.4) endorsed by the NRC in a letter dated March 28, 2013 (Reference 8.5). Exelon determined that a revision to the TMI EAL scheme to implement the EAL scheme contained in Appendix C of NEI 99-01, Rev. 6 (Reference 8.4), Recognition Category PD (Permanently Defueled), is appropriate for the permanently defueled conditions, as a result of the supporting analyses presented in Reference 8.1. The EAL associated with the Independent Spent Fuel Storage Installation (ISFSI) in Recognition Category "E" is being included and will be applicable when spent fuel is in the ISFSI.

3.0 REASON FOR PROPOSED CHANGES

The proposed changes are necessary to reflect the pending permanent cessation of operation and permanent defueling of the TMI-1 reactor at the end of the current operating cycle and anticipated conditions following 488 days of decay of the spent fuel. After the reactor is shut down, all fuel assemblies will be removed from the reactor vessel and placed in the SFP. The spent fuel will be stored in the SFP and in the ISFSI (when built) until it is shipped off-site in accordance with the schedules described in the Post-Shutdown Decommissioning Activities Report (PSDAR) (Reference 8.6) and the Spent Fuel Management Plan (Reference 8.7).

The proposed revisions to the SEP and EAL scheme are commensurate with the reduction in radiological hazards associated with the permanently defueled condition and will allow the facility to transition to an emergency plan and EAL scheme developed for a permanently defueled facility. The proposed changes are necessary to properly reflect the conditions of the facility 488 days following shutdown while continuing to maintain the effectiveness of the emergency plan and preserve the TMI-1 Decommissioning Trust Fund.

4.0 BACKGROUND

Three Mile Island Nuclear Station is located in an area of low population density about 12 miles southeast of Harrisburg, Pennsylvania. The area is in Londonderry Township, Dauphin County, about 2.5 miles from the southern tip of Dauphin County, where the county is coterminous with York and Lancaster Counties. The TMI site is part of an 814-acre tract consisting of Three Mile Island and several adjacent islands, which were purchased by a predecessor. The island, which is situated about 900 feet from the east bank and approximately one mile from the west bank of the Susquehanna River, is elongated parallel to the flow of the river with its longest axis oriented approximately due north and south. The north and south ends of the island have access bridges, which connect the island to State Highway Route 441. The north access bridge is used daily. Route 441 is a two-lane highway, which runs parallel to TMI on the east bank of the Susquehanna River and is more than 2,000 feet from the TMI reactors at the closest point. The exclusion area for TMI is a 2,000-foot radius, and for the purposes of Emergency Planning, the exclusion area and the site boundary are considered the same.

As presented in Section 5.0, the analyses of the potential radiological impact of accidents 488 days after the plant is in a permanently shutdown indicate that no design basis accident or reasonably conceivable beyond design basis accident will be expected to result in radioactive releases that exceed the EPA PAGs (Reference 8.3) beyond the site boundary.

TMI-1 submitted the PSDAR (Reference 8.6) on April 5, 2019, which selected the SAFSTOR

method of decommissioning for TMI-1. By September 30, 2019, the TMI-1 reactor will be permanently shut down. After the reactor is shut down, all fuel assemblies will be removed from the reactor vessel and placed in the SFP. The spent fuel will be stored in the SFP and the ISFSI (when built) until it is shipped off-site in accordance with the schedules described in the PSDAR and Spent Fuel Management Plan (Reference 8.7).

Three Mile Island, Unit 2 (TMI-2), has a possession only license and is currently maintained in accordance with the NRC approved SAFSTOR condition (method in which a nuclear facility is placed and maintained in a condition that allows it to be safely stored and subsequently decontaminated) known as Post-Defueling Monitored Storage (PDMS). All fuel assemblies have been removed from the TMI-2 reactor and spent fuel pool.

By letter dated April 18, 2019 (Reference 8.8), the NRC issued the Post-Shutdown Emergency Plan (PSEP) which approved changes to the TMI SEP to support the planned permanent cessation of operations and permanent defueling of the TMI-1 reactor. The PSEP revised the TMI SEP emergency response organization (ERO) on-shift and augmented staffing to be commensurate with the reduced spectrum of credible accidents for a permanently shutdown and defueled nuclear power reactor facility. The PSEP maintains effectiveness of the TMI SEP in accordance with 10 CFR 50.47 and 10 CFR 50, Appendix E.

With the reactor defueled, the reactor vessel assembly and supporting structures and systems are no longer in operation and have no function related to the safe storage and management of spent fuel. The SFP cooling system is provided to remove decay heat from spent fuel stored in the SFP and to maintain a specified water temperature and level.

5.0 TECHNICAL EVALUATION

5.1 Accident Analysis Overview

10 CFR 50.82(a)(2) specifies that the 10 CFR Part 50 license no longer authorizes operation of the reactor or emplacement or retention of fuel in the reactor vessel after docketing the certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel in accordance with 10 CFR 50.82(a)(1). Following the termination of reactor operations at TMI-1 and the permanent removal of the fuel from the reactor vessel, the postulated accidents involving failure or malfunction of the reactor and supporting structures, systems and components will no longer be applicable.

Section 5.0 of Interim Staff Guidance (ISG)-02 (Reference 8.9) indicates that site-specific analyses should demonstrate that: (1) the radiological consequences of the remaining applicable postulated accidents would not exceed the limits of the EPA PAGs at the Exclusion Area Boundary (EAB); (2) in the event of a beyond design basis event resulting in the partial drain down of the SFP to the point that cooling is not effective, there is at least 10 hours (assuming an adiabatic heat-up) from the time that the fuel is no longer being cooled until the hottest fuel assembly reaches 900 degrees Celsius (°C); (3) adequate physical security is in place to assure implementation of security strategies that protect against spent fuel sabotage; and (4) in the unlikely event of a beyond design basis event resulting in a loss of all SFP cooling, there is sufficient time to implement pre-planned mitigation measures to provide makeup or spray to the SFP before the onset of a zirconium cladding ignition.

Section 6, "Safety Analysis," of the TMI-1 Defueled Safety Analysis Report (DSAR) describes the design basis accident (DBA) scenarios that were applicable to TMI-1. After the reactor is defueled,

the spent fuel will be stored in the Spent Fuel Pool (SFP) located in the Fuel Handling Building. While spent fuel is stored in the SFP, the remaining accident is the Fuel Handling Accident (FHA) that takes place in the SFP.

TMI-1 described these analyses and provided each for NRC review in Reference 8.1. The specific analyses are summarized in the following sections.

5.1.1 Consequences of Design Basis Events

TMI-1

The Fuel Handling Accident (FHA) is defined as the dropping of a single spent fuel assembly in the SFP during fuel handling activities, such that the entire outer row of fuel rods in the assembly, 56 of 208, suffers mechanical damage to the cladding. This accident is postulated to occur despite the administrative controls and physical limitations imposed on fuel-handling operations. The gap activity in the damaged rods is instantaneously released into the SFP. The release occurs under 23 feet of water, which acts as a filter.

The FHA dose calculation (Reference 8.10) shows that the dose at the EAB 365 days after shutdown (with no credit for safety systems) is 1.78×10^{-4} rem total effective dose equivalent (TEDE) and 5.95×10^{-13} rem Thyroid dose. This is less than the EPA PAG of 1 rem TEDE and 5 rem Thyroid, and the accepted 10% EPA PAG for declaration of Site Area Emergency per NEI 99-01, Rev.6 (Reference 8.4).

TMI-2

The bounding event for TMI-2 is a fire in the Reactor Building (RB) with the RB Purge System in operation. Per the TMI-2 Fire Protection Program Evaluation Report (Reference 8.11) 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.

This is also less than the EPA PAGs and the accepted 10% EPA PAG for declaration of Site Area Emergency per NEI 99-01, Rev.6 (Reference 8.4).

5.1.2 Hottest Fuel Assembly Adiabatic Heat-Up (Zirconium Fire)

The analysis provided in Reference 8.12 compares the conditions for the hottest fuel assembly stored in the TMI-1 SFP to a criterion proposed in SECY-99-168, "Improving Decommissioning Regulations for Nuclear Power Plants" (Reference 8.13), applicable to offsite emergency response for the unit in the decommissioning process. This criterion considers the time for the hottest assembly to heat up from 30°C to 900°C adiabatically. If the heat up time is greater than 10 hours, then offsite emergency preplanning involving the facility is not necessary.

Based on the limiting fuel assembly for decay heat and adiabatic heat-up analysis, at 488 days (approximately 16 months) after permanent cessation of power operations (488 days decay time), the time for the hottest fuel assembly to reach 900°C is 10 hours after the assemblies have been uncovered.

Because of the length of time it would take for the adiabatic heat-up to occur, there is ample time to respond to any partial drain down event that might cause such an occurrence by restoring SFP cooling or makeup or providing spray. As a result, the likelihood that such a scenario would progress to a zirconium fire is not deemed credible. The analysis was submitted for NRC review

in Reference 8.1.

5.1.3 Consequences of Other Analyzed Events

NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," (Reference 8.14), Supplement 1, Section 4.3.9, identifies that a SFP drain down event is a beyond design basis event.

The offsite and Control Room radiological impacts of a postulated complete loss of SFP water were assessed in Technical Evaluation 623073, "TMI Spent Fuel Pool Draindown Shine Dose Rate Evaluation, Revision 0" (Reference 8.15). A loss of water shielding above the fuel could increase the offsite radiation levels because of the gamma rays streaming up out of the SFP being scattered back to a receptor at the site boundary. With a decay of 365 days from shutdown, the dose rate at the EAB would be 4.04×10^{-1} mrem/hr not crediting the shielding from the Fuel Handling Building (FHB) roof. Crediting the FHB roof structure, the dose rate at the EAB would be 4.6×10^{-10} mrem/hr. The resultant dose rates if taken over the 10-hour accident duration would be less than the EPA PAGs and the Site Area Emergency Fraction provided by NEI 99-01, Rev. 6 (Reference 8.4).

5.1.4 Comparison to NUREG-1738 Industry Decommissioning Commitments and Staff Decommissioning Assumptions

Although the limited scope of design and beyond design basis accidents that remain applicable to TMI-1 justify a reduction in the necessary scope of emergency response capabilities, Exelon also evaluated the industry decommissioning commitments (IDCs) and staff decommissioning assumptions (SDAs) contained in NUREG-1738 (Reference 8.16).

The IDCs and SDAs are listed in Tables 4.1-1 and 4.1-2, respectively, of NUREG-1738. Tables 4 and 5 of Exelon's EP exemption request (Reference 8.1, Attachment 1), identify how the TMI-1 SFP meets or compares with each of these IDCs and SDAs.

5.1.5 Consequences of a Beyond Design Basis Earthquake

TMI-1 conducted a seismic evaluation in response to an NRC request for information pursuant to 10 CFR 50.54(f) regarding Recommendation 2.1 of the Near-Term Task Force (NTTF) Review of Insights from the Fukushima Dai-ichi Accident. The seismic evaluation included all structures including the SFP and was prepared and submitted for NRC review. The Exelon submittal (Reference 8.17) documents the seismic evaluation in conformance with NTTF Recommendation 2.1 including the high-confidence-of-low-probability-of-failure (HCLPF) values and the 1×10^{-5} per year hazard level. The NRC staff review of the NTTF submittal, specifically for the SFP evaluation associated with the reevaluated seismic hazard implementing NTTF Recommendation 2.1, is documented in Reference 8.18. The NRC staff concluded that the assessment was performed consistent with the NRC-endorsed (Reference 8.19) SFP Evaluation Guidance Report (Reference 8.20) and provided sufficient information, including the SFP integrity evaluation, to meet the SFP Evaluation Guidance (Item 9 in Enclosure 1 of the NRC's 50.54(f) letter). The TMI-1 response to other beyond design basis environmental events is also addressed in Tables 4 and 5 of Exelon's EP exemption request (Reference 8.1).

5.2 Permanently Defueled Emergency Plan

The PDEP is provided as Attachment 2 of this submittal for NRC review and approval. The PDEP describes the station's plan for responding to emergencies that may arise at TMI while in a

permanently shutdown and defueled configuration. The PDEP was developed considering the guidance contained within Attachment 1 of NSIR/DPR-ISG-02, Interim Staff Guidance, "Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants" (Reference 8.9).

The analyses of the potential radiological impact of accidents while the facility is in a permanently defueled condition indicate that no design basis accident or reasonably conceivable beyond design basis accident will be expected to result in radioactive releases that exceed EPA PAGs beyond the site boundary or the industry recognized fractional PAG threshold (10% PAG) for a Site Area Emergency (Reference 8.3). This allows for the State to utilize a comprehensive emergency management plan to respond to an event at TMI.

The slow progression rate of postulated event scenarios indicates sufficient time is available to initiate appropriate mitigating actions to protect the health and safety of the public (Reference 8.1). Therefore, the proposed PDEP states that notification of an emergency declaration will be made to State authorities within 30 minutes after an emergency has been declared. Based on the results of the accident analysis, a 30-minute notification time and reduced scope of offsite and onsite emergency response plans can be implemented without undue risk to public health and safety, commensurate with the reduced offsite radiological consequences associated with the defueled and decommissioning status of the facility.

In the event of a large area fire, deliberate attack, or other rapidly developing beyond design basis events, the rapid deployment of offsite resources, including law enforcement, ambulance, and fire/rescue services may be requested by the TMI to assist with the onsite response. These requests would be made via direct contact with local law enforcement using established communications methods, including the 911 system.

The PDEP addresses the applicable regulations contained in 10 CFR 50.47, "Emergency plans" and 10 CFR Part 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities" and is consistent with the applicable guidance established in ISG-02 (Reference 8.9) and NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (Reference 8.21) that remain applicable after the previously requested exemptions are approved (Reference 8.1).

5.3 Permanently Defueled Emergency Action Levels

The current TMI-1 EAL scheme was developed based on the guidance presented in NEI 99-01, Rev. 6 (Reference 8.4).

Attachment 3 provides the proposed "Three Mile Island Permanently Defueled Emergency Action Levels and Technical Bases," Rev. 0. This document contains the site-specific EALs and technical bases for the proposed Permanently Defueled EAL scheme.

5.3.1 Differences and Deviations

Attachment 4 provides a cross-reference between each generic EAL contained in NEI 99-01, Revision 6 (Reference 8.4) and the proposed Permanently Defueled EALs. Differences and deviations are identified in accordance with the guidance contained in NRC Regulatory Issue Summary (RIS) 2003-18, "Use of Nuclear Energy Institute (NEI) 99-01, Methodology for Development of Emergency Action Levels, Revision 4, Dated January 2003," (and Supplements 1 and 2) (Reference 8.22).

As discussed in RIS 2003-18, Supplement 1, differences are defined as follows:

"A *difference* is an EAL change where the basis scheme guidance (NUREG, NUMARC, NEI) differs in wording but agrees in meaning and intent, such that classification of an event would be the same, whether using the basis scheme guidance or the site-specific proposed EAL. Examples of differences include the use of site-specific terminology or administrative reformatting of site-specific EALs."

An explanation for each *difference* between the Permanently Defueled and ISFSI EALs and the guidance presented in NEI 99-01, Rev. 6 is included in Attachment 4. The *differences* do not alter the meaning or intent of the Initiating Condition or EAL.

As discussed in RIS 2003-18, Supplement 1, deviations are defined as follows:

"A *deviation* is an EAL change where the basis scheme guidance differs in wording and is altered in meaning or intent, such that classification of the event could be different between the basis scheme guidance and the site-specific proposed EAL. Examples of *deviations* include the use of altered mode applicability, altering key words or time limits, or changing words of physical reference (protected area, safety-related equipment, etc.)."

There are no *deviations* between the Permanently Defueled and ISFSI EALs and the guidance presented in NEI 99-01, Revision 6.

5.3.2 Operating Modes and Applicability

The proposed Permanently Defueled EALs are only applicable to the permanently defueled condition, with all spent fuel permanently removed from the reactor vessel and following 488 days of decay of the spent fuel.

5.3.3 State and Local Government Review of Proposed Changes

Because of the geographic location of TMI, emergency planning and responsibilities have historically involved coordination with the Commonwealth of Pennsylvania. Decommissioning-related emergency plan submittals for TMI have been discussed with offsite response organizations since Exelon provided notification that it would permanently cease power operations.

In support of this license amendment numerous discussions have been held with the Commonwealth of Pennsylvania and local response organizations. On May 30, 2019, the Commonwealth of Pennsylvania – Department of Environmental Protection Bureau of Radiation Protection (PA-BRP) received the draft proposed changes of the TMI Permanently Defueled Emergency Plan and EAL scheme. On June 24, 2019, the PA-BRP and Pennsylvania Emergency Management Agency (PEMA) met with representatives of TMI-1 and provided comments on the PDEP and associated EALs. Attachment 5 contains acknowledgement from the Commonwealth of Pennsylvania confirming that they completed their review of the proposed TMI Emergency Plan/EALs and comments were resolved to their satisfaction.

Following NRC approval and prior to implementation, Exelon will provide an overview of the new classification scheme to State and local emergency management officials in accordance with 10 CFR Part 50, Appendix E, Section IV.B.1.

5.4 Summary

On June 20, 2017, Exelon submitted a notification of permanent cessation of power operations pursuant to 10 CFR 50.82(a)(1)(i), stating that Exelon has decided to permanently cease power operation of TMI-1 by September 30, 2019 (Reference 8.2). Upon docketing of the certifications for permanent cessation of operations (10 CFR 50.82(a)(1)(i)) and permanent removal of fuel from the reactor vessel (10 CFR 50.82(a)(1)(ii)), pursuant to 10 CFR 50.82(a)(2), the 10 CFR Part 50 license for TMI-1 will no longer authorize operation of the reactor or emplacement or retention of fuel into the reactor vessel.

TMI-1 has demonstrated that no postulated accident or reasonably conceivable beyond design basis event will result in radiological releases requiring offsite protective actions, or the slow progression rate of postulated event scenarios indicate sufficient time is available to initiate appropriate mitigating actions to protect the health and safety of the public (Reference 8.1).

This proposed amendment would revise the emergency plan and the EAL scheme to reflect the permanently defueled condition following 488 days of decay of the spent fuel. The proposed emergency plan and EAL scheme are being submitted to the NRC for approval prior to implementation, as required under 10 CFR 50.54(q)(4) and 10 CFR Part 50, Appendix E, Section IV.B.2, and are predicated on approval of exemptions submitted to the NRC (Reference 8.1).

6.0 REGULATORY EVALUATION

The proposed PDEP and Permanently Defueled EAL scheme are predicated on approval of requests for exemptions from portions of 10 CFR 50.47(b); 10 CFR 50.47(c)(2); and 10 CFR Part 50, Appendix E, Section IV, submitted in Reference 8.1, and as such, they do not meet all the standards of 10 CFR 50.47(b) and requirements of 10 CFR Part 50, Appendix E. Upon approval of the requested exemptions, the emergency plan and EAL scheme, as revised, will meet the remaining applicable requirements in 10 CFR Part 50, Appendix E and the planning standards of 10 CFR 50.47(b).

6.1 Applicable Regulatory Requirements and Guidance

Exelon intends to meet the applicable emergency regulatory requirements as discussed below with the exemptions previously requested (Reference 8.1). The requested exemptions are reflected by "strikeout" text in the discussion below.

10 CFR 50.47, "Emergency plans," sets forth emergency plan requirements for nuclear power plant facilities. The regulations in 10 CFR 50.47(a)(1)(i) state, in part:

"... no initial operating license for a nuclear power reactor will be issued unless a finding is made by the NRC that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency."

10 CFR 50.47(b) establishes the standards that the onsite and offsite emergency response plans must meet for NRC staff to make a positive finding that there is reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency. Planning Standard (4) of this section (e.g. 10 CFR 50.47(b)(4)) (with exemption) requires that a licensee's emergency response plan contain the following:

"A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility"

~~licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures."~~

10 CFR 50.54(q)(4) specifies the process for revising emergency plans where the changes reduce the effectiveness of the plan. This regulation states the following:

"The changes to a licensee's emergency plan that reduce the effectiveness of the plan as defined in paragraph (q)(1)(iv) of this section may not be implemented without prior approval by the NRC. A licensee desiring to make such a change after February 21, 2012 shall submit an application for an amendment to its license. In addition to the filing requirements of §§ 50.90 and 50.91, the request must include all emergency plan pages affected by that change and must be accompanied by a forwarding letter identifying the change, the reason for the change, and the basis for concluding that the licensee's emergency plan, as revised, will continue to meet the requirements in appendix E to this part and, for nuclear power reactor licensees, the planning standards of § 50.47(b)."

Section IV.B.1 of Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50, states, in part (with exemption):

"The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described, including emergency action levels that are to be used as criteria for determining the need for notification and participation of local and State agencies, the Commission, and other Federal agencies, and the emergency action levels that are to be used for determining when and what type of protective measures should be considered within ~~and outside~~ the site boundary to protect health and safety. The emergency action levels shall be based on in-plant conditions and instrumentation in addition to onsite ~~and offsite~~ monitoring. ~~By June 20, 2012, for nuclear power reactor licensees, these action levels must include hostile action that may adversely affect the nuclear power plant."~~

Section IV.B.2 of Appendix E states that:

"A licensee desiring to change its entire emergency action level scheme shall submit an application for an amendment to its license and receive NRC approval before implementing the change."

Section IV.C.1 of Appendix E requires (with exemption) each emergency plan to define the emergency classification levels that determine the extent of the participation of the emergency response organization. EALs are used by plant personnel in determining the appropriate emergency classification level to declare. This section states, in part:

"Emergency action levels (based not only on onsite ~~and offsite~~ radiation monitoring information but also on readings from a number of sensors that indicate a potential emergency, ~~such as the pressure in containment and the response of the Emergency Core Cooling System~~) for notification of offsite agencies shall be described. The existence, but not the details, of a message authentication scheme shall be noted for such agencies. The emergency classes defined shall include: (1) Notification of unusual events, [and] (2) alert, ~~(3) site area emergency, and (4) general emergency."~~

In November 2012, NEI published NEI 99-01, Revision 6 (Reference 8.4). The EAL scheme

changes being requested herein are based on Revision 6 to NEI 99-01. NRC endorsed NEI 99-01, Revision 6, by letter dated March 28, 2013 (Reference 8.5). The analyses of the potential radiological impact of accidents while the plant is in a permanently defueled condition indicate that no design basis accident or reasonably conceivable beyond design basis accident will be expected to result in radioactive releases that exceed EPA PAGs beyond the site boundary. The slow progression rate of postulated event scenarios indicates sufficient time is available to initiate appropriate mitigating actions to protect the health and safety of the public (Reference 8.1). Therefore, the Permanently Defueled EALs, detailed in NEI 99-01, Revision 6, will be adopted, with certain differences. Pursuant to 10 CFR Part 50, Appendix E, Section IV.B.2, a revision to an entire EAL scheme must be approved by the NRC before implementation.

NSIR/DPR-ISG-02, Interim Staff Guidance, "Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants" (Reference 8.9) contains guidance for NRC staff evaluation of decommissioning emergency plans.

The proposed amendment is being submitted to the NRC pursuant to 10 CFR 50.90 for the purpose of revising the TMI-1 SEP in order to establish an emergency plan appropriate for a permanently defueled facility (e.g., PDEP) and to implement a Permanently Defueled EAL scheme, predicated on approval of the exemptions requested in Reference 8.1.

6.2 Precedent

The changes to the TMI Emergency Plan and associated EAL scheme, including the change to assess, classify, and declare an emergency within 30 minutes, are consistent with changes to emergency plans and EALs for the transition to a permanently defueled condition that have recently been approved by the NRC for other nuclear power reactor facilities beginning decommissioning. Specifically, the NRC approved similar changes to: 1) Omaha Public Power District's (OPPD) Fort Calhoun Station, Unit 1 on December 12, 2017 (Reference 8.23); 2) Entergy Nuclear Operations, Inc. for the Vermont Yankee Nuclear Power Station on December 11, 2015 (Reference 8.24); 3) Southern California Edison Company for the San Onofre Nuclear Generating Station, Units 1, 2, and 3 on June 5, 2015 (References 8.25 and 8.26); 4) Duke Energy Florida, Inc. for the Crystal River Unit 3 Nuclear Generating Station on March 31, 2015 (Reference 8.27); and 5) Dominion Energy Kewaunee, Inc. for the Kewaunee Power Station on October 31, 2014 (Reference 8.28).

Similar changes to the emergency plan and the associated EAL scheme were approved by NRC for the Zion Station as it transitioned from an operating plant to a decommissioned facility, as described in References 8.29 and 8.30.

6.3 No Significant Hazards Consideration Determination

Pursuant to 10 CFR 50.92, Exelon has reviewed the proposed changes and concludes that the changes do not involve a significant hazards consideration because the proposed changes satisfy the criteria in 10 CFR 50.92(c). These criteria require that operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

The proposed changes would revise the Three Mile Island Nuclear Station (TMI) Site Emergency Plan (SEP) and Emergency Action Level (EAL) scheme commensurate with the hazards associated with a permanently defueled facility.

The discussion below addresses each of these criteria and demonstrates that the proposed amendment does not constitute a significant hazard.

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed changes to the site emergency plan (SEP) and EAL scheme do not impact the function of plant structures, systems, or components (SSCs). The proposed changes do not affect accident initiators or precursors, nor does it alter design assumptions. The proposed changes do not prevent the ability of the on-shift staff and emergency response organization (ERO) to perform their intended functions to mitigate the consequences of any accident or event that will be credible in the permanently defueled condition.

The probability of occurrence of previously evaluated accidents is not increased, since most previously analyzed accidents can no longer occur and the probability of the few remaining credible accidents are unaffected by the proposed amendment.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed changes reduce the scope of the SEP and EAL scheme commensurate with the hazards associated with a permanently shutdown and defueled facility. The proposed changes do not involve installation of new equipment or modification of existing equipment, so that no new equipment failure modes are introduced. In addition, the proposed changes do not result in a change to the way that the equipment or facility is operated so that no new or different kinds of accident initiators are created.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

Margin of safety is associated with confidence in the ability of the fission product barriers (i.e., fuel cladding, reactor coolant system pressure boundary, and containment structure) to limit the level of radiation dose to the public. The proposed changes are associated with the SEP and EAL scheme and do not impact operation of the plant or its response to transients or accidents. The change does not affect the Technical Specifications. The proposed changes do not involve a change in the method of plant operation, and no accident analyses will be affected by the proposed changes. Safety analysis acceptance criteria are not affected by the proposed changes. The Post Defueled Emergency Plan (PDEP) will continue to provide the necessary response staff with the appropriate guidance to protect the health and safety of the public.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, Exelon concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

6.4 Conclusion

In conclusion, based on the considerations discussed above: 1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, 2) such activities will be conducted in compliance with Commission's regulations, and 3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

7.0 ENVIRONMENTAL CONSIDERATIONS

This amendment request meets the eligibility criteria for categorical exclusion from environmental review set forth in 10 CFR 51.22(c)(9) as follows:

(i) The amendment involves no significant hazards consideration.

As described in Section 6.3 of this evaluation, the proposed changes involve no significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.

The proposed changes do not involve any physical alterations to the plant configuration or any changes to the operation of the facility that could lead to a change in the type or amount of effluent release offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed changes do not involve any physical alterations to the plant configuration or any changes to the operation of the facility that could lead to a significant increase in individual or cumulative occupational radiation exposure.

Based on the above, Exelon concludes that the proposed change meets the eligibility criteria for categorical exclusion as set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

8.0 REFERENCES

- 8.1. Letter from Michael P. Gallagher, (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission – "Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR Part 50, Appendix E," dated July 1, 2019 (ML19182A104)
- 8.2. Letter from J. Bradley Fewell (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Certification of Permanent Cessation of Power Operations for Three Mile Island Nuclear Station, Unit 1," dated June 20, 2017 (NRC Accession No. ML17171A151)
- 8.3. U.S. Environmental Protection Agency, EPA 400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," dated October 1991 (reprinted May 1992)

- 8.4. Nuclear Energy Institute (NEI) 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors," dated November 2012 (ADAMS Accession No. ML12326A805)
- 8.5. Letter, Mark Thaggard (USNRC) to Susan Perkins-Grew (NEI), "U.S. Nuclear Regulatory Commission Review and Endorsement of NEI 99-01, Revision 6, Dated November 2012 (TAC No. D92368)," dated March 28, 2013 (ADAMS Accession No. ML12346A463)
- 8.6. Letter from Michael P. Gallagher, (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission – "Three Mile Island Nuclear Station, Unit 1 – Post-Shutdown Decommissioning Activities Report," dated April 5, 2019 (ADAMS Accession No. ML19095A041)
- 8.7. Letter from Michael P. Gallagher, (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission – "Spent Fuel Management Plan for Three Mile Island Nuclear Station – Unit 1," dated April 5, 2019 (ADAMS Accession No. ML19095A009)
- 8.8. Letter from U.S. Nuclear Regulatory Commission to Bryan C. Hanson, (Exelon Generation Company, LLC), "Three Mile Island Nuclear Station, Units 1 and 2 – Issuance of Amendment No. 296 for Unit 1 RE: Changes to Emergency Plan for Post-Shutdown and Permanently Defueled Condition (EPID L-2018-LLA-0073), dated April 18, 2019 (ADAMS Accession No. ML19065A114)
- 8.9. NSIR/DPR-ISG-02, Interim Staff Guidance, "Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants," dated May 11, 2015 (ADAMS Accession No. ML14106A057)
- 8.10. C-1101-900-E000-088, "Fuel Handling Accident Dose Consequence - Post Permanent Shutdown," Revision 0, dated May 11, 2018
- 8.11. 990-3017, "Three Mile Island Unit No. 2 Fire Protection Program Evaluation, Revision 12, dated May 18, 2018
- 8.12. C-1101-202-E410-476, "DECOM Spent Fuel Pool Thermohydraulic Analysis," Revision 1, dated June 10, 2019
- 8.13. U.S. Nuclear Regulatory Commission, Commission Paper SECY-99-168, Improving Decommissioning Regulations for Nuclear Power Plants, dated June 30, 1999 (ADAMS Accession No. ML992800087)
- 8.14. NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," dated October 2002
- 8.15. Technical Evaluation 623073, "TMI Spent Fuel Pool Draindown Shine Dose Rate Evaluation, Revision 0," dated May 28, 2018
- 8.16. NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," dated February 2001 (ADAMS Accession No. ML010430066)

- 8.17. Letter from Mr. James Barstow (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Exelon Generation Company, LLC, Seismic Hazard and Screening Report (Central and Eastern United States (CEUS) Sites), Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 31, 2014 (ADAMS Accession No. ML14090A271)
- 8.18. Letter from U.S. Nuclear Regulatory Commission to Mr. Bryan C. Hanson (Exelon Generation Company, LLC), "Oyster Creek Nuclear Generating Station - Staff Assessment of Information Provided Pursuant to Title 10 of the Code of Federal Regulations Part 50, Section 50.54(f), Seismic Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (CAC NO. MF3905)," dated August 14, 2015 (ADAMS Accession No. ML15223A215)
- 8.19. Letter, Jack R. Davis (USNRC) to Joseph E. Pollock (NEI), "Endorsement of Electric Power Research Institute Report 3002007148, Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation," dated March 17, 2016 (ADAMS Accession No. ML15350A158)
- 8.20. EPRI, "Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation," Electric Power Research Institute Technical Update 3002007148, dated February 2016 (ADAMS Accession No. ML16055A021)
- 8.21. NUREG-0654, FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, published November 1980
- 8.22. NRC Regulatory Issue Summary 2003-18, "Use of Nuclear Energy Institute (NEI) 99-01, Methodology for Development of Emergency Action Levels, Revision 4, dated January 2003," dated October 8, 2003 (ADAMS Accession No. ML032580518), and Supplement 1 and 2, respectively dated July 13, 2004 (ADAMS Accession No. ML041550395) and December 12, 2005 (ADAMS Accession No. ML051450482)
- 8.23. U.S. Nuclear Regulatory Commission, Omaha Public Power District, Fort Calhoun Station, "Fort Calhoun Station, Unit 1 - Issuance of Amendment Re: Revise Emergency Plan to The Permanently Defueled Emergency Plan and Permanently Defueled Emergency Action Level Scheme (CAC NO. MF8951; EPID L-2016-LLA-0036)," Dated December 12, 2017, (ADAMS Accession No. ML17276B286)
- 8.24. Letter, USNRC to Entergy Nuclear Operations, Inc., Vermont Yankee Nuclear Power Station, "Vermont Yankee Nuclear Power Station – Issuance of Amendment Re: Changes to the Emergency Plan and Emergency Action Levels (TAC No. MF4279)," dated December 11, 2015 (ADAMS Accession No. ML15233A166)
- 8.25. Letter, USNRC to San Onofre Nuclear Generating Station, "San Onofre Nuclear Generating Station, Units 1, 2, and 3 and the Independent Spent Fuel Storage Installation – Issuance of Amendments Re: Changes to the Emergency Action Level Scheme (TAC Nos. MF3838, MF3839, MF3840)," dated June 5, 2015 (ADAMS Accession No. ML15105A349)

- 8.26. Letter, USNRC to San Onofre Nuclear Generating Station, "San Onofre Nuclear Generating Station, Units 1, 2, and 3 and the Independent Spent Fuel Storage Installation – Issuance of Amendments Re: Changes to the Emergency Plan (TAC Nos. MF3841, MF3842, MF3843)," dated June 5, 2015 (ADAMS Accession No. ML15126A461)
- 8.27. Letter, USNRC to Crystal River Nuclear Plant (NA2C), "Crystal River Unit 3 – Issuance of Amendment Regarding Changes to the Emergency Plan and Emergency Action Levels (TAC No. MF3415)," dated March 31, 2015 (ADAMS Accession No. ML15027A209)
- 8.28. Letter, USNRC to Dominion Energy Kewaunee, Inc., "Kewaunee Power Station – Issuance of Amendment for Changes to the Emergency Plan and Emergency Action Levels (TAC No. MF3411)," dated October 31, 2014 (ADAMS Accession No. ML14279A482)
- 8.29. Letter, USNRC to Zion Nuclear Power Station, Unit Nos. 1 and 2, "Request for Approval of Defueled Station Emergency Plan and Exemption from Certain Requirements of 10 CFR 50.47, "Emergency Plans"- Zion Nuclear Power Station, Unit Nos. 1 and 2 (TAC NOS MA5253 and MA554)," dated August 31, 1999 (ADAMS Legacy No. 9909070087)
- 8.30. Letter, USNRC to Zion Nuclear Power Station, Unit Nos. 1 and 2, "Emergency Action Level Revisions for Zion Nuclear Power Station (TAC Nos. J00327 and J00328)," dated February 25, 2008 (ADAMS Accession No. ML072680350)

ATTACHMENT 2

THREE MILE ISLAND NUCLEAR STATION

PERMANENTLY DEFUELED EMERGENCY PLAN

EXELON GENERATION

THREE MILE ISLAND

PERMANENTLY DEFUELED

EMERGENCY PLAN (PDEP)

[illegible]

TABLE OF CONTENTS

SECTION	PAGE
1.0 INTRODUCTION	1
1.1. Purpose.....	1
1.2. Scope	1
2.0 SUMMARY OF EMERGENCY PLAN.....	3
2.1. Overview of Permanently Defueled Emergency Plan	3
2.2. Objectives	4
2.3. Actions in an Emergency.....	4
2.4. Emergency Response Facilities.....	5
2.5. Mobilization	5
2.6. State and Local Government Notification and Response.....	5
2.7. Federal Government Notification and Response	5
2.8. Technical Support	6
2.9. Mitigation of Consequences of Beyond Design Basis Events	6
3.0 SITE DESCRIPTION	7
3.1. Facility Description.....	7
3.2. Area Characteristics and Land Use	7
4.0 EMERGENCY CLASSIFICATION SYSTEM	12
4.1. Unusual Event	12
4.2. Alert.....	13
4.3. Emergency Classification System Review by State Authorities	13
5.0 EMERGENCY RESPONSE FACILITIES AND EQUIPMENT	14
5.1. Control Room	14
5.2. Assessment Capability	14
6.0 COMMUNICATIONS.....	17
7.0 ORGANIZATION.....	20
7.1. Normal Facility Organization	20
7.2. Emergency Response Organization.....	21
7.3. Coordination with State Government Authorities	24

TABLE OF CONTENTS

SECTION	PAGE
8.0 EMERGENCY RESPONSE	27
8.1. Emergency Condition Recognition and Classification	27
8.2. Activation of the Emergency Response Organization	27
8.3. Emergency Termination Criteria	29
9.0 RADIOLOGICAL ASSESSMENT AND PROTECTIVE MEASURES	30
9.1. Radiological Assessment	30
9.2. Radiological Exposure Control	30
9.3. Protective Measures	30
9.4. Aid to Affected Personnel	32
9.5. Protective Actions for Onsite Personnel	34
10.0 EMERGENCY NOTIFICATION AND PUBLIC INFORMATION	38
10.1. Emergency Notification	38
10.2. Public Information	38
11.0 MAINTAINING EMERGENCY PREPAREDNESS	40
11.1. Drills and Exercises	40
11.2. Training	43
11.3. Review and Updating of Plan and Procedures	44
11.4. Maintenance and Inventory of Emergency Equipment and Supplies	45
11.5. Responsibility for the Planning Effort	45

LIST OF TABLES

Table 7.1: Minimum On-Shift and ERO Staffing Requirements	26
Table 9.1: Emergency Dose Limits	34

LIST OF FIGURES

Figure 3.1: TMI Site Arrangement	10
Figure 3.2: TMI Site Relative Location	11
Figure 6.1: Exelon Notification Scheme	19
Figure 7.1: Normal On-Shift and Emergency Response Organization	25

APPENDICES

- APPENDIX 1 REFERENCES**
- APPENDIX 2 INDEX OF EMERGENCY PLAN IMPLEMENTING
PROCEDURES**
- APPENDIX 3 PROCEDURE CROSS REFERENCE TO NUREG-0654**
- APPENDIX 4 LIST OF LETTERS OF AGREEMENT**
- APPENDIX 5 GLOSSARY OF TERMS AND ACRONYMS**

ADDENDUMS

- ADDENDUM 1 Three Mile Island Station Permanently Defueled Emergency
Action Levels and Technical Bases**

1.0 INTRODUCTION

The Permanently Defueled Emergency Plan (PDEP) describes the facility's plan for responding to emergencies that may arise at the Three Mile Island Nuclear Station (TMI). The Emergency Plan encompasses both Three Mile Island Unit 1 (TMI-1) and Three Mile Island Unit 2 (TMI-2).

This plan is applicable after the TMI-1 has been permanently shutdown and defueled and sufficient time has passed (488 days after shutdown) for the hottest fuel assembly to have decayed such that there would be 10 hours prior to the onset of zirconium clad ignition should a beyond design basis event result in the loss of all water from the spent fuel pool (Reference 1). Per 10 CFR 50.82(a)(1)(i) and (ii) TMI-1 is a possession only facility with all irradiated fuel stored in the Spent Fuel Pool (SFP) and/or the Independent Spent Fuel Storage Installation (ISFSI) (when built). An analysis of the possible design basis events and consequences is presented in the Decommissioned Safety Analysis Report (DSAR) for TMI-1 and the Post-Defueling Monitored Storage Safety Analysis Report for TMI-2.

Exelon maintains the emergency planning responsibilities for TMI-2, which is owned by First Energy Corporation, through a service agreement.

This PDEP adequately addresses the risks associated with TMI's current conditions.

The analysis of the potential radiological impacts of postulated design basis accident in a permanently defueled condition indicates that any releases beyond the Site Boundary would be below the Environmental Protection Agency (EPA) Protective Action Guide (PAG) exposure levels. Additionally, postulated beyond design basis accidents have been analyzed showing that due to their slow progression there is sufficient time available to initiate appropriate mitigating actions to protect the health and safety of the public. Therefore, the PDEP adequately addresses the risk associated with TMI's permanently defueled condition and continues to provide adequate protection for facility personnel and the public. Exposure levels, which warrant pre-planned response measures, are limited to onsite areas. For this reason, the TMI's PDEP is focused on onsite actions.

1.1. Purpose

The purpose of the PDEP is to assure an adequate level of preparedness by which to cope with a spectrum of emergencies that could be postulated to occur, including the means to minimize radiation exposure to facility personnel. This plan integrates the necessary elements to provide effective emergency response considering cooperation and coordination of off-site organizations expected to respond to potential emergencies.

1.2. Scope

The PDEP has been developed to respond to potential radiological emergencies at TMI considering the permanently shut down and defueled status. Because there are no postulated accidents that would result in dose consequences that are large enough to require offsite emergency planning, the overall scope of this plan delineates the actions necessary to

safeguard onsite personnel and minimize damage to property. If determined appropriate by government officials, protective actions may be implemented to protect the public using an all hazards approach to emergency planning.

The concepts presented in this plan address the applicable regulations stipulated in 10 CFR 50.47, "Emergency Plans" and 10 CFR Part 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," as exempted. Exemptions to selected portions of 10 CFR 50.47(b), 10 CFR 50.47(c)(2) and 10 CFR Part 50, Appendix E were previously approved by the NRC. The plan is consistent with the remaining applicable guidelines established in NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Facilities" (NUREG-0654). Appendix 3 contains a cross-reference to the applicable guidance in NUREG-0654.

Abbreviations and acronyms used in this plan are included in Appendix 5.

2.0 SUMMARY OF EMERGENCY PLAN

2.1. Overview of Permanently Defueled Emergency Plan

In the event of an emergency at TMI, actions are required to identify and assess the nature of the emergency and to bring it under control in a manner that protects the health and safety of the public and facility personnel.

This plan describes the organization and responsibilities for implementing emergency measures. It describes interfaces with Federal, Commonwealth of Pennsylvania, and local organizations that may be notified in the event of an emergency and may provide assistance.

Emergency services are provided by local public and private entities. Fire support services are provided by:

- Bainbridge Volunteer Fire Company (Lancaster County)
- Middletown Volunteer Fire Department
- Londonderry Volunteer Fire Company
- Elizabethtown Fire Department
- Lower Swatara Volunteer Fire Department
- Susquehanna Area Regional Airport Authority (SARAA)

Law enforcement support services are provided by local, state, and federal law enforcement authorities, as appropriate. Ambulance service is provided by Londonderry Volunteer Fire Company.

Because there are no postulated accidents that would result in off-site dose consequences that are large enough to require off-site emergency planning, emergencies are divided into two classifications: 1) Notification of Unusual Event (Unusual Event) and 2) Alert. The classification scheme, developed in accordance with NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors", Revision 6, November 2012, has been discussed and agreed upon with responsible offsite organizations and is compatible with their respective emergency plans. If determined appropriate by government officials, protective actions may be implemented to protect the public using the existing all hazards emergency planning (i.e., Comprehensive Emergency Management Plan (CEMP)).

TMI is responsible for planning and implementing emergency measures within the Site Boundary. This plan is provided to meet this responsibility. To carry out specific emergency measures discussed in this plan, detailed emergency plan implementing procedures (EPIP) are established and maintained. A list of EIPs is included in Appendix 2.

In addition to the description of activities and steps that can be implemented during an emergency, this plan also provides a general description of the steps taken to recover from an emergency situation. It also describes the training, drills, planning, and coordination appropriate to maintain an adequate level of emergency preparedness.

2.2. Objectives

The basic objectives of this plan are:

- 1) To establish a system for identification and classification of the emergency condition and initiation of response actions;
- 2) To establish an organization for the direction of activity within the facility to limit the consequences of the incident;
- 3) To establish an organization for control of surveillance activities to assess the extent and significance of any uncontrolled release of radioactive material;
- 4) To identify facilities, equipment and supplies available for emergency use;
- 5) To establish an engineering support organization to aid the facility personnel in limiting the consequences of and recovery from an event;
- 6) To establish the basic elements of an emergency recovery program;
- 7) To specify a system for coordination with federal, state, and local authorities and agencies for offsite support;
- 8) To develop a communications network between the facility and offsite authorities to provide notification of emergency situations;
- 9) To develop a training and Emergency Plan exercise program to assure constant effectiveness of the plan.

2.3. Actions in an Emergency

This plan is activated by the Shift Manager upon identification of an emergency situation based upon Emergency Action Level (EAL) criteria. The emergency measures described in the subsequent sections and emergency plan implementing procedures are implemented in accordance with the classification and nature of the emergency at the direction of the Shift Manager. Regulatory authorities and offsite support organizations are notified in accordance with this plan. The Shift Manager has authority and responsibility for control and mitigation of the emergency, including emergency response resources, coordination of radiological assessment activities, and recovery implementation.

If an emergency condition develops, the Shift Manager assumes the role of Emergency Director, including responsibilities for initiating emergency actions to limit the consequences of the incident and to bring the facility into a stable condition. The individual must:

- 1) Recognize the emergency condition by observation of EALs;
- 2) Classify the accident in accordance with the emergency classification system;
- 3) Initiate emergency procedure(s) applicable to the event;
- 4) Activate the facility emergency alarm system;
- 5) Notify state authorities of emergency conditions;
- 6) Notify the NRC Operations Center ;

- 7) Direct and coordinate all emergency response efforts until overall responsibility is assumed by another individual qualified as an Emergency Director.

2.4. Emergency Response Facility

The Control Room is the emergency response facility, which is utilized by the Emergency Response Organization (ERO) and is described in Section 5.0. Key site personnel are dispatched to perform accident assessments, implement corrective actions, and analyze accident data.

2.5. Mobilization

The mobilization scheme is based on the emergency notification plan. The notification system utilizes the facility public address system, commercial telephone lines, and the ERO notification system to notify and mobilize facility personnel. The mobilization scheme ensures that specific technical disciplines can be augmented within appropriate time frames. On-site staff are informed of an emergency condition through the use of the plant public address system, office telephone and/or wireless devices capable of receiving telephone calls and text messages. In the event that personnel required to staff emergency positions are not on-site at the time an emergency is declared, they may be contacted by commercial telephone including land lines and/or wireless devices capable of receiving telephone calls and text messages. Mobilization of the ERO will be conducted under the direction of the Emergency Director, according to personnel assignments and telephone numbers maintained in various telephone directories. Section 7.2, Figure 7.1 and Table 7.1 outline the minimum staffing requirements for the ERO at TMI.

2.6. State and Local Government Notification and Response

Notification to the Lead State authority (Pennsylvania Emergency Management Agency (PEMA)) is required within 30 minutes after declaring an emergency. PEMA will provide notification to the responsible local government agencies. The commercial telephone network serves as the primary means to provide emergency notification to State agencies. It is used to provide initial and updated notifications and for general information flow between these agencies.

In the event the commercial telephone system is unavailable, wireless communications can be used to make emergency notifications. In addition, electronic means may be used to transmit the notification message.

As part of the State's CEMP, a cooperative arrangement exists among the Pennsylvania State authorities and TMI concerning radiological emergency preparedness. TMI's emergency classification system and notification messages are reviewed with the Commonwealth of Pennsylvania on an annual basis.

2.7. Federal Government Notification and Response

Notification to the NRC Operations Center is made as soon as possible after State notifications and within 60 minutes of event classification or change in classification. Once notified of an

emergency, the NRC evaluates the situation and determines the appropriate NRC response. Depending on the severity of the accident and the emergency classification declared, the NRC activates its incident response operations in accordance with the NRC Incident Response Plan. If the emergency warrants, the NRC notifies the Federal Emergency Management Agency (FEMA) and other appropriate federal agencies to activate the federal emergency response organization in accordance with the National Response Framework (NRF). The NRF makes available the resources and capabilities of federal agencies to support facility, state and local governments, as necessary to respond to the specific nature of the emergency. Principal participants are the NRC, FEMA, Department of Energy (DOE), and Environmental Protection Agency (EPA).

2.8. Technical Support

In the event of an emergency that requires personnel and other support resources beyond those available within the TMI organization, augmentation is available from other Exelon facilities and can be requested from various contractors. Additional technical and personnel support are provided to TMI through support plans listed in Appendix 2, List of Emergency Plan Implementing Procedures.

2.9. Mitigation of Consequences of Beyond Design Basis Events

Strategies to mitigate a loss of SFP inventory and prevent a zirconium fire are contained within several operating procedures:

- OP-TM-AOP-035, "Loss of Spent Fuel Pool Cooling;"
- OP-AA-201-010-1001, "B.5.b Mitigating Strategies Equipment Expectations;"
- OP-TM-251-901, "High Capacity Fire Service Makeup to Spent Fuel Pool;"
- OP-TM-251-902, "Spent Fuel Pool Spray;"
- OP-TM-919-914, "Spent Fuel Pool Makeup Using FX-P-2A or FX-P-2B;"
- OP-TM-919-922, "FSG-6 – Makeup from Raw Water Sources;"
- OP-TM-919-000, " FLEX - Diverse and Flexible Coping Strategy and Advanced Accident Mitigation B.5.b (919)."

These mitigative strategies support NRC Order on Mitigative Strategies (EA-02-026) and implement the requirements of License Condition 2.c.(17), "Mitigation Strategy License Condition."

3.0 SITE DESCRIPTION

3.1. Facility Description

Three Mile Island, Unit 1 (TMI-1) is owned by Exelon Generation. TMI-1 ceased power operations in September 2019 and certified that fuel had been permanently removed from the reactor vessel. The 10 CFR Part 50 license for TMI will no longer authorize operation of the reactor, emplacement or retention of fuel into the reactor vessel, as specified in 10 CFR 50.82(a)(2). TMI consists of a permanently shutdown pressurized water reactor. An ISFSI (when built) will be located on the facility site. The arrangement of the major TMI facilities is shown in Figure 3.1: TMI Site Arrangement.

TMI, Unit 2 (TMI-2) is owned by First Energy Corporation. The TMI-2 reactor was damaged during an accident in 1979 and is currently defueled and the plant maintained in long-term monitored storage. Monitoring of this facility is performed by Exelon through a service agreement with First Energy Corporation.

The TMI site is located in an area of low population density about 12 miles southeast of Harrisburg, Pennsylvania. The area is in Londonderry Township, Dauphin County, about 2.5 miles from the southern tip of Dauphin County, where the county is coterminous with York and Lancaster Counties.

The TMI site is part of an 814-acre tract consisting of TMI and several adjacent islands, which were purchased by a predecessor. The island, which is situated about 900 feet from the east bank and approximately one mile from the west bank of the Susquehanna River, is elongated parallel to the flow of the river with its longest axis oriented approximately due north and south. The north and south ends of the island have access bridges, which connect the island to State Highway Route 441. The north access bridge is used daily. Route 441 is a two-lane highway, which runs parallel to TMI on the east bank of the Susquehanna River and is more than 2,000 feet from the TMI reactors at the closest point. The exclusion area for TMI is a 2,000-foot radius, and for the purposes of Emergency Planning, the exclusion area and the site boundary are considered the same.

A Norfolk Southern one-track line runs adjacent and parallel to Route 441 on the east bank of the river. On the west bank of the river, there is a multi-track Norfolk Southern line at the river's edge about 1.25 miles west of the site and a black top, two lane road that runs parallel to it. There is a one-track railroad spur across the bridge on the north end of the island, which is used for site-related activities. A general area map showing the relative location of the TMI sites is shown as Figure 3.2.

3.2. Area Characteristics and Land Use

Owner Controlled Area and Exclusion Area

The Owner Controlled Area (OCA) for the TMI includes all areas within the site perimeter security fence. At TMI, the minimum distance to the owner-controlled area boundary is measured from the centerline of the Fuel Handling Building to the western shoreline of the island, which is approximately 675 feet.

The Exclusion Area for the TMI is a 2,000-foot radius that includes a portion of TMI, the river surface around it, and a portion of Shelly Island. The minimum distance of 2,000 feet occurs on the shore of the mainland in a due easterly direction. The TMI-1 licensee retains complete authority to determine and maintain sufficient control of all activities including the authority to exclude or remove personnel and property for all land areas within the exclusion area. For the purposes of Emergency Planning, the exclusion area boundary and the Site Boundary are considered the same.

Population and Population Distribution

The nearest major population center is Harrisburg, Pennsylvania which is located approximately 12 miles northwest of TMI. This distance satisfies the requirements of 10 CFR 100 with respect to population center distance.

There are no schools located within two-miles from the facility. There are several recreational areas (Falmouth Fish Commission Access Area, Tri-County Boat Club and Canal Lock Boat Launch Area). There is some seasonal shift in population within a 5-mile radius of TMI since there are over 100 summer cabins on the islands within the area. Additional transients participate in boating activities in the vicinity of TMI.

Local Industry and Military Facilities

The TMI site is currently surrounded by farmlands within a 10-mile radius. Lands are used for dairy cattle, tobacco, poultry, vegetables, fruit, corn, wheat, and other products. A summary of land use for the risk counties is provided in Table 1 and the Defueled Safety Analysis Report (DSAR). The Susquehanna River is used for sport fishing and boating but is not used for commercial fishing. Manufacturing industries in the region produce clothing, wood products, shoes, electrical wiring devices, steel products, packed meat and other food. These activities, within a 10-mile radius of the site, are confined chiefly to the communities of Harrisburg, New Cumberland, Steelton, and Middletown. A listing of typical industries within 10 miles of TMI can be found in the site DSAR. There are gas and oil transmission lines located at a minimum distance of approximately 2 miles from TMI.

Approximately 3 miles downstream from the site is the York Haven hydro-electric project. The York Haven Station is operated on a "run-of-the-river" basis, and its power output is dependent primarily upon the water available. The reservoir is used for peaking operation during periods of low river flow. Brunner Island Station, a large steam-electric generating plant owned by the Talen Energy is located on the Susquehanna River approximately one mile downstream from the York Haven project. This station uses water from the river on a "once-through" basis for cooling water. Three other hydroelectric generating stations are also located downstream from TMI, with each project having a dam and reservoir on the Susquehanna River. The three stations are Safe Harbor, Holtwood, and Conowingo Hydroelectric Projects, located approximately 25, 31, and 47 miles south of TMI, respectively. There is also a coal fired, steam electric plant at Holtwood, and the Muddy Run Pumped Storage Project is associated with Conowingo Station. The Peach Bottom Atomic Power Station (PBAPS) is located along the west bank of the Susquehanna River, about 41 miles downstream of TMI, just north of the Maryland-Pennsylvania border and is the only nuclear plant within a 50-mile radius of TMI.

There are two airports within 10 miles of the TMI sites. Harrisburg International Airport (formerly Olmsted Air Force Base) is located on the east bank of the Susquehanna River approximately 2.5 miles northwest of the site. The Capital City Airport is located approximately 8 miles west-northwest of TMI. The vital areas of the TMI sites are designed to withstand a hypothetical aircraft accident.

Norfolk Southern lines are located on both sides of the Susquehanna River, the closest being the east bank, approximately 2,000 feet from the TMI Reactor Buildings. Routine traffic in liquified petroleum gas was identified on the railroad line, which passes along the east shore of the river. Analyses indicate that any missiles generated by this traffic would be less damaging than the postulated aircraft strike against which the plant is protected and that flammable gases would dissipate before reaching the TMI Nuclear Units.

The closest military installation to the site is the Air National Guard facility at Harrisburg International Airport. There are no military firing ranges or missile facilities within a 10-mile radius of TMI. Other military facilities, however, are Army and Navy depots located at New Cumberland and Mechanicsburg, Pennsylvania, respectively.

Figure 3.1: TMI Site Arrangement

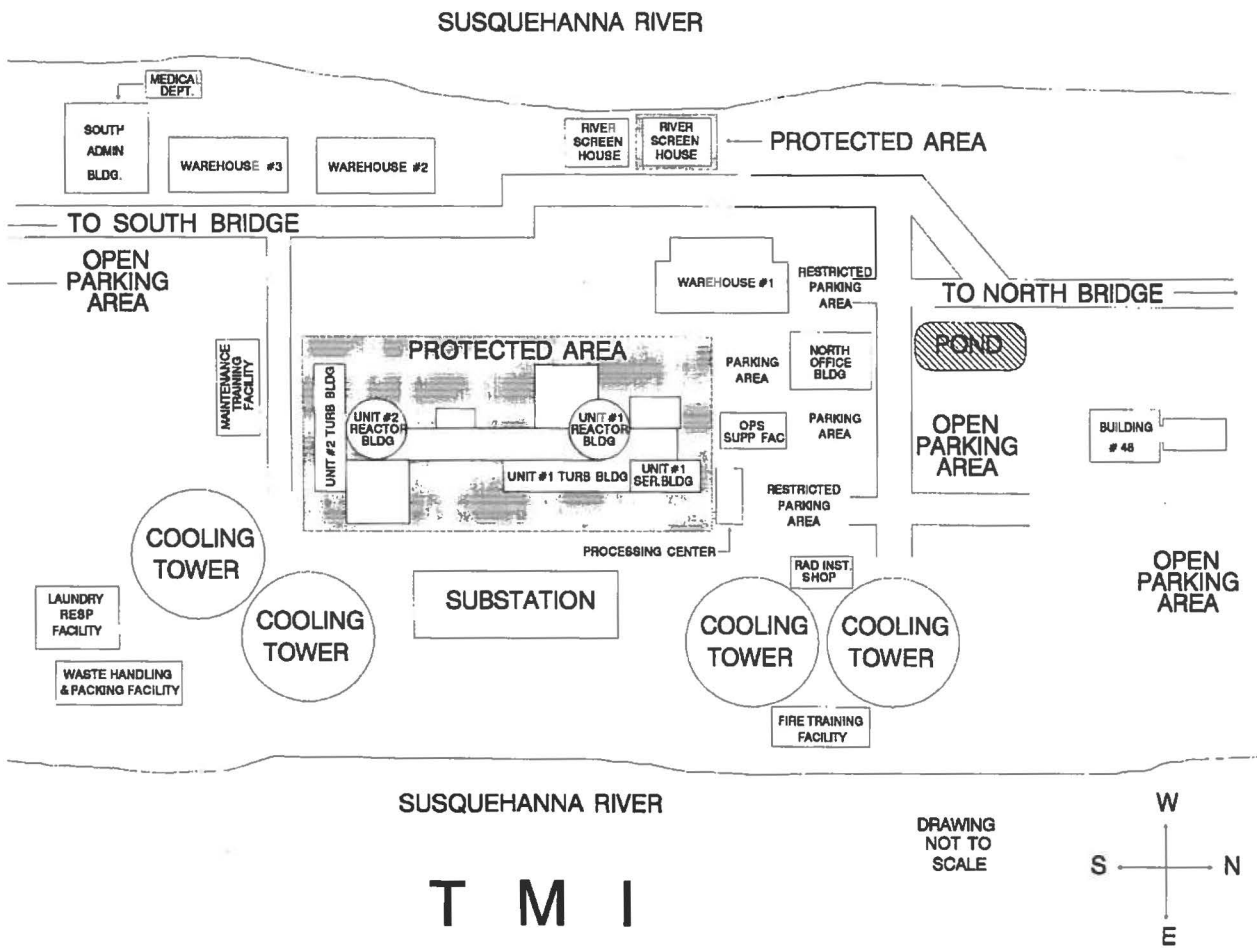
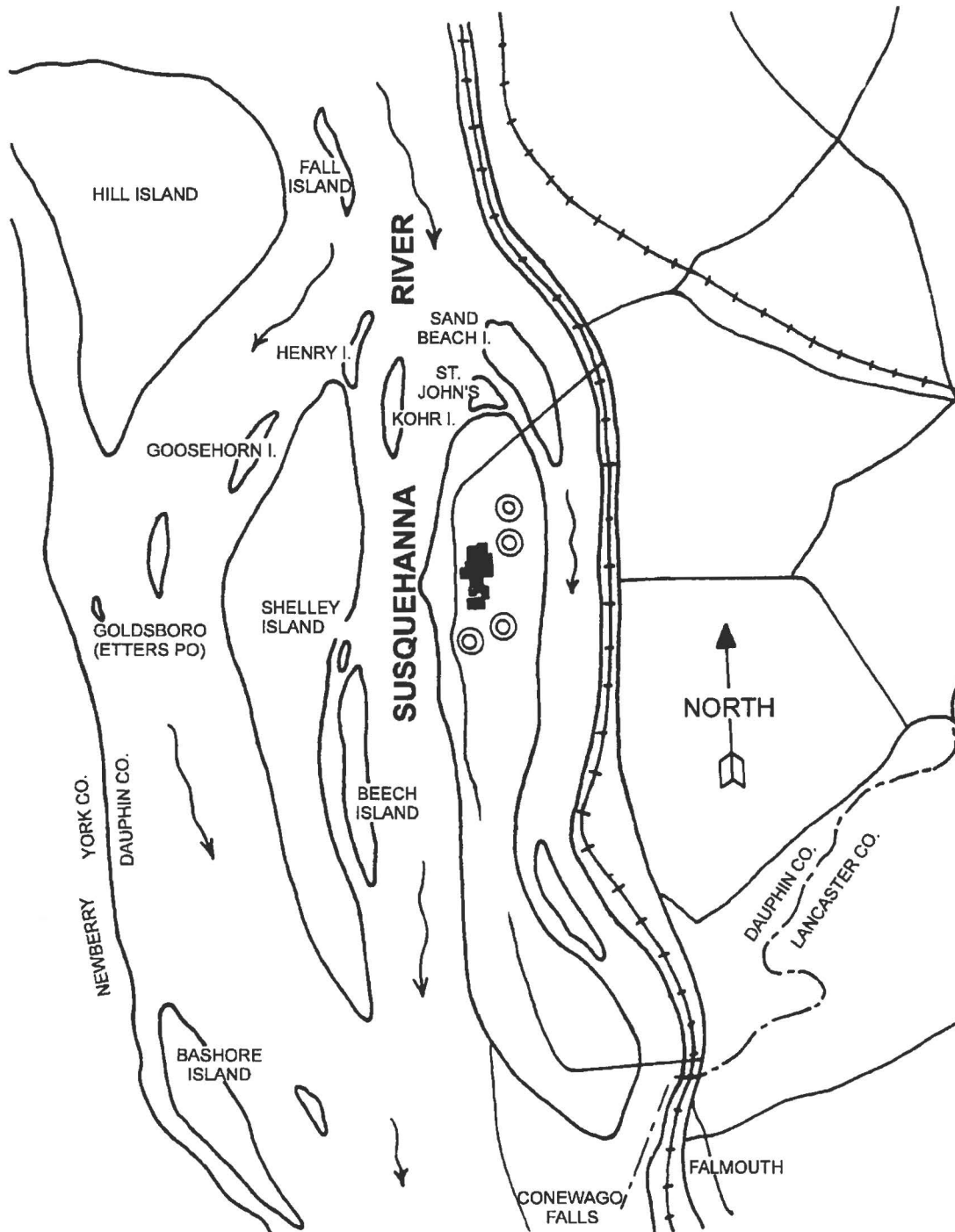


Figure 3.2: TMI Site Relative Location

4.0 EMERGENCY CLASSIFICATION SYSTEM

The emergency classification system covers an entire spectrum of possible radiological and non-radiological emergencies at the TMI. The emergency classification system categorizes accidents and emergency situations, according to severity, into two emergency classification levels: Unusual Event and Alert.

The incidents leading to each of the emergency classifications are further identified by certain measurable and observable indicators of facility conditions or EALs. EALs addressed in Addendum 1 aid the operator in recognizing the potential of an incident immediately and assure that the first step in the emergency response is carried out. The classification of the event may change as the conditions change. TMI maintains the capability to assess, classify and declare an emergency condition in accordance with site procedures.

Emergency classifications are to be made as soon as conditions are present and recognizable for the classification in accordance with the applicable EALs; but within 30 minutes in all cases after the availability of indications to plant operators that an EAL threshold has been reached.

Incidents may be classified in a lower emergency classification level first, and then upgraded to the higher level if the situation deteriorates. An event will be terminated as described in Section 8.3, "Emergency Termination Criteria."

EALs and EAL bases were derived from NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors" Rev. 6, for classifying emergencies. Specifically, Appendix C of NEI 99-01, Rev. 6 contains a set of Initiating Conditions/ EALs for permanently defueled nuclear power plants that had previously operated under a 10 CFR Part 50 license and have permanently ceased operations, and Section 8 of NEI 99-01, Rev. 6 for the Independent Spent Fuel Storage Installation (ISFSI). The classification system referenced in NEI 99-01, Rev. 6 has been endorsed by the NRC and provides a standard method for classifying emergencies.

4.1. Unusual Event

EVENTS ARE IN PROGRESS OR HAVE OCCURRED WHICH INDICATE A POTENTIAL DEGRADATION OF THE LEVEL OF SAFETY OF THE FACILITY OR INDICATE A SECURITY THREAT TO FACILITY PROTECTION HAS BEEN INITIATED. NO RELEASES OF RADIOACTIVE MATERIAL REQUIRING OFFSITE RESPONSE OR MONITORING ARE EXPECTED UNLESS FURTHER DEGRADATION OF SAFETY SYSTEMS OCCURS.

Unusual Event conditions do not cause serious damage to the facility. The purpose of the Unusual Event declaration is to:

- 1) provide for an increased awareness of abnormal conditions;
- 2) ensure that the first step in any response later found to be necessary has been carried out;
- 3) bring the ERO to a state of readiness;

- 4) provide for systematic handling of information and decision-making, and
- 5) augment on-shift personnel, if deemed necessary by the Emergency Director.

See Addendum 1 for a complete list of EALs corresponding to an Unusual Event.

4.2. Alert

EVENTS ARE IN PROGRESS OR HAVE OCCURRED WHICH INVOLVE AN ACTUAL OR POTENTIAL SUBSTANTIAL DEGRADATION OF THE LEVEL OF SAFETY OF THE FACILITY OR A SECURITY EVENT THAT INVOLVES PROBABLE LIFE-THREATENING RISK TO SITE PERSONNEL OR DAMAGE TO SITE EQUIPMENT BECAUSE OF HOSTILE ACTION. ANY RELEASES ARE EXPECTED TO BE LIMITED TO SMALL FRACTIONS OF THE EPA PAG EXPOSURE LEVELS.

The purpose of the Alert declaration is to:

- 1) activate the Emergency Response Organization to perform event mitigation and radiation monitoring, if required,
- 2) provide the Commonwealth of Pennsylvania and the NRC with current information on facility status, and
- 3) ensure that all necessary resources are being applied to accident mitigation.

The Alert status shall be maintained until termination of the event occurs. Offsite authorities will be informed of the change in the emergency status and the necessary documentation shall be completed as specified in the EIPs.

Facility responses associated with this event classification assure that sufficient emergency response personnel are mobilized and respond to event conditions. Actual releases of radioactivity which exceed Technical Specification limits may be involved, thus radiation monitoring and dose projection may be required.

See Addendum 1 for a complete list of EALs corresponding to an Alert.

4.3. Emergency Classification System Review by State Authorities

The emergency classification system specified above and the EALs presented in Addendum 1, are reviewed with the state authorities of Pennsylvania annually.

5.0 EMERGENCY RESPONSE FACILITIES AND EQUIPMENT

Following the declaration of an emergency, the activities of the emergency response organization are coordinated in the Control Room. Descriptions of TMI facilities and assessment capabilities are presented below.

5.1. Control Room

The Control Room is where facility systems and equipment parameters are monitored and is continuously occupied as per Technical Specifications. Control Room personnel assess facility conditions, evaluate the magnitude and potential consequences of abnormal conditions, initiate preventative, mitigating and corrective actions and perform notifications. The Control Room is the onsite center for emergency command and control.

The Control Room staff coordinates all phases of emergency response and corrective action required to restore the facility to a safe condition. Classification and subsequent declaration of the appropriate emergency condition by the Shift Manager may result in activation of the ERO. The Control Room staff's attention focuses on mitigating the emergency as the ERO reports to their designated locations and is delegated emergency functions.

When activated, the ERO reports to the Emergency Director to assist the on-shift staff in the assessment, mitigation and response to an emergency and to support the dispatch of emergency teams. The composition of the ERO is addressed in Section 7.2.

ERO activation may be modified or suspended if the safety of personnel may be jeopardized by a security event or other event hazardous to personnel.

The Control Room contains communications equipment, emergency radiation monitoring equipment, and emergency respiratory devices. Adjacent rooms store radiation protection clothing and other emergency supplies. The ERO has access to up-to-date technical documentation, including drawings, system information and procedures to enable mitigation planning and support of Control Room staff.

The Control Room is the general assembly area for emergency mitigation and radiation protection personnel.

5.2. Assessment Capability

The activation of the Emergency Plan and the continued assessment of accident conditions require monitoring and assessment capabilities. TMI maintains and operates on-site monitoring systems needed to provide data that is essential for initiating emergency measures and performing accident assessment, including dose assessment and assessing the magnitude of a release. This includes monitoring systems for plant processes, radiological conditions, meteorological conditions, and fire hazards. The essential monitoring systems needed are incorporated in the EALs specified in

Addendum 1. This section briefly describes monitoring systems as well as other assessment capabilities.

5.2.1. Process Monitors

Annunciator and computer alarms are provided for a variety of parameters including the SFP cooling system to indicate SFP level, temperature, and pump status.

The manner in which process monitors are used for accident recognition and classification is given in the detailed EAL listings in Addendum 1.

5.2.2. Radiological Monitors

A number of radiation monitors and monitoring systems are provided on process and effluent liquid and gaseous lines that serve directly or indirectly as discharge route for radioactive materials. These monitors, which include Control Room readout and alarm functions, exist in order that appropriate action can be initiated to limit fuel damage and/or contain radioactive material.

The onsite Radiation Monitoring System (RMS) contributes to personnel protection, equipment monitoring, data gathering, and accident assessment by measuring and recording radiation levels and concentrations of radioactive material at selected locations within the facility. The RMS alarms and initiates required emergency actions when radiation levels or radionuclide concentrations exceed predetermined levels. Area, liquid, and atmospheric monitoring subsystems are required to perform these functions.

The general description of the radiation monitors is provided below, specific details on these monitoring systems such as location, monitoring channels, type, etc., are contained in the DSAR Section 4.4.

The data from these subsystems are displayed by readout in the Control Room. Recorders and/or the facility process computer are located in the Control Room.

5.2.2.1. Area Radiation Monitors

The TMI area radiation monitoring subsystem is comprised of channels, which utilize an ion chamber detector housed in a weatherproof container.

5.2.2.2. Liquid Radiation Monitoring Subsystem

The liquid radiation monitoring subsystem is comprised of monitors, each of which has a sampler, detector, and Control Room ratemeter module (exceptions are the IVTS/IWFS discharge monitor and waste treatment system discharge monitor). The monitors provide visual indications in the Control Room.

5.2.2.3. Atmospheric Radiation Monitoring

Each installed atmospheric monitor is comprised of a particulate measuring channel, a gaseous measuring channel and may include an iodine measuring channel. The atmospheric radiation monitor subsystem is comprised of monitors with fixed and movable

particulate filters, and fixed radioiodine filters. Representative samples are obtained by means of a sampling head placed in a ventilation duct.

Movable airborne monitors are typically used in the spent fuel handling area during fuel handling operations and in the radiochemical laboratory during laboratory sample preparation operations. These monitors are supplemented with various other portable radiation monitors. Each monitor contains three channels for particulate, iodine, and gaseous monitoring, respectively.

5.2.3. Meteorological and Seismic

The National Weather Service (NWS) provides meteorological information (e.g., wind speed, temperature, and wind direction) from several locations in the vicinity of TMI. This information is available by telephone or the internet.

Seismic information can be obtained from the U.S. Geological Surveys (USGS) National Earthquake Center by telephone or internet.

Meteorological data can be remotely interrogated by telephone by NRC and Commonwealth of Pennsylvania.

5.2.4. Fire Detection and Suppression Equipment

The fire protection system has been designed to detect and extinguish potential fires. The system is designed in accordance with the standards of the National Fire Protection Association (NFPA) and recommendations of the Nuclear Electric Insurance Limited (NEIL). Fire detectors are located throughout the facility with alarms and indicators in the Control Room. The fire protection system is described in the Three Mile Island Fire Protection Program.

5.2.5. Assessment Facilities and Equipment

Offsite fire departments listed in Appendix 4 notify the facility of any fire which might have an impact on the facility. Local Law Enforcement Agencies notify Facility Security of any situation in the area which might have an impact on the facility.

TMI has access to outside analytical assistance and laboratory facilities from other non-affected Exelon nuclear sites, State and Federal agencies and other utilities. These laboratories can act as backup facilities in the event that the affected facility's radiochemistry counting room and laboratory become unusable or the offsite radiological monitoring and environmental sampling operation exceeds the capacity or capability of the facility laboratory during an emergency. It is estimated that these laboratories will be able to respond within several hours from initial notification.

The above facilities have the capability to perform laboratory analyses of various environmental samples (e.g., terrestrial, marine and air). It is also estimated that the analytical assistance and laboratory support will be able to respond within four (4) to eight (8) hours from initial notification.

6.0 COMMUNICATIONS

Various modes of communication are available to facility staff to transmit information within TMI and to various locations offsite during normal and emergency conditions.

This section describes the provisions utilized for prompt communications among principal emergency response organizations, communications with the ERO and communications with the general public. Figure 6.1 depicts the notification paths and the organizational titles from the Exelon Emergency Response Facility (ERF) to federal, state and local emergency response organizations, and industry support agencies.

Exelon has extensive and reliable communication systems installed at TMI. Examples of the communications systems may include telephone lines, fiber-optic voice channels, cell phones, satellite phones, mobile radio units, handi-talkies and computer peripherals. Communication systems provide:

1) Local Commercial Telephone System

The commercial telephone system provides for emergency notification system between TMI and State agencies (see Section 2.6). It will be used to provide initial and follow-up notifications and for general information flow between these agencies.

In addition, facility communication links exist to ensure appropriate information transfer capabilities during an emergency. The facility may also utilize its Public Address System, facility radios and notification devices to augment its emergency communications.

2) ERO Notification

In the event that personnel required to staff ERO positions are not on-site at the time an emergency is declared, they may be contacted by commercial telephone including land lines and/or wireless devices capable of receiving telephone calls and text messages. Mobilization of the ERO will be conducted under the direction of the Emergency Director, according to personnel assignments and telephone numbers maintained in various telephone directories.

3) NRC Communications - Emergency Notification System (ENS)

Communications with the NRC Operations Center will be performed via the NRC ENS circuit or commercial telephone line. This line will be used for event notification and status updates. The ENS is a dedicated telephone system in place between the Control Room and the NRC. Installation and use of these NRC telephones is under the direction of the NRC.

4) Radio Communications

Radio communication equipment used during normal facility operations will be used in an emergency to communicate with mobile units and to provide backup to the telephone system.

At TMI, radio capabilities include the following frequencies from Control Room, CAS/SAS and mobile vehicle / potable units, as applicable:

- TMI Operations Frequencies
- TMI Security Frequency
- Environmental and Radiological System Frequency
- Maintenance and Rad Con Frequency

5) Facility Warning System

In addition, facility communication links exist to ensure appropriate information transfer capabilities during an emergency. The facility may also utilize its Facility Warning System, facility radios and pagers to augment its emergency communications. The Facility Warning System consists of the following:

- 1) Alarms: Audible alarms are a quick and effective means of communicating emergency warnings on the site. Alarms currently installed at Three Mile Island include:
 - Facility Emergency Alarm
 - Fire Alarm

Each alarm provides a distinctive sound that all site personnel and contractors are trained to recognize and respond to. The Facility Emergency Alarm will be followed by an announcement that provides emergency information such as class of emergency declared, accountability directions, radiological precautions, etc.

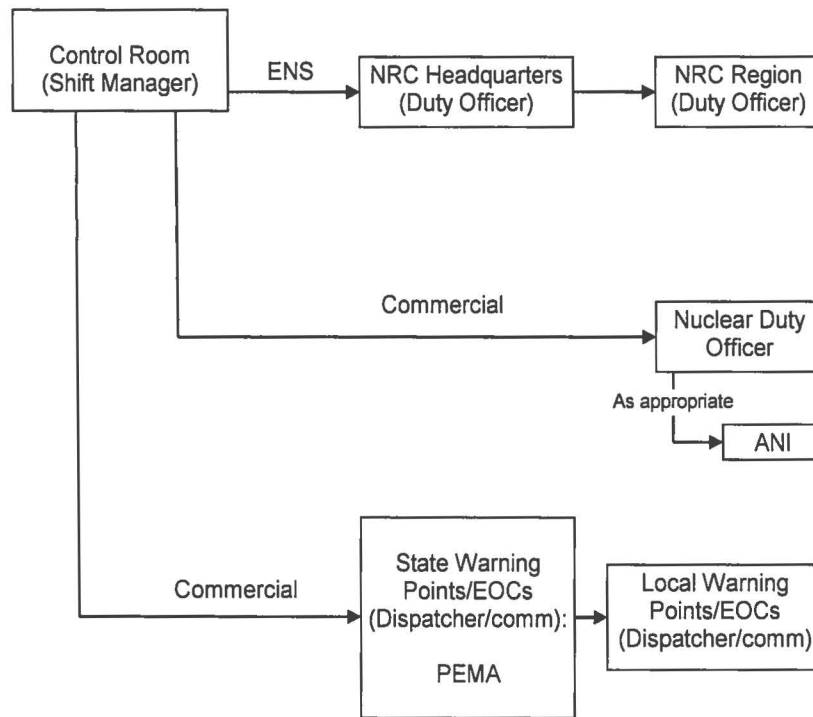
The Control Room alarm systems consist of overhead annunciators, panel annunciators and computer alarms. The overhead and panel annunciators consist of flashing translucent tiles and audible indicators (i.e., buzzer or horn). The computer alarms use annunciators and also provide specific data using the alarm printer. At TMI-1, alarm data is also provided by CRTs.

- 2) Facility Paging System: The Facility Paging System provides facility-wide paging from the Control Room and all remote stations plus private communications during normal operating conditions.

The facility paging system provides immediate warning and instructions to onsite personnel in the event of an emergency. Phone stations and

speakers of this subsystem are located in key locations within the facility.

Figure 6.1: Exelon Notification Scheme



7.0 ORGANIZATION

This section describes how the normal facility and support organizations transform into an emergency response organization to effectively deal with any incident at TMI.

7.1. Normal Facility Organization

The personnel and resources of TMI's normal facility and management organization consist of the onsite facility organization supported by the engineering and management organizations located offsite. The relationship and content of these onsite and offsite organizations are specified in the facility Technical Specifications and the TMI Defueled Quality Assurance Program (DQAP).

The minimum staff required to conduct routine and immediate emergency mitigation is maintained at the facility. During normal conditions, the minimum staff on duty at the facility during all shifts consists of one (1) Shift Manager, two (2) Non-Certified Operators, one (1) Radiation Protection Technician and security personnel as indicated in Figure 7.1 and Table 7.1. Security and Fire Brigade personnel are staffed in accordance with the Site Security Plan and Fire Protection Plan. The responsibility for monitoring the status of the facility and approving all onsite activities is assigned to the Shift Manager. When an emergency situation becomes apparent, the Shift Manager shall assume the position of Emergency Director once the emergency classification has been made. Additional personnel are available on an on-call basis to respond to facility emergencies.

7.1.1. Shift Manager/Emergency Director

The Shift Manager position is staffed at the facility 24 hours a day and is the senior management position at the facility during off-hours. This position is responsible for monitoring facility conditions and approving onsite activities. The position has the authority, management ability, and technical knowledge to classify and declare a facility emergency and assume the Emergency Director role.

The Emergency Director shall assume command and control upon declaration of an event. The Emergency Director is responsible for the direction of the total emergency response and has the company authority to accomplish the following responsibilities, which cannot be delegated:

1. Classification of event
2. Approval of emergency notification (Task of making notifications may be delegated)
3. Authorization of emergency exposure controls in excess of 5 Rem TEDE and the issuance of potassium iodide (KI), for Exelon Generation emergency workers per EPA-400 (radiation exposures in excess of 10 CFR Part 20 limits).

Other responsibilities assumed by the Emergency Director include:

1. Notification of the emergency classification to the NRC and Commonwealth of Pennsylvania
2. Management of available facility resources

3. Initiation of mitigating actions
4. Initiation of corrective actions
5. Initiation of onsite protective actions
6. Decision to call for offsite assistance (police, fire or ambulance)
7. Augment the ERO staff as deemed necessary
8. Coordinate Security activities
9. Terminate the emergency condition when appropriate
10. Performance of initial Dose Assessment
11. Maintain a record of event activities

7.1.2. Non-Certified Operator

The Non-Certified Operators, on-shift 24 hours a day, performs system and component manipulations. The organizational relationship to the Shift Manager/Emergency Director is the same during normal and abnormal situations.

7.1.3. Radiation Protection Technician

The Radiation Protection Technician, on-shift 24 hours a day, is available to monitor personnel exposure, determine if radiological conditions preclude access to areas necessary to maintain SFP cooling, and to provide timely field survey results, if necessary.

7.1.4. Security

Security staffing is maintained in accordance with the Security Plan. The Security Force will report to the Emergency Director when implementing the PDEP.

7.2. Emergency Response Organization

The TMI ERO is activated at an Alert classification. However, it can be activated in part or in whole at the discretion of the Emergency Director for an Unusual Event.

Plans and procedures are in place to ensure the timely activation of the ERO. The goal of the ERO is to augment the on-shift staff within 2 hours of an Alert classification. The designated on-shift and augmented TMI ERO staff are capable of continuous (24-hour) operations for a protracted period.

The minimum augmented staff consists of a Technical Coordinator and a Radiation Protection Coordinator. Augmented staff provides the technical expertise required to assist the Emergency Director. The on-shift staff is augmented by additional personnel that report as directed after receiving notification of an emergency requiring augmented staff.

Designated members of the on-shift staff fulfill roles within the ERO appropriate with their training and experience. For example, Radiation Protection personnel would be expected to undertake radiation protection activities, Security personnel would undertake security activities, engineering personnel would focus on facility assessment, provide technical

support, and assist in recovery operations as designated by the Technical Coordinator, Operations personnel would focus on facility operations.

The TMI ERO is illustrated in Figure 7.1. Table 7.1 provides a representation of the functional responsibilities of the on-shift and ERO positions that fulfill the emergency staffing requirements.

7.2.1. Technical Coordinator

The Technical Coordinator reports to the Emergency Director. During an emergency, the responsibilities of the Technical Coordinator include:

1. Evaluate technical data pertinent to facility conditions
2. Augment the emergency staff as deemed necessary
3. Designate engineering support, as necessary, to evaluate facility conditions and provide technical support,
4. Recommend mitigating and corrective actions
5. Direct search and rescue operations
6. Coordinate maintenance and equipment restoration
7. Establish and maintain communications as desired by the Emergency Director
8. Maintain a record of event activities

7.2.2. Radiation Protection Coordinator

The Radiation Protection Coordinator reports to the Emergency Director. During an emergency, the responsibilities of the Radiation Protection Coordinator include:

1. Monitor personnel accumulated dose
2. Advise the Emergency Director concerning Radiological EALs
3. Augment the emergency staff as deemed necessary
4. Direct radiological monitoring and analysis
5. Perform Dose Assessment
6. Coordinate decontamination activities
7. Establish and maintain communications as desired by the Emergency Director
8. Maintain a record of event activities

7.2.3. Extensions of the Three Mile Island Emergency Response Organization

7.2.3.1. Local Services

Arrangements have been made for the extension of the ERO's capability to address emergencies. Arrangements are in place through letters of agreement for ambulance services, treatment of contaminated and injured patients, fire support services, and law enforcement response as requested by the facility. Evidence of agreements with participating local services is listed in Appendix 4.

7.2.3.2. Federal Government Support

Resources of federal agencies appropriate to an emergency condition are made available in accordance with the National Response Framework. This plan and the resources behind it are activated through the facility notification of the NRC.

7.2.3.3. Additional Support

Dependent upon the emergency condition and response needs, the TMI ERO can be augmented by personnel and equipment support from the remainder of the Exelon Generation organization. This support capability is outlined in the Emergency Plan Implementing Procedures referenced in Appendix 2.

7.2.4. **Recovery Organization**

The emergency measures presented in this plan are actions designated to mitigate the consequences of the accident in a manner that affords the maximum protection to facility personnel. Planning for recovery involves the development of general principles and an organizational capability that can be adapted to any emergency situation. Upon termination of an emergency, the Emergency Director assembles the recovery organization, as necessary, to address the specific emergency circumstances of the terminated event.

The Emergency Director directs the recovery organization and is responsible for:

- Ensuring the facility is maintained in a safe condition;
- Managing onsite recovery activities during the initial recovery phase; and
- Keeping corporate support apprised of recovery activities and requirements.

The remainder of the recovery organization consists of the normal plant and emergency organizations described in Section 7.1 and 7.2, as necessary, to provide the radiological and technical expertise required to assist the Emergency Director restore the plant to normal conditions.

The following is a brief summary of the recovery organization's responsibilities:

1. Maintain comprehensive radiological surveillance of the facility to assure continuous control and recognition of problems;
2. Control access to the area and exposure to workers;
3. Decontaminate affected areas and/or equipment;
4. Conduct clean-up and restoration activities;
5. Isolate and repair damaged systems;
6. Document all proceedings of the accident and review the effectiveness of the emergency organization in reducing public hazard and/or facility damage.

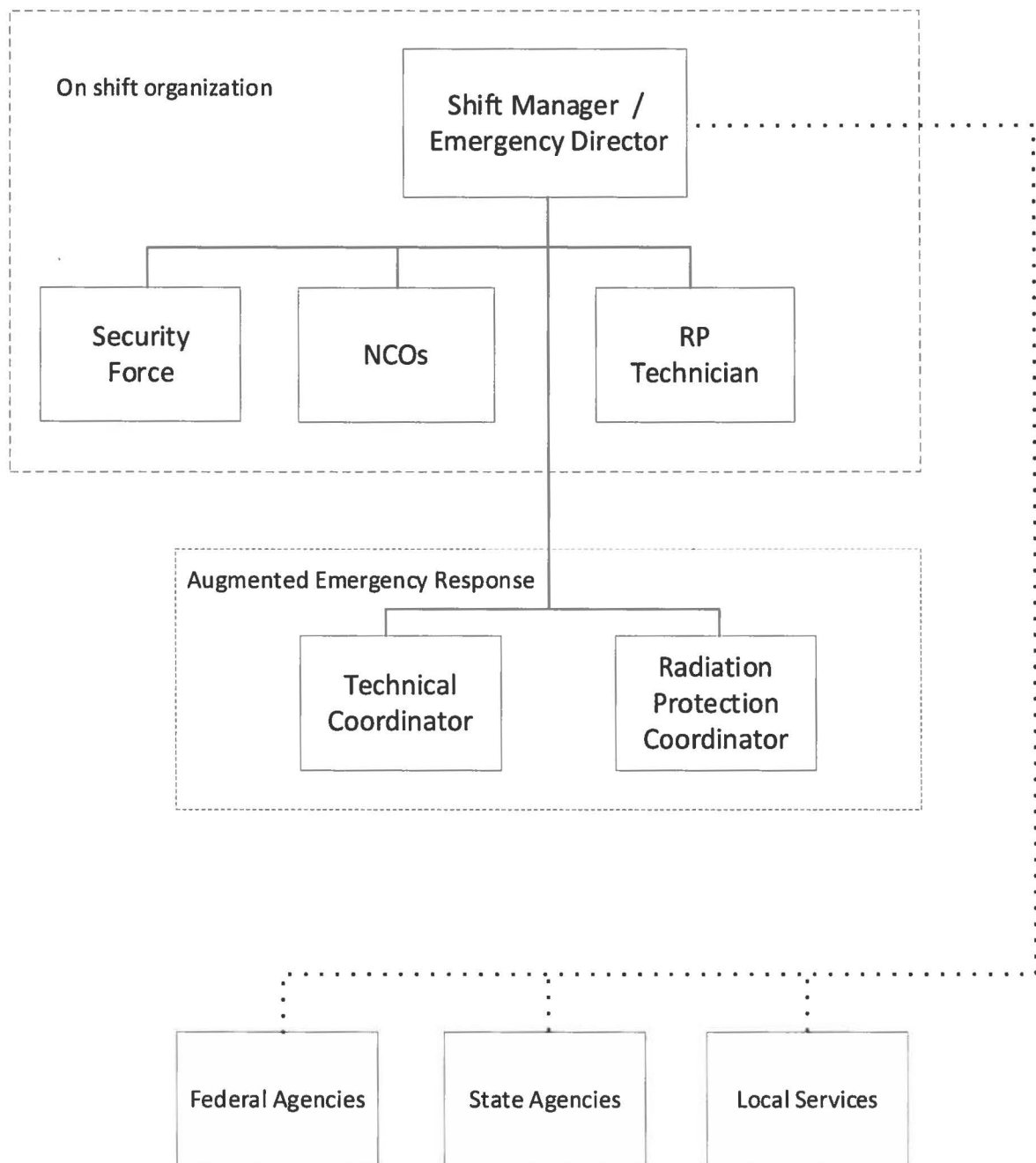
The organization relies on facility staff and/or resources to restore the facility to normal conditions. The expertise provided through the support plans is available to aid with the necessary corrective actions required to control and/or restore normal facility status.

When facility conditions allow a transition from the emergency phase to the recovery phase, the Emergency Director conducts a facility emergency management meeting to discuss the recovery organization. The actions taken by this organization concerning termination of the emergency proceeds in accordance with a recovery plan developed specifically for the accident conditions.

7.3. Coordination with State Government Authorities

Section 6.0 describes the communications network between TMI and the Commonwealth of Pennsylvania as a means of promptly notifying appropriate authorities under accident conditions.

The Shift Manager initiates notification of Pennsylvania authorities, providing them with applicable information utilizing an established message format that describes the accident status. The Emergency Director, or designee, issues periodic reports to Commonwealth of Pennsylvania authorities.

Figure 7.1: Normal On-Shift and Emergency Response Organization

Note: Fire Brigade is staffed in accordance with the Fire Protection Program.

Table 7.1: Minimum On-Shift and ERO Staffing Requirements

MAJOR FUNCTIONAL AREA	MAJOR TASKS	LOCATION	TMI EMERGENCY POSITION, TITLE, OR EXPERTISE	# ON-SHIFT	TMI AUGMENTED STAFF CAPABILITY FOR RESPONSE IN 2 HOURS
Facility Operations and assessment of Operational Aspects / Fire Brigade	Facility Equipment	Control Room	Non-Certified Operator*	1	–
Emergency Direction and Control	Emergency Director	Control Room	Shift Manager*	1	–
Notification/Communication	Notify Licensee, State local and Federal personnel and maintain communications	Control Room			–
Radiological Accident Assessment and Support of Operational Accident Assessment	Onsite Dose Assessment and Monitoring	As Directed by the Emergency Director	Radiation Protection Coordinator	–	1 (may augment the ERO with Radiation Monitoring Personnel as deemed necessary)
Protective Actions (In-Facility)	In-Facility Surveys Radiation Protection a. Access Control b. HP Coverage for Repair, Corrective Actions, Search and Rescue, First Aid, and Firefighting c. Personnel Monitoring d. Dosimetry	On-Scene	Radiation Protection Technician*	1	–
Engineering Support	Technical Direction	As Directed by the Emergency Director	Technical Coordinator	–	1 (may augment the ERO with technical support and emergency repair personnel as deemed necessary)
Facility Condition Evaluation, Repair, and Corrective Action	Repair, Mitigation, and Corrective Action	As Directed by the Emergency Director	Non-Certified Operator*	1	
Firefighting	Firefighting	On-Scene	Fire Brigade	Per the Fire Protection Plan	–
Rescue Operations/First Aid	Rescue and First Aid	On-Scene	First Aid Qualified	**	–
Site Access Control and Accountability	Security, Firefighting, Communications, and Personnel Accountability	Per the Physical Security Plan	Security Personnel	Per the Physical Security Plan	–

* On-Shift personnel required to direct or perform site-specific mitigation strategies required for a catastrophic loss of SFP inventory.

** May be provided by shift personnel assigned other functions.

8.0 EMERGENCY RESPONSE

8.1. Emergency Condition Recognition and Classification

TMI maintains the capability to assess, classify, and declare an emergency condition in accordance with facility procedures. The expectation is that emergency classifications are to be made as soon as conditions are present and recognizable for the classification in accordance with the applicable EALs; but within 30 minutes in all cases after the availability of indications to operators that an EAL threshold has been reached.

Section 4.0 presents the emergency classification system used for categorizing the spectrum of possible emergency conditions into one of two emergency classes. The process of condition recognition, immediate response to correct the condition, event classification, and initiation of the appropriate emergency implementing procedures are critical responsibilities of the Shift Manager and the on-shift crew.

Site procedures contain the listing of conditions that represents each of the two emergency categories and the detailed EALs that allow the Shift Manager to determine the emergency classification. Once the emergency is classified, the applicable emergency implementing procedure is initiated, the ERO is activated and the notification of offsite authorities is initiated. The activation of the ERO brings to the assistance of the on-shift personnel the various support elements described in this plan. Specific support elements are implemented as detailed in the emergency implementing procedures. See Appendix 2 for a listing of these procedures.

8.2. Activation of the Emergency Response Organization

Classification of an accident condition requires that the facility staff recognize that pre-established EALs associated with an emergency condition, as defined in Addendum 1, have been reached or exceeded. Depending upon the specific action levels attained, the Shift Manager declares one of the following: Unusual Event or Alert. The Shift Manager activates the ERO if facility conditions reach predetermined EALs. The ERO shall be activated at the Alert classification.

8.2.1. Unusual Event Response

Addendum 1 defines the conditions that require the declaration of an Unusual Event. An Unusual Event does not activate the ERO but may require augmentation of on-shift resources to address the event. However, the ERO may be activated, in part or in whole, at any time at the discretion of the Shift Manager/Emergency Director. Offsite emergency organizations are notified for informational purposes, and aid from offsite fire, medical, and security organizations may be required depending on the nature of the event.

The response required as a result of this declaration of an Unusual Event varies according to the specified event, but a general summary of actions taken is described below:

1. The emergency condition is recognized and classified by the Shift Manager;

2. Emergency classification is announced over the facility page system;
3. The on-duty and selected facility personnel respond as directed by the Shift Manager and assume assigned functions;
3. Control Room personnel notify the Pennsylvania State authorities;
4. The NRC Operation Center is notified;
5. Other support is requested as necessary;
6. Additional personnel report to the facility as requested by the Shift Manager;
7. The Shift Manager/Emergency Director directs the activities of emergency response personnel;
8. If necessary, appropriate emergency medical, fire department, or law enforcement agencies are notified and requested to respond;
9. The public information representative is notified and handles public information associated with the event; and
10. The Shift Manager/Emergency Director terminates the Unusual Event status and closes out the event with a verbal summary to offsite authorities or escalates to higher level emergency classification.

The Unusual Event status will be maintained until an escalation in emergency class occurs or the event is terminated. Offsite authorities will be informed of the change in the emergency status and the necessary documentation will be completed as specified in site procedures.

8.2.2. Alert Response

An Alert requires actions to assure that sufficient emergency response personnel are mobilized to respond to the accident conditions at the site. Notification is made to State officials and follow-up information is provided as needed to offsite emergency organizations. In an Alert, the steps listed in the Unusual Event Response section and the following are performed:

1. Initiate ERO augmentation;
2. The Shift Manager/ Emergency Director evaluates the need to evacuate, and if necessary directs the evacuation of, all non-essential personnel from the facility;
3. If sufficient personnel are not available onsite, off-duty personnel are called in as specified in the emergency implementing procedures;
4. The Emergency Director assumes total responsibility for overall emergency response actions and recovery;
5. The Emergency Director reaches agreement with offsite authorities concerning termination of the event and closes out the event by verbal summary to offsite authorities. If an event is a reportable occurrence, a written summary is issued

to these authorities in an appropriate time frame through distribution by the Emergency Director.

The Alert status shall be maintained until termination of the event occurs. Off-site authorities will be informed of the change in the emergency status and the necessary documentation shall be completed as specified in site procedures.

8.3. Emergency Termination Criteria

An extensive review of facility parameters including SFP parameters and process and radiation monitoring systems, in conjunction with the pre-established EALs is required to terminate an emergency.

Termination of an emergency status is the responsibility of the Emergency Director. The decision will be based on the following considerations:

1. Conditions no longer meet an EAL and it appears unlikely that conditions will deteriorate;
2. Facility releases of radioactive materials to the environment are under control (within Technical Specifications);
3. In-Facility radiation levels are stable or decreasing, and are acceptable given facility conditions;
4. Operability and integrity of power supplies, electrical equipment and facility instrumentation including radiation monitoring equipment is acceptable;
5. All required notifications have been made;
6. Radiological and facility conditions permit resumption of normal occupational exposure limits to continue mitigation/repair activities.

9.0 RADIOLOGICAL ASSESSMENT AND PROTECTIVE MEASURES

9.1. Radiological Assessment

9.1.1. Initial Radiological Dose Projection

TMI has developed a method to quickly determine the projected radiological conditions at the Site boundary. During the initial stages of an emergency, the Shift Manager or designated individual is responsible to perform the initial evaluation of radiological conditions. The initial evaluation is accomplished in accordance with site procedures.

9.2. Radiological Exposure Control

During a facility emergency, abnormally high levels of radiation and/or radioactivity may be encountered by facility personnel. All reasonable measures shall be taken to control the radiation exposure to emergency response personnel providing rescue, first aid, decontamination, emergency transportation, medical treatment services, or corrective or assessment actions within applicable limits specified in 10 CFR Part 20.

Table 9.1 specifies the guidelines on emergency dose limits for personnel providing emergency response duties consistent with Table 2-2, "Guidance on Dose Limits for Workers Performing Emergency Services," provided in the EPA PAG Manual (Reference 13). The Shift Manager/Emergency Director has the responsibility to authorize emergency dose commitments in excess of 10 CFR Part 20 limits. This authorization is coordinated with the assistance of the Radiation Protection Coordinator. Exposure to individuals providing emergency functions will be consistent with the limits specified in Table 9.1 with every attempt made to keep exposures As Low As Reasonably Achievable (ALARA).

The Radiation Protection Coordinator is responsible for developing emergency radiological protection programs for ERO and augmented personnel. Emergency kits are provided with self-reading dosimeters. Each member reporting to the site will be provided a Dosimeter of Legal Record (DLR). Dose records will be maintained based upon the results of the self-reading dosimeters. This information is cross-referenced with the DLR data. The capability exists for the emergency processing of DLRs on a 24-hour per day basis. Emergency workers are instructed to read self-reading dosimeters frequently, and DLRs may be processed with increased periodicity.

9.3. Protective Measures

9.3.1. Site Personnel Accountability

Accountability should be considered and used as a protective action whenever a site-wide risk to health and safety exists and prudence dictates. If personnel accountability is required, at the direction of the Emergency Director, all individuals at the site (including non-essential employees, visitors, and contractor personnel) shall be notified by sounding the facility alarm and making announcements over the Public Address System. Following announcement of an emergency declaration, and when accountability has been

requested, facility personnel are responsible for reporting to designated areas and aiding Security in the accountability process.

Accountability of all personnel on the site should be accomplished within 60 minutes of the accountability announcement. If personnel are unaccounted for, teams shall be dispatched to locate the missing personnel. Accountability may be modified or suspended if the safety of personnel may be jeopardized by a Security event or other event hazardous to personnel.

9.3.2. Site Egress Control Methods

All visitors and unnecessary contractors are evacuated from the facility at the discretion of the Emergency Director. In the event of a suspected radiological release, personnel are monitored for radioactive contamination prior to leaving the Protected Area. Portable radiation survey meters are available to monitor for potential contamination.

9.3.3. Contamination Control and Decontamination Capability

During emergency conditions, TMI maintains normal plant decontamination and contamination control measures as closely as possible. However, these measures may be modified by the Emergency Director should conditions warrant.

TMI maintains contamination control measures to address area access control, drinking water and food supplies, and the return of areas and items to normal use.

- a. Contaminated areas are isolated as restricted areas with appropriate radiological protection and access control. Personnel leaving contaminated areas are monitored to ensure both themselves and their clothing are not contaminated. Supplies, instruments, and equipment that are in contaminated areas or have been brought into contaminated areas will be monitored prior to removal. Items found to be contaminated, will be decontaminated using normal plant decontamination techniques and facilities or may be disposed of as radioactive waste.
- b. Should the potential exist for contamination of on-site food or drinking water supplies that renders these supplies non-consumable, TMI will make arrangements for transport of non-contaminated off-site supplies.
- c. TMI permits areas and items to be returned to normal use following conduct of appropriate surveys and verification that contamination levels have returned to acceptable levels.

TMI maintains an in-plant decontamination capability. Waste generated through the use of this system is collected and processed by the plant liquid radwaste system. Survey instrumentation for personnel "frisking" and sensitive body burden monitoring equipment are available. Decontamination is performed under the direction of the Radiation Protection Coordinator.

9.3.4. Use of Onsite Protective Equipment and Supplies

The facility supplies of personnel radiation protection equipment and gear are utilized to support the emergency response effort. Equipment such as respiratory protection gear and protective clothing is assigned to emergency response organization members and facility response personnel in accordance with established facility radiation protection criteria.

9.3.5. Fire Fighting

Strategies have been developed for firefighting and fire protection in specific critical areas of the facility. The Fire Protection Program describes the fire protection organization and individual responsibilities.

9.4. Aid to Affected Personnel

This section describes the arrangements for medical services for contaminated injured individuals sent from the facility.

9.4.1. Offsite Hospital and Medical Services

Hospital personnel have been trained and hospitals are equipped to handle contaminated or radiation injured individuals. Specifically, training of medical support personnel at the agreement hospitals will include basic training on the nature of radiological emergencies, diagnosis and treatment, and follow-up medical care. Facility personnel are available to assist medical personnel with decontamination, radiation exposure and contamination control. Arrangements, by letter of agreement or contract, are maintained by the facility with a qualified hospital located in the vicinity of each nuclear facility for receiving and treating contaminated or exposed persons with injuries requiring immediate hospital care. Exelon shall provide medical consultants to aid in any special care necessary at these facilities.

Arrangements are also maintained with a qualified medical facility well equipped and staffed for dealing with persons having radiation injuries and whenever necessary, such persons will be transferred to this hospital facility for extended specialized treatment. Exelon will have available to the staff of this hospital, medical consultants who will provide the direction of the special care necessary for the treatment of persons having radiation injuries.

These agreements are verified annually. Refer to Appendix 4 for details.

9.4.2. Onsite First Aid Capability

Three Mile Island maintains onsite first aid supplies and equipment necessary for the treatment of contaminated or injured persons. In general, physicians or nurses are not staffed at Three Mile Island, and as such, medical treatment given to injured persons is of a "first aid" nature. Additionally, the Radiation Protection Technicians at Three Mile Island are experienced in control of radioactive contamination and decontamination work. Facility

personnel are also trained and qualified to administer first aid. The functions of facility personnel in handling onsite injured people are:

1. Afford rescue;
2. Administer first aid including such resuscitative measures as are deemed necessary;
3. Begin decontamination procedures; and
4. Arrange for suitable transportation to a hospital when required.

Primary attention shall be directed to the actual factors involved in the treatment of casualties, such as: control of bleeding, resuscitation including heart and lung, control of bleeding after resuscitation, protection of wounds from bacterial or radioactive contamination and the immobilization of fractures.

Facility personnel provide an initial estimate of the magnitude of surface contamination of the injured and preliminary estimates of total body dose to the injured. Primary rapid and simple decontamination of the surface of the body (when possible and advisable) before transportation to a designated hospital may be carry out as directed or performed by Radiation Protection personnel. When more professional care is needed, injured persons are transported to a local clinic or hospital. Contaminated and injured persons are transported to a dedicated specified facility.

9.4.3. Medical Service Facilities

Because of the specialized nature of the diagnosis and treatment of radiation injuries, Corporate Emergency Preparedness maintains an agreement with Radiation Emergency Assistance Center/Training Site (REAC/TS). REAC/TS is a radiological emergency response team of physicians, nurses, health physicists and necessary support personnel on 24-hour call to provide consultative or direct medical or radiological assistance at the REAC/TS facility or at the accident site. Specifically, the team has expertise in and is equipped to conduct: medical and radiological triage; decontamination procedures and therapies for external contamination and internally deposited radionuclides, including chelation therapy; diagnostic and prognostic assessments or radiation-induced injuries; and radiation dose estimates by methods that include cytogenetic analysis, bioassay, and in vivo counting.

In addition to REAC/TS, the Facility Annex may identify additional medical consultants, based on agreements with local hospitals, to support personnel training and medical response.

9.4.4. Medical Transportation

Arrangements are made for prompt ambulance transport of persons with injuries involving radioactivity to designated hospitals. Such service is available on a 24-hour per day basis and is confirmed by letter of agreement. Radiation monitoring services shall be provided by Three Mile Island whenever it becomes necessary to use the ambulance service for the transportation of contaminated persons. The local ambulance/first aid organization as

listed in Appendix 4 can be contacted directly through commercial phone line from the TMI control room or as dispatched by the State EOCs.

A qualified Radiation Protection person shall accompany the ambulance to the hospital. Additional Radiation Protection personnel may be contacted and dispatched to local hospitals to assist in the monitoring and decontamination of the injured victim and hospital and ambulance facilities and personnel.

9.5. Protective Actions for Onsite Personnel

This section of the plan describes the means for controlling emergency worker radiological exposures during an emergency, as well as the measures that are used by Exelon to provide necessary assistance to persons injured or exposed to radiation and/or radioactive materials. Exposure guidelines in this section are consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides described in EPA 400-R-92-001 (EPA-400) (Reference 13).

9.5.1. Emergency Exposure Guidelines

Being licensed by the NRC, all Exelon nuclear facilities maintain personnel exposure control programs in accordance with 10 CFR 20 under normal operating conditions. The Emergency Director is assigned the non-delegable responsibility for authorizing personnel exposure levels under emergency conditions per EPA-400. In emergency situations, workers may receive exposure under a variety of circumstances in order to assure safety and protection of others and of valuable property. These exposures will be justified if the maximum risks or costs to others that are avoided by their actions outweigh the risks to which the workers are subjected. The Emergency Worker Dose Limits are as follows:

Table 9.1: Emergency Dose Limits

Dose Limit (Rem TEDE)	Activity	Condition
0-5 Rem	All	Personnel should be kept within normal 10 CFR 20 limits during bona fide emergencies, except as authorized for activities as indicated below.
5-10 Rem	Protecting valuable property	Lower dose not practicable.
10-25 Rem	Lifesaving or protection of large populations	Lower dose not practicable.
>25 Rem	Lifesaving or protection of large populations	Only on a voluntary basis to persons fully aware of the risks involved.

Limit dose to the lens of the eye to 3 times the above values and doses to any other organ (including skin and body extremities) to 10 times the above values.

Whenever possible, the concurrence of the facility's Radiation Protection (Department) Manager should be secured before exposing individuals to dose equivalents beyond the EPA-PAG Manual lower limit.

9.5.2. Emergency Radiation Protection Program

The Radiation Protection Coordinator is the individual responsible for the implementation of the radiation protection actions during an emergency. Radiation protection guidelines include the following:

- Volunteers over forty-five years of age are considered first for any emergency response action requiring exposure greater than normal limits. Routine dose limits shall not be extended to emergency dose limits for declared pregnant individuals. As in the case of normal occupational exposure, doses received under emergency conditions should be maintained as low as reasonably achievable.
- Persons undertaking any emergency operation in which the dose will exceed 25 Rem TEDE should do so only on a voluntary basis and with full awareness of the risks involved including the numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effects.
- In the context of the emergency limits, exposure of workers that is incurred for the protection of large populations may be considered justified for situations in which the collective dose avoided by the emergency operation is significantly larger than that incurred by the workers involved.
- Exposure accountability is maintained, and proper personnel radiological monitoring equipment is provided for all personnel during emergency conditions.
- Access to high radiation areas is only permitted with prior approval of the applicable Radiation Protection Coordinator. Personnel are not allowed to enter known or potential high radiation areas unless their exposure has been properly evaluated.
- Periodic habitability surveys of emergency facilities are performed during an emergency. If the facility is determined to be uninhabitable, the facility is evacuated in order to prevent or minimize exposure to radiation and radioactive materials. Alternate assembly areas are established, as necessary, to relocate and monitor evacuated personnel.

9.5.3. Personnel Monitoring

Emergency workers will receive DLR badges and personal self-reading dosimeters capable of measuring expected exposures on a real time basis. The capability exists for the emergency processing of DLRs on a 24-hour per day basis, if necessary.

Emergency worker dose records are maintained by the Radiation Protection Coordinator (as appropriate) in accordance with the emergency and radiological protection

procedures. Emergency workers are instructed to read their dosimeters frequently. DLRs may be processed with increased periodicity.

9.5.4. Non-Exelon Personnel Exposure Authorization

The responsibility for authorizing non-Exelon emergency workers (i.e. state and local agency emergency workers) to receive exposures in excess of the EPA General Public Protective Action Guides rests with the state and county organizations, except when such emergency workers are onsite. Authorization of exposures in excess of EPA General Public Protective Action Guides, in this latter instance, rests with the Emergency Director.

9.5.5. Contamination and Decontamination

During an emergency, the Emergency Director is responsible for preventing or minimizing personnel exposure to radioactive materials deposited on the ground or other surfaces.

- a. During emergency conditions, normal facility contamination control criteria will be adhered to as much as possible. However, these limits may be modified by the Emergency Director per existing Radiation Protection procedures, should conditions warrant.
- b. Personnel found to be contaminated will normally be attended to at decontamination areas located onsite. Temporary decontamination areas can also be set up inside at various locations. Decontamination showers and supplies are provided onsite with additional personnel decontamination equipment and capabilities. Shower and sink drains in the controlled area is processed and monitored prior to discharge. Potentially contaminated emergency vehicles will be surveyed before they are allowed to leave the facility or offsite assembly area. If the survey area is not suitable for monitoring and decontamination due to radiological or other concerns, vehicles will be surveyed at an alternate location.

9.5.6. Contamination Control Measures

Controls are established 24 hours per day to contain the spread of loose surface radioactive contamination.

- a. Contaminated areas are isolated as restricted areas with appropriate radiological protection and access control. Personnel leaving contaminated areas are monitored to ensure they and their clothing are not contaminated. If contamination above acceptable levels is found, they will be decontaminated in accordance with facility procedures. If normal decontamination procedures do not reduce personnel contamination to acceptable levels, the case will be referred to a competent medical authority. Supplies, instruments, and equipment that are in contaminated areas or have been brought into contaminated areas will be monitored prior to removal. If found to be contaminated, they will be decontaminated using normal facility decontamination techniques and facilities or may be disposed of as radwaste. Contaminated vehicles will be decontaminated before being released.

- b. Measures will be taken to control onsite access to potentially contaminated potable water and food supplies. Under emergency conditions when uncontrolled releases of activity have occurred, eating, drinking, smoking, and chewing are prohibited in all facility emergency response facilities until such time as habitability surveys indicate that such activities are permissible.
- c. Restricted areas and contaminated items will be returned to normal use when contamination levels have been returned to acceptable levels. Contamination control criteria for returning areas and items to normal use are contained in the facility procedures.

10.0 EMERGENCY NOTIFICATION AND PUBLIC INFORMATION

10.1. Emergency Notification

The Shift Manager is responsible for the notification of an emergency declaration to the Commonwealth of Pennsylvania. Notification is to be made as soon as possible and with 30 minutes after declaring an emergency.

The format and contents of the initial message between the facility and State authorities are specified in notification procedures and have been established with the review and agreement of responsible state authorities.

The Pennsylvania Emergency Management Agency may request the following information from TMI:

1. Date and time of the incident;
2. Emergency classification;
3. Status of the facility;
4. Whether a release has occurred, is occurring, or is anticipated to occur;
5. Actual or projected dose rates at the Site boundary;
6. Whether or not Offsite assistance is needed.

Follow-up reports are provided as additional information describing the emergency situation becomes available and on an as-needed basis until such time that the emergency condition has been terminated.

10.2. Public Information

Any emergency generates a continuous and intensive demand for up-to-date information. The spokesperson function would typically be performed by Communications personnel. Communication personnel will be notified of an emergency declaration and would serve as a spokesperson. However, the function could also be performed by plant or corporate management. Upon receiving notification of an emergency declaration, the spokesperson contacts the Control Room and receives a brief description of the event.

The spokesperson monitors media activity and coordinates with senior management to address rumors and disseminate information to the public. The spokesperson will participate in news conferences as appropriate with Federal, State and local emergency response organizations conducted from the site or at other locations, as necessary. The spokesperson is available for media inquiries and the positional duties include maintaining liaison with local media and coordinating with Federal, State and local emergency response organizations to disseminate appropriate information regarding an emergency at TMI. Federal, State and local emergency response organizations maintain the capability to disseminate appropriate information regarding an emergency at TMI.

As part of its normal corporate structure, Exelon maintains a corporate communications office that can be called to provide additional resources, as necessary.

11.0 MAINTAINING EMERGENCY PREPAREDNESS

11.1. Drills and Exercises

An exercise tests the execution of the overall facility emergency preparedness and the integration of this preparedness. A drill is a supervised instruction period aimed at testing, developing and maintaining skills in a particular response function.

Emergency exercises and drills are conducted to test and evaluate the adequacy of emergency facilities, equipment, procedures, communication channels, actions of emergency response personnel, and coordination between offsite organizations and the facility.

A summary of exercises and drills and associated elements is outlined below.

11.1.1. Radiation Emergency Exercises and Drills

Biennial exercises shall be conducted to test the timing and content of implementing procedures and methods; to test emergency equipment and communication networks; and to ensure that emergency personnel are familiar with their duties. TMI offers the following organizations the opportunity to participate to the extent assistance would be expected during an emergency declaration; however, participation is not required:

1. Commonwealth of Pennsylvania
2. Local Hospitals
3. Local Fire Departments
4. Law Enforcement
5. Rescue, Inc. Ambulance Service

At least one drill involving a combination of some of the principal functional areas of emergency response shall be conducted in the interval between biennial exercises.

Communication checks with offsite agencies, fire drills, medical drills, radiological monitoring drills and health physics drills are performed as indicated in the following sections.

11.1.2. Communication Tests

To ensure that emergency communications systems described in Section 6.0 of this plan are operable, communications tests are conducted as outlined below.

1. Communication channels with the state government of Pennsylvania, is tested monthly. These communications tests will include the aspect of understanding the content of messages.
2. The ENS is tested monthly.

3. The following communication systems, as detailed in Section 6.0 of this plan, are used on a frequent basis, therefore periodic testing of these systems is not necessary:
 - Mobile UHF Radio System
 - Facility Intercom System
 - Commercial Telephone System

11.1.3. Augmentation Drills

Semi-annual, off hours, unannounced, communications drill, utilizing commercial telephone, to estimate emergency personnel response times. No actual travel is required. Participants provide an estimation of the time it would take to report to their designated ERO position. This drill shall serve to demonstrate the capability to augment the on-shift staff after declaration of an emergency.

11.1.4. Fire Drills

To test and evaluate the response and training of the facility's fire brigade, fire drills are conducted in accordance with the TMI Fire Protection Program.

11.1.5. Medical Drills

To evaluate the training of the facility's medical response and offsite medical response (ambulance and hospital), a medical drill is conducted annually with a simulated contaminated injured individual. This drill can be performed as part of an Emergency Plan drill or exercise.

11.1.6. Radiological Monitoring Drills

Facility environs and radiological monitoring drills are conducted annually. These drills include monitoring of accessible areas within the facility and include collection and analysis of airborne sample media, communications, and record keeping performed by members of the emergency team. This drill can be performed as part of an Emergency Plan drill or exercise.

11.1.7. Health Physics Drills

Health Physics drills are conducted semi-annually involving response to, and analysis of, simulated elevated in-facility airborne and liquid samples and direct radiation measurements in the environment. A drill can be performed as part of an Emergency Plan drill or exercise.

11.1.8. Security Drills

The purpose of the security drill is to maintain key skills, specifically the site-specific team skills necessary to mitigate security-based events. Security drills are conducted in accordance with the TMI Physical Security Plan.

11.1.9. Scenarios

The EP Specialist is responsible for an Emergency Plan drill or exercise. The EP Specialist's responsibilities include developing the exercise/drill scenario, the accident time sequence, and the selection and training of the controllers required to evaluate the effectiveness of the TMI Emergency Preparedness Program. In accordance with applicable portions to Section IV.G to NSIR/DPR-ISG-01, the drill or exercise scenarios will vary from year to year.

A scenario is prepared by the scenario development team (if needed) for each exercise/drill to be conducted. The contents of the scenario include, but are not limited to, the following:

1. Basic objective(s);
2. Date, time period, place and participating organizations;
3. Simulation lists;
4. Time schedule of real and simulated initiating events;
5. A narrative summary describing the conduct of the drill or exercise to include such items as simulated casualties, search and rescue of personnel, deployment of radiological monitoring teams, and public information affairs; and
6. List of controllers and participants.

The scenarios are designed to allow free play in exercising the decision-making process associated with such emergency response actions as exposure control, emergency classification, and the ERO and additional staff augmentation process.

Security based scenarios to test and evaluate security response capabilities will be conducted in accordance with security drills and exercise procedures and may be conducted during Emergency Plan drills or exercises.

Starting times and pre-notification for exercises are coordinated with and agreed upon by all participating organizations.

11.1.10. Evaluation of Exercises

To evaluate the performance of participating facility personnel and the adequacy of emergency facilities, equipment and procedures during an exercise, the Exercise Coordinator obtains qualified controllers which includes resources outside the facility to evaluate and critique the exercise.

When feasible, personnel designated as controllers are assigned to an Emergency Plan area germane to their area of expertise. Controllers are provided general instruction concerning their specific observation function. Each controller is requested to observe the implementation of the emergency plan element assigned to him or her, and then to record and report observed inadequacies.

A critique is conducted at the conclusion of the exercise with facility personnel. After the critique, the controllers submit a written evaluation to the Exercise Coordinator in which the exercise performance is evaluated against the objectives. All comments and/or recommendations are documented.

Weaknesses and/or deficiencies identified in an exercise critique are processed in accordance with the site corrective actions program.

11.1.11. Emergency Plan Audit

The TMI Emergency Plan is independently audited. The audit is conducted as part of the Decommissioning Quality Assurance Program in accordance with 10 CFR 50.54(t). All aspects of emergency preparedness, including exercise documentation, capabilities, procedures, and interfaces with state and local governments are audited.

11.2. Training

Radiological emergency response training is provided to those who may be called on to assist in an emergency. TMI Management is responsible to ensure all members of the Emergency Response Organization receive the required initial training and continuing training.

11.2.1. Emergency Response Training

The training program for ERO personnel is based on applicable requirements of Appendix E to 10 CFR Part 50 and position-specific responsibilities as defined in the PDEP. Emergency response personnel in the following categories receive initial training and annual retraining.

11.2.2. Emergency Response Organization Training

Shift Managers/Emergency Directors, Technical Coordinators, and Radiation Protection Coordinators shall have training conducted such that proficiency is maintained on topics listed below. These topics should be covered as a minimum on an annual basis.

- Emergency Action Level Classification
- Dose Assessment
- Federal, State, and local notification procedures
- ERO Augmentation
- Emergency Exposure Control
- Mitigating strategies for a catastrophic loss of spent fuel pool inventory

TMI personnel available during emergencies to perform emergency response activities as an extension of their normal duties receive duty specific training. This includes facility on-shift personnel, maintenance, radiation protection, and security personnel. Personnel assigned to liaison with offsite fire departments are trained in accordance with the Fire

Protection Program, including mitigating strategies required for a catastrophic loss of SFP inventory. Personnel assigned the responsibility of first aid response will be trained with courses equivalent to Red Cross First Aid, CPR, or AED for Lay Responders or equivalent.

11.2.3. General Employee Training

An overview of the Emergency Plan is given to all personnel allowed unescorted access into the Protected Area at TMI. Personnel receive this information during initial and requalification training. This training includes identification of the emergency alarm, the fire alarm and the steps to follow for a facility and site evacuation.

11.2.4. Local Support Services Personnel Training

Training is offered annually to offsite organizations which may provide specialized services during an emergency at TMI (fire-fighting, medical services, transport of contaminated and/or injured personnel, etc.). The training shall be structured to meet the needs of that organization with respect to the nature of their support. Topics of event notification, site access, basic radiation protection and interface activities are included in the training.

11.2.5. Documentation of Training

TMI procedures outline the process to document training of the TMI Emergency Response Organization. An Emergency Planning procedure is used to verify training provided to offsite organizations.

11.3. Review and Updating of Plan and Procedures

The Emergency Plan is reviewed at least annually. All recommendations for changes to the Emergency Plan or associated implementing procedures are reviewed in accordance with 10 CFR 50.54(q). The Emergency Plan is submitted to TMI's On-Site Safety Review Committee for approval.

Written agreements with outside support organizations and government agencies are evaluated annually to determine if these agreements are still valid. If agreements are not valid, then they are renewed and updated.

Revisions to the Emergency Plan are made in accordance with current regulations and guidelines. Changes to the Emergency Plan are forwarded to organizations and individuals with a responsibility for implementation of the Plan.

Telephone number listings associated with the emergency notification process are verified quarterly.

11.4. Maintenance and Inventory of Emergency Equipment and Supplies

Periodic inventory, testing, and calibration of emergency equipment and supplies are conducted in accordance with approved facility procedures. This equipment includes, but is not limited to:

- Portable radiation monitoring equipment
- Emergency medical response equipment
- Dosimeters
- Portable radios

Emergency equipment and instrumentation shall be inventoried, inspected and operationally checked periodically as indicated by the procedure and after each use. Sufficient reserves of equipment and instrumentation are stocked to replace emergency equipment and instrumentation removed from service for calibration and/or repair.

11.5. Responsibility for the Planning Effort

The facility Plant Manager has overall responsibility for implementation of the Emergency Plan at TMI. The overall Emergency Plan is maintained by Corporate Emergency Preparedness. The Emergency Preparedness Specialist is assisted by Corporate Emergency Preparedness. The specific duties include, but are not limited to, the following:

1. Revise and update the Emergency Plan;
2. Maintain the Emergency Plan implementing procedures so that they are updated and current with the Emergency Plan;
3. Represent the facility in offsite Emergency Plan interfaces;
4. Represent the facility in NRC emergency planning appraisals and audits; and
5. Maintain drill and exercise documentation and coordinate implementation of corrective actions deemed necessary following drills and exercises.

The Emergency Preparedness Specialist is responsible for maintaining an adequate knowledge of regulations, planning techniques and the latest applications of emergency equipment and supplies.

APPENDIX 1: REFERENCES

References consulted in the writing of this Emergency Plan are listed in this section. With exception of regulatory requirements, inclusion of material on this list does not imply adherence to all criteria or guidance stated in each individual reference.

1. C-1101-202-E410-476, "DECOM Spent Fuel Pool Thermohydraulic Analysis," Revision 1, dated June 10, 2018
2. 10 CFR 50.47, "Emergency plans"
3. 10 CFR 50.72, "Immediate Notification Requirements for Operating Nuclear Power Reactors"
4. 10 CFR 50 Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities"
5. 10 CFR 20, "Standards for Protection Against Radiation"
6. 10 CFR 70, 73, and 100
7. 10 CFR 72.32, "Emergency plan"
8. NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, dated November 1980
9. NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73"
10. NUREG-1140, "A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees"
11. NUREG-1567, "Spent Fuel Dry Storage Facilities"
12. NEI 99-01, Revision 6, "Development of Emergency Action Levels for Nuclear Power Plants," dated November 2012
13. EPA 400-R-92-001 "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," dated October 1991 (reprinted May 1992)
14. Exelon Nuclear Defueled Quality Assurance Program (DQAP), NO-DC-10
15. "Federal Bureau of Investigation and Nuclear Regulatory Commission Memorandum of Understanding for Cooperation Regarding Threat, Theft, or Sabotage in U.S. Nuclear Industry," Federal Register, Vol. 44, p. 75535, dated December 20, 1979
16. "Voluntary Assistance Agreement By and Among Electric Utilities Involved in Transportation of Nuclear Materials," dated November 1, 1980
17. Comprehensive Environmental Response, Compensation and Liability Act of 1980.
18. American Nuclear Insurers Bulletin #5B (1981), "Accident Notification Procedures for Liability Insureds"

APPENDIX 1: REFERENCES

19. Letter from William J. Dircks, Executive Director for Operations, NRC, to Dr. Donald F. Knuth, President KMC, Inc. dated October 26, 1981
20. ANI/MAELU Engineering Inspection Criteria for Nuclear Liability Insurance, Section 6.0, Rev. 1, Emergency Planning
21. NRC RIS 2006-12, "Endorsement of Nuclear Energy Institute Guidance Enhancement to Emergency Preparedness Programs for Hostile Action."
22. NRC Bulletin 2005-02, "Emergency Preparedness and Response Actions for Security-Based Events"
23. NRC Information Notice 2009-01, "National Response Framework"
24. NRC NSIR/DPR-ISG-01, "Interim Staff Guidance – Emergency Planning for Nuclear Power Plants," Revision 0, November 2011 (ADAMS Ascension No. ML113010523)

APPENDIX 2: INDEX OF EMERGENCY PLAN IMPLEMENTING PROCEDURES

Document	Document Title
EP-TM-1001 Addendum 1	PERMANENTLY DEFUELED EMERGENCY ACTION LEVELS AND TECHNICAL BASES
EP-TM-110	ASSESSMENT OF EMERGENCIES
EP-TM-111	EMERGENCY CLASSIFICATION
EP-TM-112	EMERGENCY RESPONSE ORGANIZATION ACTIVATION AND OPERATION
EP-TM-113	PERSONNEL PROTECTIVE ACTIONS
EP-TM-114	NOTIFICATIONS
EP-TM-115	TERMINATION
EP-TM-120	EMERGENCY PLAN ADMINISTRATION
EP-TM-121	EMERGENCY RESPONSE FACILITIES AND EQUIPMENT READINESS
EP-TM-122	DRILLS AND EXERCISE PROGRAM
EP-TM-123	COMPUTER PROGRAMS
EP-TM-124	INVENTORIES AND SURVEILLANCES
TQ-TM-113	ERO TRAINING AND QUALIFICATION

APPENDIX 3: PROCEDURE CROSS-REFERENCE TO NUREG-0654

NUREG-0654 Criteria	Planning Standard (10 CFR 50.47)	Planning Requirement (Appendix E. IV)	TMI PDEP Section
II.A	(b)(1)* Assignment of Responsibility (Organization Control)	A.1*, 2, 4*, 7*	6.0 7.0 Appendix 4
II.B	(b)(2) Onsite Emergency Organization	A.1*, 2, 4*, 9*; C.1*	7.0 9.0
II.C	(b)(3)* Emergency Response Support and Resources	A.6, 7*	7.0 Appendix 4
II.D	(b)(4)* Emergency Classification System	B.1*, 2; C.1*, 2*	4.0 8.0 Addendum 1
II.E	(b)(5)* Notification Methods and Procedures	A.6, 7*; C.1*, 2*; D.1*, 3*; E*	7.0 8.0 10.0 Appendix 2
II.F	(b)(6)* Public Education and Information	C.1*; D.1*, 3*; E*	6.0 8.0 11.0
II.G	(b)(7)* Public Education and Information	A.7*; D.2*	10.0
II.H	(b)(8) Emergency Facilities and Equipment	E*, G	5.0 7.0 8.0 11.0
II.I	(b)(9)* Accident Assessment	A.4*; B.1*; C.2*; E*	5.0 9.0 Addendum 1
II.J	(b)(10)* Protective Response	C.1*; E*, I	9.0
II.K	(b)(11) Radiological Exposure Control	E*	9.0
II.L	(b)(12) Medical and Public Health Support	A.6, 7*; E*	7.0 9.0
II.M	(b)(13) Recovery and Reentry Planning and Post-Accident Operations	H	7.0
II.N	(b)(14) Exercises and Drills	E.9*; F*	11.0
II.O	(b)(15) Radiological Emergency Response Training	F*	7.0 9.0 11.0
II.P	(b)(16) Responsibility for the Planning Effort: Development, Periodic Review and Distribution of Emergency Plans	G	11.0

* As exempted.

APPENDIX 4: LIST OF LETTERS OF AGREEMENT

Letters with Corporate Exelon:

Organization/Agreement Type

Department of Energy (DOE) Radiation Emergency
Assistance Center/Training Site, REAC/TS (Letter on File)

Medical Consultant

Environmental, Inc. (P.O.)
Radiological Environmental Monitoring

Landauer, Inc. (P.O.)
Emergency Dosimetry

Murray & Trettel, Inc. (P.O.)
Meteorological Support

Teledyne Brown Engineering (P.O.)
Bioassay Analysis/Radiochemical Analysis

Red Alert Service (P.O.)
Fire Foam Supply

APPENDIX 4: LIST OF LETTERS OF AGREEMENT**Three Mile Island Specific Letters of Agreement**

The following is a listing of letters of agreement, memorandum of understanding, and contracts specific to emergency response activities in support of the TMI Station.

NOTE: While this list reflects letters of agreement currently in effect, it is possible that the list may change for a number of reasons. The EP Specialist will consider the impact that a loss of an agency will have on the emergency response process.

1. Medical Support Organizations and Personnel

- Londonderry Volunteer Fire Company (ambulance service)
- South Central Emergency Medical Services Inc.
- Northwest Emergency Medical Services
- Hershey Medical Center
- Pinnacle Health Harrisburg Hospital

2. Firefighting Organizations

NOTE: These are supplemented by Mutual Aid agreements with other firefighting as organizations.

- Bainbridge Volunteer Fire Company (Lancaster Co.)
- Middletown Volunteer Fire Department
- Londonderry Volunteer Fire Company
- Elizabethtown Fire Department
- Lower Swatara Volunteer Fire Department
- Susquehanna Area Regional Airport Authority (SARAA)

3. Law Enforcement Agencies

- Pennsylvania State Police (letter of agreement maintained by Security)

4. Local County Response Agencies

- Pennsylvania Emergency Management Agency Memorandum of Understanding (MOU) (letter on file)

NOTE: Documentation of agreement for Cumberland, Dauphin, Lancaster, Lebanon, and York counties are contained as part of the agreement with PEMA.

5. Other Agencies

- Norfolk Southern Railway Company
- AREVA*
- Harrisburg Area Community College
- Londonderry Volunteer Fire Department (staging area)

APPENDIX 5: GLOSSARY OF TERMS AND ACRONYMS**Glossary of Terms**

Accident Assessment	Accident assessment consists of a variety of actions taken to determine the nature, effects and severity of an accident and includes evaluation of spent fuel cooling and integrity, meteorological observations, seismic observations, fire reports, radiological dose projections, and radiological and environmental monitoring.
Alert Classification	See definition in Section 4.2.
Annual	Frequency of occurrence equal to once per calendar year, January 1 to December 31.
Assessment Actions	Those actions taken during or after an emergency to obtain and process information that is necessary to make decisions to implement specific emergency measures.
Classification	The classification of emergencies is divided into TWO (2) categories or conditions, covering the postulated spectrum of emergency situations. The two (2) emergency classifications (Unusual Event and Alert) are characterized by Emergency Action Levels (EALs) or event initiating conditions and address emergencies of increasing severity.
Comprehensive Emergency Management Plan (CEMP)	A CEMP is often referred to as a synonym for "all hazards planning." It is an emergency operation plan that is flexible enough for use in all emergencies. A CEMP is addressed in the Federal Emergency Management Agency's (FEMA's) Comprehensive Preparedness Guide (CPG) 101, "Developing and Maintaining Emergency Operations Plans."
Corrective Action	Those emergency measures taken to lessen or terminate an emergency situation at or near the source of the problem in order to reduce the magnitude of a radiological release.
Dose Projection	The calculated estimate of a radiation dose to individuals at a given location (normally off-site), determined from the source term/quantity of radioactive material (Q) released, and the appropriate meteorological dispersion parameters (X/Q).

APPENDIX 5: GLOSSARY OF TERMS AND ACRONYMS

Emergency Action Levels (EALs)	A pre-determined, site-specific, observable threshold for a facility Initiating Condition that places the facility in a given emergency class.
Emergency Preparedness	A state of readiness that provides reasonable assurance that adequate protective measures can and will be taken upon implementation of the Emergency Plan in the event of a radiological emergency.
Exercise	An event that tests the integrated capability of a major portion of the basic elements existing within emergency preparedness plans and organizations.
Hostile Action	See Section 6.2 of Addendum 1.
Initiating Condition	See Section 6.2 of Addendum 1.
ISFSI	See Section 6.2 of Addendum 1.
Monthly	Frequency of occurrence equal to once per calendar month.
Off-Site	The area around a nuclear facility that lies outside the station's "Site Boundary".
Offsite Dose Calculation Manual (ODCM)	<p>The ODCM presents a discussion of the following:</p> <ol style="list-style-type: none">1. The ways in which nuclear power stations can affect their environment radiologically2. The regulations which limit radiological effluents from the nuclear power stations; and3. The methodology used by the nuclear power stations to assess radiological impact on the environment and compliance with regulations.
On-Site	The area around a nuclear facility that lies within the station's "Site Boundary".

APPENDIX 5: GLOSSARY OF TERMS AND ACRONYMS

Plant Operator	Any member of the plant staff who, by virtue of training and experience, is qualified to assess the indications or reports for validity and to compare the same to the EALs in the licensee's emergency classification scheme. A "plant operator" does not encompass plant personnel such as chemists, radiation protection technicians, craft personnel, security personnel, and others whose positions require they report, rather than assess, abnormal conditions to the control room.
Projected Dose	That calculated dose that some individuals in the population group may receive if no protective actions are implemented. Projected doses are calculated to establish an upper limit boundary.
Protected Area	See Section 6.2 of Addendum 1.
Protective Action	Measures taken to effectively mitigate the consequences of an accident by minimizing the radiological exposure that would likely occur if such actions were not taken.
Release	A ' <i>Release in Progress</i> ' is defined as <u>ANY</u> radioactive release that is a result of, or caused by, the emergency event.
Site Boundary	Three Mile Island's Site Boundary is described in detail in the ODCM. For the purposes of Emergency Planning, the exclusion area boundary and the Site Boundary are considered the same.
Site Evacuation	The evacuation of non-essential personnel from the facility site.
Source Term	Radioisotope inventory or amount of radioisotope released to the environment, often as a function of time.
Unusual Event Classification	See definition in Section 4.1.

APPENDIX 5: GLOSSARY OF TERMS AND ACRONYMS**ACRONYMS**

Any abbreviation followed by a lower case 's' denotes the plural form of the term.

ARM	Area Radiation Monitor
BRP	Bureau of Radiation Protection (Pennsylvania)
CFR	Code of Federal Regulations
CR	Control Room
DER	Department of Environmental Resources (Pennsylvania)
DLR	Dosimeter of Legal Record
DOE	U. S. Department of Energy
DOT	U. S. Department of Transportation
DSAR	Decommissioned Safety Analysis Report
EAL	Emergency Action Level
ENS	Emergency Notification System (NRC)
EPA	U. S. Environmental Protection Agency
GET	General Employee Training
IWTS/IWFS	Industrial Waste Treatment System / Industrial Waste Filtration System
NRC	U. S. Nuclear Regulatory Commission
NRF	National Response Framework
NWS	National Weather Service
PAG	Protective Action Guide
PDEP	Permanently Defueled Emergency Plan
PEMA	Pennsylvania Emergency Management Agency
RMS	Radiation Monitoring System

ATTACHMENT 3

THREE MILE ISLAND NUCLEAR STATION

PERMANENTLY DEFUELED EMERGENCY ACTION LEVELS AND BASES DOCUMENT

EXELON GENERATION

THREE MILE ISLAND STATION PERMANENTLY DEFUELED EMERGENCY ACTION LEVELS AND TECHNICAL BASES

TABLE OF CONTENTS

1.0	PURPOSE	1
2.0	DISCUSSION	1
2.1	Permanently Defueled Facility	1
2.2	Independent Spent Fuel Storage Installation	2
3.0	KEY TERMINOLOGY USED	2
3.1	Emergency Classification Levels (ECLs)	2
3.2	Initiating Condition (IC)	3
3.3	Emergency Action Level (EALs)	3
4.0	GUIDANCE ON MAKING EMERGENCY CLASSIFICATIONS	3
4.1	General Considerations	3
4.2	Classification Methodology	4
4.3	Classification of Multiple Events and Conditions	5
4.4	Classification of Imminent Conditions	5
4.5	Emergency Classification Level Upgrading and Termination	5
4.6	Classification of Short-Lived Events	5
4.7	Classification of Transient Conditions	5
4.8	After-the-Fact Discovery of an Emergency Event or Condition	5
4.9	Retraction of an Emergency Declaration	6
5.0	REFERENCES	7
5.1	Developmental	7
5.2	Implementing	7
5.3	Commitments	7
6.0	ACRONYMS & DEFINITIONS	8
6.1	Acronyms	8
6.2	Definitions	8
7.0	ATTACHMENTS	10
	Attachment 1, EAL Matrices	10
	Attachment 2, EAL Bases	10

1.0 PURPOSE

This document provides the detailed set of Emergency Action Levels (EALs) applicable to the Three Mile Island Nuclear Station (TMI) and the associated Technical Bases using the EAL development methodology found in NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6 (NEI 99-01, Rev. 6). As a permanently defueled facility, TMI will use the Recognition Category "PD" (Permanently Defueled) to provide a site-specific emergency classification scheme including a set of Initiating Conditions (ICs) and EALs associated with the permanently defueled condition and a Recognition Category "E" IC/EAL for the Independent Spent Fuel Storage Installation (ISFSI). Permanently defueled station ICs and EALs are addressed in Appendix C of NEI 99-01, Rev. 6. All recommendations for changes to this document or associated implementing procedures are reviewed in accordance with 10 CFR 50.54(q).

This document should be used to facilitate review of the TMI EALs, provide historical documentation for future reference, and serve as a resource for training. Individuals responsible for the classification of events will refer to the ICs and EALs contained in the matrix of this document. They may use the information in the associated "Basis" and "Notes" sections as a reference in support of EAL interpretation. An EAL matrix may be provided as a user aid.

Emergency classifications are to be made as soon as conditions are present and recognizable for the classification in accordance with the applicable EALs; but within 30 minutes in all cases after the availability of indications to operators that an EAL threshold has been reached. Use of this document for assistance is not intended to delay the emergency classification.

2.0 DISCUSSION

2.1 Permanently Defueled Facility

NEI 99-01, Appendix C, Rev. 6, provides guidance for an emergency classification scheme applicable to a permanently defueled facility. This is a facility that generated spent fuel under a 10 CFR Part 50 license, has permanently ceased operations and will store the spent fuel onsite for an extended period of time. The emergency classification levels applicable to permanently defueled facility are consistent with the requirements of 10 CFR Part 50 and NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Rev. 1" (NUREG-0654).

In order to relax the emergency plan requirements applicable to an operating station, the owner of a permanently defueled station must demonstrate that no credible event can result in a significant radiological release beyond the site boundary. Exelon has confirmed that the source term and motive force available in the permanently defueled condition are insufficient to warrant classifications of a Site Area Emergency or General Emergency.

Therefore, the generic ICs and EALs applicable to a permanently defueled facility may only result in either a Notification of UNUSUAL EVENT (UNUSUAL EVENT) or ALERT classification.

2.2 Independent Spent Fuel Storage Installation

Selected guidance in NEI 99-01, Rev. 6, is applicable to licensees electing to use their 10 CFR Part 50 emergency plan to fulfill the requirements of 10 CFR 72.32 for a stand-alone Independent Spent Fuel Storage Installation (ISFSI). The emergency classification levels applicable to an ISFSI are consistent with the requirements of 10 CFR Part 50. The initiating conditions germane to a 10 CFR 72.32 emergency plan (as described in NUREG-1567, "Spent Fuel Dry Storage Facilities") are subsumed within the classification scheme for a 10 CFR 50.47 emergency plan.

The analysis of potential onsite and offsite consequences of accidental releases associated with the operation of an ISFSI is contained in NUREG-1140, "A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees" (NUREG-1140). NUREG-1140 concluded that the postulated worst-case accident involving an ISFSI has insignificant consequences to public health and safety. This evaluation shows that the maximum offsite dose to a member of the public due to an accidental release of radioactive materials would not exceed 1 Rem Total Effective Dose Equivalent.

Regarding the above information, the expectations for an offsite response to an ALERT classified under a 10 CFR 72.32 emergency plan are generally consistent with those for an UNUSUAL EVENT in a 10 CFR 50.47 emergency plan (e.g., to provide assistance if requested). Also, the licensee's Emergency Response Organization (ERO) required for 10 CFR 72.32 emergency plan is different from that prescribed for a 10 CFR 50.47 emergency plan (e.g., there is no emergency technical support function required).

3.0 KEY TERMINOLOGY USED

There are several key terms that appear throughout the NEI 99-01, Rev. 6, methodology. These terms are introduced in this section to support understanding of subsequent material.

3.1 Emergency Classification Levels (ECLs)

One of a set of names or titles established by the U.S. Nuclear Regulatory Commission (NRC) for grouping off-normal events or conditions according to (1) potential or actual effects or consequences, and (2) resulting onsite and offsite response actions. The ECLs that remain applicable to TMI, in ascending order of severity, are:

3.1.1 UNUSUAL EVENT (UE)

Events are in progress or have occurred which indicate a potential degradation of the level of safety of the facility or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Purpose: The purpose of this classification is to assure that the first step in future response has been carried out, to bring the operations staff to a state of readiness, and to provide systematic handling of UNUSUAL EVENT information and decision-making.

3.1.2 ALERT

Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the facility or a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the Environmental Protection Agency (EPA) Protective Action Guides (PAG) exposure levels.

Purpose: The purpose of this classification is to assure that emergency personnel are readily available to respond if the situation becomes more serious or to perform confirmatory radiation monitoring, if required, and provide offsite authorities current information on facility status and parameters.

3.2 Initiating Condition (IC)

An event or condition that aligns with the definition of one of the two ECLs by virtue of the potential or actual effects or consequences.

Discussion: An IC describes an event or condition, the severity or consequences of which meets the definition of an ECL. An IC can be expressed as a continuous, measurable parameter (e.g., radiation monitor readings) or an event (e.g., an earthquake).

Appendix 1 of NUREG-0654 does not contain example EALs for each ECL, but rather ICs (i.e., conditions that indicate that a radiological emergency, or events that could lead to a radiological emergency, have occurred). NUREG-0654 states that the ICs form the basis for establishment by a licensee of the specific facility instrumentation readings (as applicable) which, if exceeded, would initiate the emergency classification. Thus, it is the specific instrument readings that would be the EALs.

3.3 Emergency Action Level (EAL)

A pre-determined, site-specific, observable threshold for an IC that, when met or exceeded, places the facility in a given ECL.

Discussion: EAL statements may utilize a variety of criteria including instrument readings and status indications, observable events, results of calculations and analyses, entry into particular procedures, and the occurrence of natural phenomena.

4.0 GUIDANCE ON MAKING EMERGENCY CLASSIFICATIONS

4.1 General Considerations

When making an emergency classification, the Emergency Director must consider all information having a bearing on the proper assessment of an IC. This includes the EAL plus Notes and the informing Basis information.

All emergency classification assessments should be based upon valid indications, reports or conditions. A valid indication, report, or condition is one that has been verified through appropriate means such that there is no doubt regarding the indicator's operability, the condition's existence, or the report's accuracy. For example, validation could be accomplished through an instrument channel check, response on related or redundant

indicators, or direct observation by personnel. The validation of indications should be completed in a manner that supports timely emergency declaration.

For ICs and EALs that have a stipulated time duration (e.g., 15 minutes, 60 minutes, etc.), the Emergency Director should not wait until the applicable time has elapsed but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If an ongoing radiological release is detected and the release start time is unknown, it should be assumed that the release duration specified in the IC/EAL has been exceeded, absent data to the contrary.

A planned work activity that results in an expected event or condition which meets or exceeds an EAL does not warrant an emergency declaration provided that 1) the activity proceeds as planned and 2) the facility remains within the limits imposed by the operating license. Such activities include planned work to test, manipulate, repair, maintain, or modify a system or component. In these cases, the controls associated with the planning, preparation, and execution of the work will ensure that compliance is maintained with all aspects of the operating license provided that the activity proceeds and concludes as expected. Events or conditions of this type may be subject to the reporting requirements of 10 CFR 50.72.

The assessment of some EALs is based on the results of analyses that are necessary to ascertain whether a specific EAL threshold has been exceeded (e.g., gaseous and liquid effluent sampling, etc.); the EAL and/or the associated basis discussion will identify the necessary analysis. In these cases, the declaration period starts with the availability of the analysis results that show the threshold to be exceeded (i.e., this is the time that the EAL information is first available).

While the EALs have been developed to address a full spectrum of possible events and conditions which may warrant emergency classification, a provision for classification based on operator/management experience and judgment is still necessary. The NEI 99-01, Rev. 6, scheme provides the Emergency Director with the ability to classify events and conditions based upon judgment using EALs that are consistent with the ECL definitions (refer to PD-HU3 and PD-HA3). The Emergency Director will need to determine if the effects or consequences of the event or condition reasonably meet or exceed a particular ECL definition.

4.2 Classification Methodology

To make an emergency classification, the user will compare an event or condition (i.e., the relevant facility indications and reports) to an EAL(s) and determine if the EAL has been met or exceeded. The evaluation of an EAL(s) must be consistent with the related Notes. If an EAL has been met or exceeded, then the IC is considered met and the associated ECL is declared in accordance with facility procedures.

When assessing an EAL that specifies a time duration for the off-normal condition, the EAL time duration runs concurrently with the emergency classification time duration.

4.3 Classification of Multiple Events and Conditions

When multiple emergency events or conditions are present, the user will identify all met or exceeded EALs. The highest applicable ECL identified during this review is declared. For example:

- If an UNUSUAL EVENT EAL and an ALERT EAL are met, an ALERT should be declared.

There is no "additive" effect from multiple EALs meeting the same ECL. For example:

- If two UNUSUAL EVENT EALs are met, an UNUSUAL EVENT should be declared.

Related guidance concerning classification of rapidly escalating events or conditions is provided in Regulatory Issue Summary (RIS) 2007-02, "Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events."

4.4 Classification of Imminent Conditions

Although EALs provide specific thresholds, the Emergency Director must remain alert to events or conditions that could lead to meeting or exceeding an EAL within a relatively short period of time (i.e., a change in the ECL is IMMINENT). If, in the judgment of the Emergency Director, meeting an EAL is IMMINENT, the emergency classification should be made as if the EAL has been met. While applicable to all ECLs, this approach is particularly important at the higher ECL since it provides additional time for implementation of protective measures.

4.5 Emergency Classification Level Upgrading and Termination

An ECL may be terminated when the event or condition that meets the IC and EAL no longer exists. Events will not be downgraded.

As noted above, guidance concerning classification of rapidly escalating events or conditions is provided in RIS 2007-02.

4.6 Classification of Short-Lived Events

Event-based ICs and EALs define a variety of specific occurrences that have potential or actual safety significance. By their nature, some of these events may be short-lived and, thus, over before the emergency classification assessment can be completed. If an event occurs that meets or exceeds an EAL, the associated ECL must be declared regardless of its continued presence at the time of declaration. Examples of such events would be an earthquake or explosion.

4.7 Classification of Transient Conditions

It is important to stress that the emergency classification assessment period is not a "grace period" during which a classification may be delayed to allow the performance of a corrective action that would obviate the need to classify the event; emergency classification assessments must be deliberate and timely, with no undue delays.

4.8 After-the-Fact Discovery of an Emergency Event or Condition

In some cases, an EAL may be met but the emergency classification was not made at the time of the event or condition. This situation can occur when personnel discover that an

event or condition existed which met an EAL, but no emergency was declared, and the event or condition no longer exists at the time of discovery. This may be due to the event or condition not being recognized at the time or an error that was made in the emergency classification process.

In these cases, no emergency declaration is warranted; however, the guidance contained in NUREG-1022, "Event Report Guidelines 10 CFR 50.72 and 50.73," is applicable. Specifically, the event should be reported to the NRC in accordance with 10 CFR 50.72 within one hour of the discovery of the undeclared event or condition. The licensee should also notify appropriate State and local agencies in accordance with the agreed upon arrangements.

4.9 Retraction of an Emergency Declaration

Guidance on the retraction of an emergency declaration reported to the NRC is discussed in NUREG-1022.

4.10 Response to a TMI-2 Emergency

TMI-2 alarms will be monitored on a 24-hour a day basis remotely from Unit 1 or by another appropriate location in the event of a failure of the remote monitoring system. For failures of specific local alarm capabilities, local conditions will be monitored in accordance with the applicable procedures.

A TMI-2 related emergency will be reported to the TMI-1 Control Room. TMI-1 Control Room personnel will assess and evaluate the situation; classify the event as required based on impact to TMI-1 and the site per the EALs; and provide the appropriate response. When direct monitoring is in effect the individual may leave the monitoring point in order to provide direct assistance to the TMI response team provided that he/she does not leave the monitoring point unattended in excess of one hour for any single event.

5.0 REFERENCES**5.1 Developmental**

- 5.1.1 NEI 99-01 Revision 6, Development of Emergency Action Levels for Non-Passive Reactors, November 2012
- 5.1.2 10 CFR Part 50, Domestic Licensing of Production and Utilization Facilities
- 5.1.3 RIS 2007-02, Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events, February 2007
- 5.1.4 NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73
- 5.1.5 10 CFR 50.72, Immediate Notification Requirements for Operating Nuclear Power Reactors
- 5.1.6 NUREG-0654/FEMA-REP-1, Rev. 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants
- 5.1.7 10 CFR 72.32, Emergency Plan
- 5.1.8 NUREG-1567, Spent Fuel Dry Storage Facilities
- 5.1.9 10 CFR 50.47, Emergency Plans
- 5.1.10 NUREG-1140, A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees
- 5.1.11 NSIR/ISG-02, Interim Staff Guidance, Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants

5.2 Implementing

- 5.2.1 EP-TM-1001, Permanently Defueled Emergency Plan
- 5.2.2 EP-TM-1001, Addendum 1, Emergency Action Levels and Technical Bases

5.3 Commitments

None

6.0 ACRONYMS & DEFINITIONS

6.1 Acronyms

AOP	Abnormal Operating Procedure
CDE	Committed Dose Equivalent
CFR	Code of Federal Regulations
cpm	Counts per Minute
EAL	Emergency Action Level
ECL	Emergency Classification Level
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
ISFSI	Independent Spent Fuel Storage Installation
IC.....	Initiating Condition
mRem	milli-Roentgen Equivalent Man
NEI	Nuclear Energy Institute
NORAD	North American Aerospace Defense Command
NPP	Nuclear Power Plant
NRC	Nuclear Regulatory Commission
ODCM	Off-site Dose Calculation Manual
PAG	Protective Action Guide
PD	Permanently Defueled
Rem	Roentgen Equivalent Man
TEDE	Total Effective Dose Equivalent
μCi/cc.....	micro Curies per Cubic Centimeter
UFSAR/DSAR	Updated Final/Defueled Safety Analysis Report

6.2 Definitions

NOTE: Selected terms used in IC and EAL statements are set in all capital letters (e.g., ALL CAPS).

ALERT: Refer to Section 3.1.2.

CONFINEMENT BOUNDARY: The irradiated fuel dry storage cask barrier(s) between areas containing radioactive substances and the environment.

Emergency Action Level (EAL): Refer to Section 3.3.

Emergency Classification Level (ECL): Refer to Section 3.1.

Initiating Condition (IC): Refer to Section 3.2.

EXPLOSION: A rapid, violent and catastrophic failure of a piece of equipment due to combustion, chemical reaction or overpressurization. A release of steam (from high

energy lines or components) or an electrical component failure (caused by short circuits, grounding, arcing, etc.) should not automatically be considered an explosion. Such events may require a post-event inspection to determine if the attributes of an explosion are present.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fire. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

HOSTILE ACTION: An act toward a Nuclear Power Plant (NPP) or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILES, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: Any individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: The trajectory of events or conditions is such that an EAL will be met within a relatively short period of time regardless of mitigation or corrective actions.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

NORMAL LEVELS: As applied to radiological IC/EALs, the highest reading in the past twenty-four hours excluding the current peak value.

OWNER CONTROLLED AREA (OCA): The property associated with the station and owned by the company. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a NPP that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: An area that normally encompasses all controlled areas within the security protected area fence.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A SECURITY CONDITION does not involve a HOSTILE ACTION.

UNPLANNED: A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

UNUSUAL EVENT (UE): Refer to Section 3.1.1

VISIBLE DAMAGE: Damage to a component or structure that is readily observable without measurements, testing, or analysis. The visual impact of the damage is sufficient to cause concern regarding the operability or reliability of the affected component or structure.

7.0 ATTACHMENTS

Attachment 1: EAL Matrices

Attachment 2: EAL Bases

Attachment 1 - EALs Matrices

Table PD-1: Recognition Category "PD" Initiating Condition Matrix

UNUSUAL EVENT	ALERT
PD-RU1 Release of gaseous or liquid radioactivity greater than 2 times the ODCM limits for 60 minutes or longer.	PD-RA1 Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem TEDE or 50 mRem thyroid CDE.
PD-RU2 UNPLANNED rise in facility radiation levels.	PD-RA2 UNPLANNED rise in facility radiation levels that impedes facility access required to maintain spent fuel integrity.
PD-MU1 UNPLANNED spent fuel pool temperature rise.	
PD-HU1 Confirmed SECURITY CONDITION or threat.	PD-HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.
PD-HU2 Hazardous Event affecting equipment necessary for spent fuel cooling.	
PD-HU3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT.	PD-HA3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT.

Table E-1: Recognition Category "E" Initiating Condition Matrix

UNUSUAL EVENT
E-HU1 Damage to a loaded cask CONFINEMENT BOUNDARY.

Attachment 1 - EALs Matrices

ALERT	UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluents	
<div style="display: flex;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; padding-right: 10px;">Radiological Effluents</div> <div> <p>PD-RA1 Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem TEDE or 50 mRem thyroid CDE.</p> <p>Emergency Action Level (EAL):</p> <p>Notes:</p> <ul style="list-style-type: none"> The Emergency Director should declare the ALERT promptly upon determining that the applicable time has been exceeded, or will likely be exceeded. If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes. Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes. The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available. <ol style="list-style-type: none"> Readings on RM-A-8GH (Station Vent) > 3.23 E+03 cpm for ≥ 15 minutes. OR Dose assessment using actual meteorology indicates doses at or beyond the site boundary of EITHER: <ol style="list-style-type: none"> > 10 mRem TEDE OR > 50 mRem CDE Thyroid OR Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses greater than EITHER of the following at or beyond the site boundary <ol style="list-style-type: none"> 10 mRem TEDE for 60 minutes of exposure OR 50 mRem CDE Thyroid for 60 minutes of exposure OR Field survey results at or beyond the site boundary indicate EITHER: <ol style="list-style-type: none"> Gamma (closed window) dose rates > 10 mR/hr are expected to continue for ≥ 60 minutes OR Analyses of field survey samples indicate > 50 mRem CDE Thyroid for 60 minutes of inhalation. </div> </div>	<p>PD-RU1 Release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM limit for 60 minutes or longer.</p> <p>Emergency Action Level (EAL):</p> <p>Notes:</p> <ul style="list-style-type: none"> The Emergency Director should declare the UNUSUAL EVENT promptly upon determining that 60 minutes has been exceeded, or will likely be exceeded. If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 60 minutes. Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes. <ol style="list-style-type: none"> Reading on discharge permit specified effluent monitors > 2 times alarm setpoint established by a current radioactive release discharge permit for ≥ 60 minutes. OR Readings on RM-A-8GH (Station Vent) > 7.15 E+01 cpm for ≥ 60 minutes. OR Confirmed sample analyses for gaseous or liquid releases indicates a concentration or release rates > 2 times ODCM Limit with a release duration of ≥ 60 minutes.

Attachment 1 - EALs Matrices

ALERT		UNUSUAL EVENT
Abnormal Rad Levels / Radiological Effluents		
Area Rad Levels	<p>PD-RA2 UNPLANNED rise in facility radiation levels that impedes facility access required to maintain spent fuel integrity.</p> <p>Emergency Action Level (EAL):</p> <ol style="list-style-type: none"> UNPLANNED dose rate > 15 mR/hr in ANY of the following areas required for continuous occupancy to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity: <ul style="list-style-type: none"> Control Room Central Alarm Station (by survey) UNPLANNED Area Radiation Monitor readings or survey results indicate a rise of > 100 mR/hr over NORMAL LEVELS that impedes access to ANY of the following areas needed to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity: <ul style="list-style-type: none"> Fuel Handling Building Operating Floor SFP Cooling Pump /Heat Exchanger Area NSSCW Pump / Heat Exchanger Areas 	<p>PD-RU2 UNPLANNED rise in facility radiation levels.</p> <p>Emergency Action Level (EAL):</p> <ol style="list-style-type: none"> a. UNPLANNED water level drop in the Spent Fuel Pool as indicated by ANY of the following: <ul style="list-style-type: none"> Spent Fuel Pool water level < 342' 6" (23.167' on SF-LI-1219A/B) Indication or report of an UNPLANNED drop in water level. <p>AND</p> <ol style="list-style-type: none"> b. UNPLANNED Area Radiation Monitor reading rise on RM-G-9 FHB Bridge radiation monitor. <p>OR</p> <ol style="list-style-type: none"> Area radiation monitor reading or survey result indicates an UNPLANNED rise of 25 mR/hr over NORMAL LEVELS.

ALERT		UNUSUAL EVENT
System Malfunctions		
Spent Fuel Pool		<p>PD-MU1 UNPLANNED Spent Fuel Pool temperature rise.</p> <p>Emergency Action Level (EAL):</p> <ol style="list-style-type: none"> UNPLANNED Spent Fuel Pool temperature rise to > 160°F.

Attachment 1 - EALs Matrices

ALERT		UNUSUAL EVENT	
Hazards and Other Conditions Affecting Facility Safety			
Security	<p>PD-HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.</p> <p><u>Emergency Action Level (EAL):</u></p> <p>1. A validated notification from NRC of an aircraft attack threat < 30 minutes from the site.</p> <p>OR</p> <p>2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.</p>	<p>PD-HU1 Confirmed SECURITY CONDITION or threat.</p> <p><u>Emergency Action Level (EAL):</u></p> <p>1. Notification of a credible security threat directed at the site as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.</p> <p>OR</p> <p>2. A validated notification from the NRC providing information of an aircraft threat.</p> <p>OR</p> <p>3. Notification by the Security Force of a SECURITY CONDITION that does <u>not</u> involve a HOSTILE ACTION.</p>	
			<p>PD-HU2 Hazardous Event affecting equipment necessary for spent fuel cooling.</p> <p><u>Emergency Action Level (EAL):</u></p> <p>1. a) The occurrence of ANY of the following hazardous events:</p> <ul style="list-style-type: none">• Seismic event (earthquake)• Internal or external flooding event• High winds or tornado strike• FIRE• EXPLOSION• Other events with similar hazard characteristics as determined by the Shift Manager <p>AND</p> <p>b) The event has damaged at least one train of a system needed for Spent Fuel Cooling</p> <p>AND</p> <p>c) The damaged train(s) <u>cannot</u>, or potentially <u>cannot</u>, perform its design function based on EITHER:</p> <ul style="list-style-type: none">• Indications of degraded performance• VISIBLE DAMAGE
Hazardous Event			

Attachment 1 - EALs Matrices

ALERT		UNUSUAL EVENT	
Hazards and Other Conditions Affecting Facility Safety			
Emergency Director Judgment	PD-HA3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT.	PD-HU3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT.	
	<u>Emergency Action Level (EAL):</u> Other conditions exist which, in the judgment of the Emergency Director, indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the facility or a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	<u>Emergency Action Level (EAL):</u> Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the facility or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of equipment required for spent fuel cooling occurs.	

ALERT		UNUSUAL EVENT	
ISFSI Malfunction			
ISFSI		E-HU1 Damage to a loaded cask CONFINEMENT BOUNDARY.	
		<u>Emergency Action Level (EAL):</u> Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by a radiation reading > 2 times the ISFSI Technical Specification allowable levels.	

Attachment 2 - EAL Bases**Recognition Category PD EAL Basis**

Recognition Category PD provides a stand-alone set of ICs/EALs for a Permanently Defueled nuclear facility to consider for use in developing a site-specific emergency classification scheme. For development, it was assumed that the plant had operated under a 10 CFR Part 50 license and that the operating company has permanently ceased plant operations. Further, the company intends to store the spent fuel within the plant for some period of time.

When in a permanently defueled condition, the plant licensee typically receives approval from the NRC for exemption from specific emergency planning requirements. These exemptions reflect the lowered radiological source term and risks associated with spent fuel pool storage relative to reactor at-power operation. Source terms and accident analyses associated with plausible accidents are documented in the station's Final Safety Analysis Report (FSAR), as updated. As a result, each licensee will need to develop a site-specific emergency classification scheme using the NRC-approved exemptions, revised source terms, and revised accident analyses as documented in the station's FSAR.

Recognition Category PD uses the same ECLs as operating reactors; however, the source term and accident analyses limit the ECLs to an UNUSUAL EVENT and ALERT. The UNUSUAL EVENT ICs provide for an increased awareness of abnormal conditions while the ALERT ICs are specific to actual or potential impacts to spent fuel. The source terms and release motive forces associated with a permanently defueled facility would not be sufficient to require declaration of a Site Area Emergency or General Emergency.

A permanently defueled facility is essentially a spent fuel storage facility with the spent fuel stored in a pool of water that serves as both a cooling medium (i.e., removal of decay heat) and shield from direct radiation. These primary functions of the spent fuel storage pool are the focus of the Recognition Category PD ICs and EALs. Radiological effluent IC and EALs were included to provide a basis for classifying events that cannot be readily classified based on an observable events or facility conditions alone.

In NEI 99-01, Rev. 6, appropriate ICs and EALs from Recognition Categories A [R], C, F, H, and S [M] were modified and included in Recognition Category PD to address a spectrum of the events that may affect a spent fuel pool. The Recognition Category PD ICs and EALs reflect the relevant guidance in this document (e.g., the importance of avoiding both over-classification and under-classification). TMI has developed this emergency classification scheme using the NRC-approved exemptions, and site-specific source terms, and accident analyses. Security-related events are also included.

The following table, Table PD-1: Recognition Category "PD" Initiating Condition Matrix, provides a summary of initiating conditions associated with Recognition Category PD.

Recognition Category E EAL Basis

Recognition Category E provides an IC/EAL for an ISFSI. An ISFSI is a complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage. A significant amount of the radioactive material contained within a cask must escape its packaging and enter the

Attachment 2 - EAL Bases

atmosphere for there to be a significant environmental effect resulting from an accident involving the dry storage of spent nuclear fuel. Formal offsite planning is not required because the postulated worst-case accident involving an ISFSI has insignificant consequences to the public health and safety.

Attachment 2 - EAL Bases

PD-RA1

Initiating Condition:

Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem TEDE or 50 mRem thyroid CDE.

Emergency Action Level (EAL):**Notes:**

- The Emergency Director should declare the ALERT promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

1. Readings on **RM-A-8GH (Station Vent)** > 3.23 E+03 cpm for **≥ 15 minutes**.

OR

2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of **EITHER**:

- a. **> 10 mRem TEDE**

OR

- b. **> 50 mRem CDE Thyroid**

OR

3. Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses greater than **EITHER** of the following at or beyond the site boundary

- a. **10 mRem TEDE for 60 minutes** of exposure

OR

- b. **50 mRem CDE Thyroid for 60 minutes** of exposure

OR

Attachment 2 - EAL Bases

PD-RA1 (cont)**Emergency Action Level (EAL) (cont):**

4. Field survey results at or beyond the site boundary indicate **EITHER:**

- a. Gamma (closed window) dose rates **> 10 mR/hr** are expected to continue for **≥ 60 minutes**

OR

- b. Analyses of field survey samples indicate **> 50 mRem CDE Thyroid** for **60 minutes** of inhalation.

Basis:

This IC addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude represent an actual or potential substantial degradation of the level of safety of the facility as indicated by a radiological release that significantly exceeds regulatory limits (e.g., a significant uncontrolled release).

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of facility conditions alone. The inclusion of both facility condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at 1% of the EPA PAG of 1000 mRem while the 50 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Basis Reference(s):

1. NEI 99-01 Rev 6, PD-AA1
2. OP 1101-2.1 Radiation Monitoring System Setpoints
3. DSAR Section 4.4 Radiation Monitoring System
4. OP-TM-MAP-C0101, Radiation Level HI
5. EP-EAL-0609, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Three Mile Island Unit-1 (TMI-1)
6. EP-EAL-0616, Three Mile Island Criteria for Choosing Radiological Liquid Effluent EAL Threshold Values

Attachment 2 - EAL Bases

PD-RU1

Initiating Condition:

Release of gaseous or liquid radioactivity greater than 2 times the ODCM limits for 60 minutes or longer.

Emergency Action Level (EAL):**Notes:**

- The Emergency Director should declare the UNUSUAL EVENT promptly upon determining that 60 minutes has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 60 minutes.
- Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
 1. Reading on discharge permit specified monitor > **2 times alarm setpoint** established by a current radioactive release discharge permit for **≥ 60 minutes:**
OR
 2. Readings on **RM-A-8GH** > 7.15 E+01 cpm for **≥ 60 minutes:**
OR
 3. Confirmed sample analyses for gaseous or liquid releases indicate a concentration or release rates > **2 times ODCM Limit** with a release duration of **≥ 60 minutes.**

Basis:

This IC addresses a potential decrease in the level of safety of the facility as indicated by a low-level radiological release that exceeds regulatory commitments for an extended period of time (e.g., an uncontrolled release). It includes any gaseous or liquid radiological release, monitored or un-monitored, including those for which a radioactivity discharge permit is normally prepared.

Attachment 2 - EAL Bases

PD-RU1 (cont)

TMI-1 incorporated design features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, and to control and monitor intentional releases. The occurrence of an extended, uncontrolled radioactive release to the environment is indicative of degradation in these features and/or controls.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of facility conditions alone. The inclusion of both facility condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

Releases should not be prorated or averaged. For example, a release exceeding 4 times release limits for 30 minutes does not meet the EAL.

EAL #1 addresses radioactivity releases that cause effluent radiation monitor readings to exceed 2 times the limit established by a radioactivity discharge permit. This EAL will typically be associated with planned batch releases from non-continuous release pathways (e.g., radwaste, waste gas).

The declaration criteria will be based on the monitor and monitor setpoints specified in the Discharge Permit.

EAL #2 addresses normally occurring continuous radioactivity releases from monitored gaseous effluent pathways. For the defueled condition the only remaining release path is through the Station Vent and is monitored by RM-A-8GH.

EAL #3 addresses uncontrolled gaseous or liquid releases that are detected by sample analyses or environmental surveys, particularly on unmonitored pathways (e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.).

Escalation of the emergency classification level would be via IC PD-RA1.

Basis Reference(s):

1. NEI 99-01 Rev 6, PD-AU1
2. OP 1101-2.1 Radiation Monitoring System Setpoints
3. DSAR Section 4.4 Radiation Monitoring System
4. Offsite Dose Calculation (ODCM)
5. OP-TM-MAP-C0101, Radiation Level HI
6. EP-EAL-0609, Criteria for Choosing Radiological Gaseous Effluent EAL Threshold Values, Three Mile Island Unit-1 (TMI-1)

Attachment 2 - EAL Bases

PD-RA2

Initiating Condition:

UNPLANNED rise in facility radiation levels that impedes facility access required to maintain spent fuel integrity.

Emergency Action Level (EAL):

1. UNPLANNED dose rate > 15 mR/hr in **ANY** of the following areas required for continuous occupancy to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity:
 - Control Room
 - Central Alarm Station (by survey)

OR

2. UNPLANNED Area Radiation Monitor readings or survey results indicate a rise of > 100 mR/hr over NORMAL LEVELS that impedes access to **ANY** of the following areas needed to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity:
 - Fuel Handling Building Operating Floor
 - SFP Cooling Pump /Heat Exchanger Area
 - NSCCW Pump / Heat Exchanger Areas

Basis:

This IC addresses increased radiation levels that impede necessary access to areas containing equipment that must be operated manually or that requires local monitoring, in order to maintain systems needed to maintain spent fuel integrity. As used here, 'impede' includes hindering or interfering, provided that the interference or delay is sufficient to significantly threaten necessary facility access. It is this impaired access that results in the actual or potential substantial degradation of the level of safety of the facility.

This IC does not apply to anticipated temporary increases due to planned events.

This IC addresses elevated radiation levels in certain facility rooms/areas sufficient to preclude or impede personnel from performing actions necessary to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity. As such, it represents an actual or potential substantial degradation of the level of safety of the facility.

Assuming all facility equipment is operating as designed, normal operation is capable from the Control Room (CR). The areas listed in EAL #2 are facility areas that contain equipment which require a manual/local action necessary when moving fuel or manipulating SFP cooling equipment.

Attachment 2 - EAL Bases

PD-RA2 (cont)

Basis Reference(s):

1. NEI 99-01 Rev 6, PD-AA2

Attachment 2 - EAL Bases

PD-RU2

Initiating Condition:

UNPLANNED rise in facility radiation levels.

Emergency Action Level (EAL):

1. a. UNPLANNED water level drop in the Spent Fuel Pool as indicated by **ANY** of the following:

- Spent Fuel Pool water level < **342' 6"** (**23.167'** on SF-LI-1219A/B)
- Indication or report of an UNPLANNED drop in water level.

AND

- b. UNPLANNED Area Radiation Monitor reading rise on **RM-G-9** FHB Bridge radiation monitor.

OR

2. Area radiation monitor reading or survey result indicates an UNPLANNED rise of **25 mR/hr** over NORMAL LEVELS.

Basis:

This IC addresses a loss in water level above irradiated fuel sufficient to cause elevated radiation levels. This condition could be a precursor to a more serious event and is also indicative of a minor loss in the ability to control radiation levels within the facility. It is therefore a potential degradation in the level of safety of the facility

EAL #1 Basis:

A water level loss will be primarily determined by indications from available level instrumentation. Other sources of level indications may include reports from facility personnel (e.g., from a refueling crew) or video camera observations (if available) or from any other temporarily installed monitoring instrumentation. A significant drop in the water level may also cause a rise in the radiation levels of adjacent areas that can be detected by Spent Fuel Bridge Radiation monitor (RM-G-9).

Spent Fuel Pool (SFP) water level of 342'6" (mean sea level), is the entry condition for OP-TM-AOP-035, Loss of Spent Fuel Pool Cooling, and is lower than the SFP low level alarm at 343'6". The IC level corresponds to 23.167' above the top of fuel assemblies and is read on SF-LI-1219A/B.

The effects of planned evolutions should be considered. Note that EAL #1 is applicable only in cases where the elevated reading is due to an UNPLANNED water level drop.

Attachment 2 - EAL Bases**EAL #2 Basis:**

This excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials.

Escalation of the emergency classification level would be via IC PD-RA1 OR PD-RA2.

Basis Reference(s):

1. NEI 99-01 Rev 6, PD-AU2
2. OP-TM-AOP-035, "Loss of Spent Fuel Pool Cooling"
3. PLB, "Panel Left Annunciator B", Alarms PLB-2-9 "Spent Fuel Pool A Level Low" and PLB-2-10 "Spent Fuel Pool B Level Low"
4. RP-AA-203 Exposure Control and Authorization
5. NRC Order EA-12-051
6. NEI 12-02

Attachment 2 - EAL Bases

PD-MU1

Initiating Condition:

UNPLANNED spent fuel pool temperature rise.

Emergency Action Level (EAL):

1. UNPLANNED Spent Fuel Pool temperature rise to > 160°F.

Basis:

This IC addresses a condition that is a precursor to a more serious event and represents a potential degradation in the level of safety of the facility. If uncorrected, boiling in the pool will occur, and result in a loss of pool level and increased radiation levels.

Whenever irradiate fuel is stored in the spent fuel pool, the pool water temperature shall be maintained below 160°F (Reference 2). This is the entry point into OP-TM-AOP-035, Loss of Spent Fuel Pool Cooling. Operators will provide initial mitigation for a loss of SFP Cooling based on SFP high temperature alarm set at 130 °F. Based on Calculations in the Decom SFP Thermal Hydraulic Analysis (Reference 4) for a loss of SFP Cooling at 488 days after shutdown the heat up rate in the SFP would be approximately 1.35 °F/Hr. Using the Entry Condition for the Loss of Spent Fuel Pool Cooling Procedure as the EAL provides the precursor for additional action and still provides approximately 70 hours to mitigate before SFP boiling were to occur.

Escalation of the emergency classification level would be via PD-RA1 or PD-RA2.

Basis Reference(s):

1. NEI 99-01 Rev 6, PD-SU1
2. OP-TM-AOP-035, Loss of Spent Fuel Pool Cooling
3. PLB, "Panel Left Annunciator B", Alarms PLB-3-9 "Spent Fuel Pool A Hi Temp" and PLB-3-10 "Spent Fuel Pool B Hi Temp"
4. C-1101-202-E410-476, "DECOM Spent Fuel Pool TH Analysis - CMT 614944"

Attachment 2 - EAL Bases

PD-HA1

Initiating Condition:

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.

Emergency Action Level (EAL):

1. A validated notification from NRC of an aircraft attack threat < **30 minutes** from the site.

OR

2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.

Basis:

This IC addresses the notification of an aircraft attack threat or an occurrence of a HOSTILE ACTION within the OWNER CONTROLLED AREA. This event will require rapid response and assistance due to the possibility of the attack progressing to the PROTECTED AREA, or the need to prepare the facility and staff for a potential aircraft impact.

Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event.

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]*.

As time and conditions allow, these events require a heightened state of readiness by the facility staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The ALERT declaration will also heighten the awareness of Offsite Response Organizations (ORO), allowing them to be better prepared should it be necessary to consider further actions.

This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.

Attachment 2 - EAL Bases

PD-HA1 (cont)

Basis (cont):**EAL #1 Basis:**

The EAL addresses the threat from the impact of an aircraft on the facility, and the anticipated arrival time is within 30 minutes. The intent of this EAL is to ensure that threat-related notifications are made in a timely manner so that facility personnel and OROs are in a heightened state of readiness. This EAL is met when the threat-related information has been validated in accordance with OP-TM-AOP-008, Security Threat/Intrusion.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may be provided by NORAD through the NRC.

In some cases, it may not be readily apparent if an aircraft impact within the OWNER CONTROLLED AREA was intentional (i.e., a HOSTILE ACTION). It is expected, although not certain, that notification by an appropriate Federal agency to the site would clarify this point. In this case, the appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. The emergency declaration, including one based on other ICs/EALs, should not be unduly delayed while awaiting notification by a Federal agency.

EAL #2 Basis:

This EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes any action directed against an ISFSI that is located outside the facility PROTECTED AREA.

Basis Reference(s):

1. NEI 99-01 Rev 6, PD-HA1
2. Station Security Plan – Appendix C
3. OP-TM-AOP-008, Security Threat / Intrusion

Attachment 2 - EAL Bases

PD-HU1

Initiating Condition:

Confirmed SECURITY CONDITION or threat.

Emergency Action Level (EAL):

1. Notification of a credible security threat directed at the site as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities.
OR
2. A validated notification from the NRC providing information of an aircraft threat.
OR
3. Notification by the Security Force of a SECURITY CONDITION that does not involve a HOSTILE ACTION.

Basis:

This IC addresses events that pose a threat to facility personnel or spent fuel cooling system equipment, and thus represent a potential degradation in the level of facility safety. Security events which do not meet one of these EALs are adequately addressed by the requirements of 10 CFR § 73.71 or 10 CFR § 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under ICs PD-HA1.

Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event. Classification of these events will initiate appropriate threat-related notifications to facility personnel and OROs.

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]*.

EAL #1 Basis:

Addresses the receipt of a credible security threat. The credibility of the threat is assessed in accordance with SY-AA-101-132.

EAL #2 Basis:

Addresses the threat from the impact of an aircraft on the facility. The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may also be provided by NORAD through the NRC. Validation of the threat is performed in accordance with OP-TM-AOP-008, Security Threat/Intrusion.

Attachment 2 - EAL Bases

PD-HU1 (cont)

Basis (cont):

EAL #3 Basis:

References Security Force because these are the individuals trained to confirm that a security event is occurring or has occurred. Training on security event confirmation and classification is controlled due to the nature of Safeguards and 10 CFR § 2.39 information.

Escalation of the emergency classification level would be via IC PD-HA1.

Basis Reference(s):

1. NEI 99-01 Rev 6, PD-HU1
2. Station Security Plan – Appendix C
3. OP-TM-AOP-008, Security Threat / Intrusion
4. SY-AA-101-132, Security Assessment and Response to Unusual Activities

Attachment 2 - EAL Bases

PD-HU2

Initiating Condition:

Hazardous Event affecting equipment necessary for spent fuel cooling.

Emergency Action Level (EAL):

1. a) The occurrence of ANY of the following hazardous events:

- Seismic event (earthquake)
- Internal or external flooding event
- High winds or tornado strike
- FIRE
- EXPLOSION
- Other events with similar hazard characteristics as determined by the Shift Manager

AND

b) The event has damaged at least one train of a system needed for Spent Fuel Cooling

AND

c) The damaged train(s) cannot, or potentially cannot, perform its design function based on **EITHER**:

- Indications of degraded performance
- VISIBLE DAMAGE

Basis:

This IC addresses a hazardous event that causes damage to at least one train of a system needed for spent fuel cooling. The damage must be of sufficient magnitude that the system(s) train cannot, or potentially cannot, perform its design function. This condition reduces the margin to a loss or potential loss of the fuel clad barrier, and therefore represents a potential degradation of the level of safety of the facility.

For the first bullet in EAL 1.c, indications of degraded performance apply to in service/operating systems or components that are needed for spent fuel cooling.

Attachment 2 - EAL Bases

PD-HU2 (cont)

For the second bullet in EAL 1.c, VISIBLE DAMAGE applies to equipment needed for spent fuel cooling that is not in service/operating or readily apparent through indications alone. Operators will make this determination based on the totality of available event and damage report information. This is intended to be a brief assessment not requiring lengthy analysis or quantification of the damage.

Escalation of the emergency classification level could, depending upon the event, be based on any of the ALERT ICs: PD-RA1, PD-RA2, PD-HA1 or PD-HA3.

Basis Reference(s):

1. NEI 99-01, Rev 6, PD-HU2
2. OP-TM-AOP-001, Fire
3. OP-TM-AOP-002, Flood
4. OP-TM-AOP-003, Earthquake
5. OP-TM-AOP-004, Tornado/High Winds

Attachment 2 - EAL Bases

PD-HA3

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT.

Emergency Action Level (EAL):

Other conditions exist which, in the judgment of the Emergency Director, indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the facility or a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for an ALERT.

Basis Reference(s):

1. NEI 99-01, Rev 6, PD-HA3

Attachment 2 - EAL Bases

PD-HU3

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT.

Emergency Action Level (EAL):

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the facility or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of equipment required for spent fuel cooling occurs.

Basis:

This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for an UNUSUAL EVENT.

Basis Reference(s):

1. NEI 99-01, Rev 6, PD-HU3

Attachment 2 - EAL Bases

E-HU1

Initiating Condition

Damage to a loaded cask CONFINEMENT BOUNDARY.

Emergency Action Level (EAL):

Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by a radiation reading > 2 times the ISFSI Technical Specification allowable levels.

Basis:

This IC addresses an event that results in damage to the CONFINEMENT BOUNDARY of a storage cask containing spent fuel. It applies to irradiated fuel that is licensed for dry storage beginning at the point that the loaded storage cask is sealed. The word cask, as used in this EAL, refers to the storage container in use at the site for dry storage of irradiated fuel. The issues of concern are the creation of a potential or actual release path to the environment, degradation of any fuel assemblies' due to environmental factors, and configuration changes which could cause challenges in removing the cask or fuel from storage.

The existence of "damage" is determined by radiological survey. The cask technical specification multiple of "2 times" which is also used in Recognition Category R IC PD-RU1, is used here to distinguish between non-emergency and emergency conditions. The emphasis for this classification is the degradation in the level of safety of the spent fuel cask and not the magnitude of the associated dose or dose rate. It is recognized that in the case of extreme damage to a loaded cask, the fact that the "on-contact" dose rate limit is exceeded may be determined based on measurement of a dose rate at some distance from the cask.

Security-related events for ISFSIs are covered under ICs PD-HU1 and PD-HA1.

Basis Reference(s):

1. NEI 99-01, Rev 6, E-HU1
2. Certificate of Compliance 72.1031 NAC MAGNASTOR® Canister

ATTACHMENT 4

THREE MILE ISLAND NUCLEAR STATION

**COMPARISON MATRIX FOR PERMANENTLY DEFUELED EALS BASED ON NEI 99-01,
"DEVELOPMENT OF EMERGENCY ACTION LEVELS FOR NON-PASSIVE REACTORS,"
REVISION 6**

**COMPARISON DOCUMENT FOR PERMANENTLY DEFUELED EALS BASED
UPON NUCLEAR ENERGY INSTITUTE (NEI) 99-01,
"METHODOLOGY FOR DEVELOPMENT OF EMERGENCY
ACTION LEVELS," REVISION 6**

Description of the Permanently Defueled EAL Technical Basis Document

The following provides a description of the Three Mile Island Nuclear Station (TMI) Emergency Action Level (EAL) Technical Bases Document (provided as Attachment 3 to this submittal). Differences between the TMI Permanently Defueled (PD) EALs Technical Bases Document and NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6 (herein referred to as "NEI 99-01") are discussed herein. Also included are the results of a comparison of the TMI EAL matrix against the corresponding information contained in NEI 99-01.

1.0 Purpose

The TMI EAL Technical Bases Document includes reference to the Recognition Category "PD" based on the facility's permanently shut down and defueled condition, providing a stand-alone set of Initiating Conditions (ICs)/EALs for a permanently defueled (PD) nuclear power facility and a Recognition Category "E" IC/EAL for the Independent Spent Fuel Storage Installation (ISFSI). A comparison between the "Purpose" section in Attachment 3 and NEI 99-01 was not made.

2.0 Discussion

The "Discussion" section in Attachment 3 was developed based on information contained in NEI 99-01, Section 1, "Regulatory Background." This section provides specific criteria for an ISFSI as it pertains to other regulations as well as guidance in NEI 99-01.

NEI 99-01, Section 1.1, "Operating Reactors," was excluded as it pertains to operating reactors. By September 30, 2019, TMI-1 will cease operations and fuel will be permanently removed from the reactor vessel and placed in the spent fuel pool. Pursuant to 10 CFR 50.82(a)(2), the 10 CFR Part 50 license for TMI-1 will no longer authorize operation of the reactor or emplacement or retention of fuel in the reactor vessel. The TMI PD EALs will be implemented after Exelon has certified to the U.S. Nuclear Regulatory Commission (NRC) that TMI-1 has permanently ceased power operations and all fuel has been permanently moved to the spent fuel pool. Three Mile Island, Unit 2 (TMI-2), has a possession only license and is currently maintained in accordance with the NRC approved SAFSTOR condition (method in which a nuclear facility is placed and maintained in a condition that allows it to be safely stored and subsequently decontaminated) known as Post-Defueling Monitored Storage (PDMS). All fuel assemblies have been removed from the TMI-2 reactor and spent fuel pool. Therefore, NEI 99-01 Section 1.1 is not applicable to TMI.

NEI 99-01, Section 1.2, "Permanently Defueled Station," is addressed in Section 2.1 of Attachment 3. Inclusion of this discussion is appropriate because as discussed in detail in Attachment 1 of this submittal, analyses have been completed that demonstrate that no credible event can result in a significant radiological release beyond the site boundary.

NEI 99-01, Section 1.3, "Independent Spent Fuel Storage Installation (ISFSI)," is addressed in Section 2.2 of Attachment 3. Inclusion of this discussion is appropriate because an ISFSI is under construction at TMI-1 and scheduled for completion by early 2021.

NEI 99-01, Section 1.4, "NRC Order EA-12-051," was excluded because the recommendation applies to EALs IC AA2, and new ICs AS2 and AG2, which are only applicable to operating plants and have not been recommended to be included in the permanently defueled EALs. The guidance for the spent fuel pool EALs is applied from Appendix C, which address a permanently defueled condition. Therefore, the discussion of Section 1.4 has not been included.

NEI 99-01, Section 1.5, "Applicability to Advanced and Small Modular Reactor Designs," was excluded because TMI is not an Advanced or Small Modular Reactor Design.

3.0 Key Terminology Used

This section in Attachment 3 was developed based on information contained in NEI 99-01, Section 2, "Key Terminology Used in NEI 99-01." Differences between the TMI PD EALs Technical Bases Document and NEI 99-01 are discussed below.

- References to Site Area Emergency and General Emergency were removed throughout. Emergency Classification Levels (ECLs) only include Unusual Event (Notification of Unusual Event) and Alert. EALs were developed using NEI 99-01, Appendix C, for the Permanently Defueled Station ICs/EALs and Section 8 for Independent Spent Fuel Storage Installation (ISFSI).
- References to "plant" have been revised to "facility" to indicate that TMI is no longer an operating nuclear power plant.
- In Attachment 3, Section 3.2, "Initiating Condition (IC)" (Section 2.2 of NEI 99-01), references to Reactor Coolant System (RCS) Leakage and fission product barriers were removed. Upon permanent removal of fuel from the TMI-1 reactor, the RCS and Containment will no longer be considered fission product barriers because the reactor will be permanently defueled and Containment integrity is not needed for the spent fuel pool.
- NEI 99-01, Section 2.4, "Fission Product Barrier Threshold," was excluded for reasons previously identified related to fission product barriers.

4.0 Guidance on Making Emergency Classifications

This section in Attachment 3 was developed based on information contained in NEI 99-01, Section 5, "Guidance on Making Emergency Classifications." Differences between the TMI PD EAL Technical Bases Document and NEI 99-01 are discussed below.

- In Section 4.1 (Section 5.1 of NEI 99-01), references to fission product barrier thresholds were removed as the RCS and Containment no longer serve as fission product barriers. Reference to Operating Mode Applicability was removed because Operating Modes are not applicable in a permanently defueled facility.
- In Section 4.1 (Section 5.1 of NEI 99-01), the second paragraph of NEI 99-01 stating "regulations require the licensee to establish and maintain the capability to assess,

classify and declare an emergency condition within 15 minutes," was excluded. As detailed in Interim Staff Guidance NSIR/DPR-ISG-02, "Emergency Planning Exemption Requests for Decommissioning Plants," "...the staff concludes that a decommissioning power reactor is not required to assess, classify, and declare an emergency condition within 15 minutes." TMI will maintain the ability to assess, classify, and declare an emergency within 30 minutes. An emergency declaration is required to be made as soon as conditions warranting classification are present and recognizable in accordance with the EALs, but within 30 minutes in all cases after the availability of indications to operators that an EAL threshold has been reached.

- With respect to the notification of an emergency declaration to state authorities, as discussed in Attachment 1 of this submittal, no design basis accident or reasonably conceivable beyond design basis accident will be expected to result in radioactive releases that will exceed Environmental Protection Agency (EPA) Protective Action Guides (PAGs) beyond the site boundary. Exelon will maintain EPA PAGs as specified in the current and proposed TMI Emergency Plan. In the permanently defueled condition, the rapidly developing scenarios associated with events initiated during reactor power operation are no longer credible. The radiological consequences resulting from the only remaining events (e.g., loss of SFP cooling) develop over a significantly longer period. As such, a 15-minute notification requirement is unnecessarily restrictive. A notification time of thirty (30) minutes after declaring an emergency has been negotiated with the Commonwealth of Pennsylvania and provides a reasonable amount of time to notify the state governmental authorities.
- In Section 4.2 (Section 5.2 in NEI 99-01), reference to Operating Mode Applicability was removed because Operating Modes are not applicable in a permanently defueled facility.
- In Section 4.3 (Section 5.3 of NEI 99-01), references to two units were removed because TMI is treated as a single unit site.
- NEI 99-01, Section 5.4 was excluded because mode changes during classification are not applicable to a permanently defueled facility.
- In Section 4.4 (Section 5.5 of NEI 99-01), the word "levels" was changed to "level" because there is only one higher emergency classification level (ECL) above an Unusual Event for a permanently defueled facility.
- In Section 4.5 (Section 5.6 of NEI 99-01), references to Site Area Emergency and General Emergency were removed. Site Area Emergency and General Emergency are no longer credible emergency classifications because analyses have been developed indicating that, 488 days after shutdown, no credible accident at TMI-1 will result in radiological releases requiring offsite protective actions. TMI-1 will not downgrade events.
- In Section 4.6 (Section 5.7 of NEI 99-01) references to an operating plant short-lived event (e.g., reactor trip) were removed and replaced with verbiage applicable to a permanently defueled facility. Example was changed to an "explosion" since the example given in NEI 99-01, "failure of the reactor protection system to automatically

scram/trip the reactor followed by a successful manual scram/trip" is not possible in a permanently defueled facility.

- In Section 4.7 (Section 5.8 of NEI 99-01) the discussion for classifying an event occurring during transient conditions was removed because such a case occurring is unlikely and Exelon would prefer the Emergency Director classify the event than rely on engineering judgement. The example was removed because an emergency declaration associated with an ATWS or the potential loss of both the fuel clad and RCS is no longer credible at TMI. The reference to the 15-minute emergency classification was excluded for reasons presented above.
- Section 4.10 is site-specific information pertaining to TMI-2. No corresponding section is included in NEI 99-01. The wording has been carried over from Section 1.8 of the current TMI Emergency Action Levels and Technical Bases document.

5.0 References

This section in Attachment 3 was added to provide Developmental and Implementing References applicable to the TMI EAL Technical Bases Document. No corresponding section is included in NEI 99-01.

6.0 Acronyms & Definitions

This section in Attachment 3 was developed based on the information presented in Appendices A and B of NEI 99-01. The section incorporates only those acronyms and definitions used in the TMI EAL Technical Bases Document.

- The following definitions, included in NEI 99-01, were excluded because they are not used in the TMI PD EAL Technical Bases Document:
 - General Emergency
 - Site Area Emergency
- The following key term necessary for overall understanding of the NEI 99-01 emergency classification scheme was excluded because it is not used in the TMI PD EAL Technical Bases Document:
 - Fission Product Barrier Threshold
- The key term, Initiating Condition (IC), was revised to change "four emergency classification levels" to "two emergency classification levels because Site Area Emergency and General Emergency are not used in the TMI PD EAL Technical Bases Document.
- The key term, Emergency Classification Level, was revised to exclude reference to Site Area Emergency and General Emergency because they are not used in the TMI PD EAL Technical Bases Document.

Selected terms used in Initiating Condition and Emergency Action Level statements are set in all capital letters (e.g., ALL CAPS). These words are defined terms that have specific meanings as used in NEI 99-01. Definitions not used in the TMI PD EAL Technical Bases Document were excluded.

7.0 TMI to NEI 99-01 EAL Cross-Reference

The table below facilitates association and location of the TMI EAL with the corresponding NEI 99-01 IC/EAL. Further information regarding the development of the TMI EALs based on the NEI guidance can be found in the EAL Comparison Matrix.

TMI Permanently Defueled IC/EALs	NEI 99-01, Rev. 6, Appendix C – Permanently Defueled Station ICs/EALs
PD-RU1	PD-AU1
PD-RA1	PD-AA1
PD-RU2	PD-AU2
PD-RA2	PD-AA2
PD-HU1	PD-HU1
PD-HA1	PD-HA1
PD-HU2	PD-HU2
PD-HU3	PD-HU3
PD-HA3	PD-HA3
PD-MU1	PD-SU1
TMI ISFSI ICs/EAL	NEI 99-01, Rev. 6, Section 8 – ISFSI ICs/ EALs
E-HU1	E-HU1

8.0 Attachments

8.1 Attachment 1, EAL Matrices

- References to Operating Modes were removed from Table PD-1.
- The EALs were developed using Appendix C and Section 8 of NEI 99-01.

8.2 Attachment 2, EAL Bases

- Attachment 2 of the TMI EAL Technical Bases provides the Permanently Defueled and ISFSI IC/EALs and incorporates Appendix C and Section 8 of NEI 99-01.
- Reference to Section 3 of NEI 99-01 was excluded since the section was not included and references made to this section was removed.
- The table below provides a comparison of the TMI PD EALs against the corresponding information contained in NEI 99-01.
- Reference to Operating Mode was removed from Table E-1 because Operating Modes are not applicable in a permanently defueled facility.

- The table below provides a comparison of the TMI ISFSI EALs against the corresponding information contained in NEI 99-01.

NEI 99-01 Sections Not Included

The following sections of NEI 99-01 were not included and references made to these sections were also removed:

- Section 3, "Design of the NEI 99-01 Emergency Classification Scheme"
- Section 4, "Site-Specific Scheme Development Guidance"

The following sections of NEI 99-01 were removed from the TMI PD EAL matrix as these do not apply to a permanently defueled facility:

- Section 6, Abnormal Rad Levels/Radiological Effluent ICs/EALs,
- Section 7, Cold Shutdown/Refueling System Malfunction ICs/EALs,
- Section 9, Fission Product Barrier ICs/EALs,
- Section 10, Hazards and Other Conditions Affecting Plant Safety ICs/EALs, and
- Section 11, System Malfunction ICs/EALs.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>PD-AU1</p> <p>ECL: Notification of Unusual Event</p> <p>Initiating Condition: Release of gaseous or liquid radioactivity greater than 2 times the (site-specific effluent release controlling document) limits for 60 minutes or longer.</p> <p>Operating Mode Applicability: Not Applicable</p> <p>Example Emergency Action Levels: (1 or 2)</p> <p>Notes:</p> <ul style="list-style-type: none"> The Emergency Director should declare the Unusual Event promptly upon determining that 60 minutes has been exceeded, or will likely be exceeded. If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 60 minutes. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes. 	<p>PD-RU1</p> <p>Category: R- Abnormal Rad Levels/ Radiological Effluent</p> <p>PD-RU1 Release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM limits for 60 minutes or longer.</p> <p><u>Emergency Action Level (EAL):</u></p> <p>Notes:</p> <ul style="list-style-type: none"> The Emergency Director should declare the UNUSUAL EVENT promptly upon determining that 60 minutes has been exceeded, or will likely be exceeded. If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 60 minutes. Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes. 	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> "AU1" is replaced with "RU1" to better signify a radiological event and to maintain continuity with the previous TMI emergency action level scheme. Removed Emergency Classification Level ("ECL") information. Added Recognition Category ("Category"). Changed "Initiating Condition" to IC/EAL identifier. Inserted ODCM as the site-specific effluent release controlling document. Removed "Operating Mode Applicability" information as it does not apply in a permanently defueled condition. Removed "Example" from Emergency Action Levels since they are no longer examples. Provided additional provision for classification based on effluent monitor readings. Changed format of EALs to separate EALs 1 and 2 into distinct EALs.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>(1) Reading on ANY effluent radiation monitor greater than 2 times the alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer.</p> <p>(2) Sample analysis for a gaseous or liquid release indicates a concentration or release rate greater than 2 times the (site-specific effluent release controlling document) limits for 60 minutes or longer.</p>	<p>1. Reading on discharge permit specified monitor > 2 times alarm setpoint established by a current radioactive release discharge permit for > 60 minutes.</p> <p>OR</p> <p>2. Readings on RM-A-8GH (Station Vent) > 7.15 E+01 cpm for ≥ 60 minutes.</p> <p>OR</p> <p>3. Confirmed sample analyses for gaseous or liquid releases indicates a concentration or release rates > 2 times ODCM Limit with a release duration of ≥ 60 minutes.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> Removed "radiation" from monitor notation. EAL 1: Specified that the effluent monitors are the "discharge permit specified monitor." EAL 1. Did not include list of site-specific effluent radiation monitors since they may change throughout decommissioning. Releases will be controlled through approved discharge permits which will specify monitors and monitor setpoints prior to release. Added "OR" to reflect the EAL conditions that represent entry into the classification. Added EAL 2 Station Vent monitor as the remaining permanently monitored effluent pathway to determine entry threshold. EAL 3 renumbered (NEI 99-01 EAL 2) Provided additional provisions for using sample analysis results of a gaseous or liquid release as an action level.
<p>Basis:</p> <p>This IC addresses a potential decrease in the level of safety of the plant as indicated by a low-level radiological release that exceeds regulatory commitments for an extended period of time (e.g., an uncontrolled release). It includes any gaseous or liquid radiological release, monitored or un-monitored, including those for which a radioactivity discharge permit is normally prepared.</p>	<p>TMI Basis:</p> <p>This IC addresses a potential decrease in the level of safety of the facility as indicated by a low-level radiological release that exceeds regulatory commitments for an extended period of time (e.g., an uncontrolled release). It includes any gaseous or liquid radiological release, monitored or un-monitored, including those for which a radioactivity discharge permit is normally prepared.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> Added TMI-specific basis information. Replaced "plant" with "facility."

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>Nuclear power plants incorporate design features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, and to control and monitor intentional releases. The occurrence of an extended, uncontrolled radioactive release to the environment is indicative of degradation in these features and/or controls.</p> <p>Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.</p> <p>Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.</p> <p>Releases should not be prorated or averaged. For example, a release exceeding 4 times release limits for 30 minutes does not meet the EAL.</p> <p>EAL #1 - This EAL addresses radioactivity releases that cause effluent radiation monitor readings to exceed 2 times the limit established by a radioactivity discharge permit. This EAL will typically be associated with planned batch releases from non-continuous release pathways (e.g., radwaste, waste gas).</p>	<p>TMI-1 incorporate design features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, and to control and monitor intentional releases. The occurrence of an extended, uncontrolled radioactive release to the environment is indicative of degradation in these features and/or controls.</p> <p>Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of facility conditions alone. The inclusion of both facility condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.</p> <p>Releases should not be prorated or averaged. For example, a release exceeding 4 times release limits for 30 minutes does not meet the EAL.</p> <p>EAL #1 addresses radioactivity releases that cause effluent radiation monitor readings to exceed 2 times the limit established by a radioactivity discharge permit. This EAL will typically be associated with planned batch releases from non-continuous release pathways (e.g., radwaste, waste gas).</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • Moved paragraph describing "Classification based on effluent monitoring readings..." to be in the EAL Notes. • Split the explanation of NEI 99-01 EAL #1 into two separate EAL criteria EAL #1 and EAL #2 and added "OR" thus providing additional provisions for using sample analysis results of a gaseous or liquid release as an action level. • Renumbered NEI 99-01 EAL #2 into EAL #3.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>EAL #2 - This EAL addresses uncontrolled gaseous or liquid releases that are detected by sample analyses or environmental surveys, particularly on unmonitored pathways (e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.).</p> <p>Escalation of the emergency classification level would be via IC PD-AA1.</p>	<p>The declaration criteria will be based on the monitor and monitor setpoints specified in the Discharge Permit.</p> <p>EAL #2 normally occurring continuous radioactivity releases from monitored gaseous effluent pathways. For the defueled condition the only remaining release path is through the Station Vent and is monitored by RM-A-8GH.</p> <p>EAL #3 addresses uncontrolled gaseous or liquid releases that are detected by sample analyses or environmental surveys, particularly on unmonitored pathways (e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.).</p> <p>Escalation of the emergency classification level would be via IC PD-RA1.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> Added clarification that the EAL criteria are based on the setpoints in the Discharge permit which would signify a release above expected levels for that discharge. List of site-specific effluent radiation monitors were not included since they may change throughout decommissioning. Releases will be controlled through approved discharge permits which will specify monitors and monitor setpoints prior to release. Replaced "AA1" with "RA1" to better describe escalation pathway.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>PD-AA1</p> <p>ECL: Alert</p> <p>Initiating Condition: Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE.</p> <p>Operating Mode Applicability: Not Applicable</p> <p>Example Emergency Action Levels: (1 or 2 or 3 or 4)</p> <p>Notes:</p> <ul style="list-style-type: none"> • The Emergency Director should declare the Alert promptly upon determining that the applicable time has been exceeded, or will likely be exceeded. • If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes. • If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes. • The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available. 	<p>PD-RA1</p> <p>Category: R - Abnormal Rad Levels/ Radiological Effluents</p> <p>PD-RA1: Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem TEDE or 50 mRem thyroid CDE.</p> <p><u>Emergency Action Level (EAL):</u></p> <p>Notes:</p> <ul style="list-style-type: none"> • The Emergency Director should declare the Alert promptly upon determining that the applicable time has been exceeded, or will likely be exceeded. • If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes. • Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes. • The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available. 	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • "AA1" is replaced with "RA1" to better signify a radiological event and to maintain continuity with the previous TMI action level scheme. • Removed Emergency Classification Level ("ECL") information. • Added Recognition Category ("Category"). • Changed "Initiating Condition" to IC/EAL identifier. • Removed "Operating Mode Applicability" information as it does not apply in a permanently defueled condition. • Removed "Example" from Emergency Action Levels since they are no longer examples. • Modified EAL numbering and separated EALs 1, 2, 3 and 4 into EAL flowchart format. • Provided additional provision for classification based on effluent monitor readings. Moved information from bases to Notes.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>(1) Reading on ANY of the following radiation monitors greater than the reading shown for 15 minutes or longer: (site-specific monitor list and threshold values)</p> <p>(2) Dose assessment using actual meteorology indicates doses greater than 10 mrem TEDE or 50 mrem thyroid CDE at or beyond (site-specific dose receptor point).</p> <p>(3) Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses greater than 10 mrem TEDE or 50 mrem thyroid CDE at or beyond (site-specific dose receptor point) for one hour of exposure.</p> <p>(4) Field survey results indicate EITHER of the following at or beyond (site-specific dose receptor point):</p> <ul style="list-style-type: none"> • Closed window dose rates greater than 10 mR/hr expected to continue for 60 minutes or longer. • Analyses of field survey samples indicate thyroid CDE greater than 50 mrem for one hour of inhalation. 	<p>1. Readings on RM-A-8GH (Station Vent) > 3.23 E+03 cpm for ≥ 15 minutes.</p> <p>OR</p> <p>2. Dose assessment using actual meteorology indicates doses at or beyond the site boundary of EITHER:</p> <p>a. > 10 mRem TEDE</p> <p>OR</p> <p>b. > 50 mRem CDE Thyroid</p> <p>OR</p> <p>3. Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses greater than EITHER of the following at or beyond the site boundary</p> <p>a. > 10 mRem TEDE for 60 minutes of exposure</p> <p>OR</p> <p>b. > 50 mRem CDE Thyroid for 60 minutes of exposure</p> <p>OR</p> <p>4. Field survey results at or beyond the site boundary indicate EITHER:</p> <p>a. Gamma (closed window) dose rates > 10 mR/hr are expected to continue for ≥ 60 minutes.</p> <p>OR</p> <p>b. Analyses of field survey samples indicate > 50 mRem CDE Thyroid for 60 minutes of inhalation.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • Added appropriate installed radiation monitor. • Added "site boundary" as the site-specific dose receptor point. • Added "OR" to reflect the EAL conditions that represent entry into the classification.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>Basis:</p> <p>This IC addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude represent an actual or potential substantial degradation of the level of safety of the plant as indicated by a radiological release that significantly exceeds regulatory limits (e.g., a significant uncontrolled release).</p> <p>Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.</p> <p>The TEDE dose is set at 1% of the EPA PAG of 1,000 mrem while the 50 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.</p> <p>Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.</p>	<p>TMI Basis:</p> <p>This IC addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude represent an actual or potential substantial degradation of the level of safety of the facility as indicated by a radiological release that significantly exceeds regulatory limits (e.g., a significant uncontrolled release).</p> <p>Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of facility conditions alone. The inclusion of both facility condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.</p> <p>The TEDE dose is set at 1% of the EPA PAG of 1000 mRem while the 50 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • Replaced "plant" with "facility." • Moved last paragraph to Notes

NEI99-01 REV 6 Appendix C-Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>PD-AU2</p> <p>ECL: Notification of Unusual Event</p> <p>Initiating Condition: UNPLANNED rise in plant radiation levels.</p> <p>Operating Mode Applicability: Not Applicable</p> <p>Example Emergency Action Levels: (1 or 2)</p> <p>(1) a. UNPLANNED water level drop in the spent fuel pool as indicated by ANY of the following: (site-specific level indications).</p> <p>AND</p> <p>b. UNPLANNED rise in area radiation levels as indicated by ANY of the following radiation monitors. (site-specific list of area radiation monitors).</p> <p>(2) Area radiation monitor reading or survey result indicates an UNPLANNED rise of 25 mR/hr over NORMAL LEVELS.</p>	<p>PD-RU2</p> <p>Category: R-Abnormal Rad Levels/ Radiological Effluents</p> <p>PD-RU2 UNPLANNED rise in facility radiation levels.</p> <p><u>Emergency Action Level (EAL):</u></p> <p>1. a. UNPLANNED water level drop in the Spent Fuel Pool as indicated by ANY of the following:</p> <ul style="list-style-type: none"> Spent Fuel Pool water level < 342' 6" (23.167' on SF-LI-1219A/B) Indication or report of an UNPLANNED drop in water level. <p>AND</p> <p>b. UNPLANNED Area Radiation Monitor reading rise on RM-G-9 FHB Bridge radiation monitor.</p> <p>OR</p> <p>2. Area radiation monitor reading or survey result indicates an UNPLANNED rise of 25 mR/hr over NORMAL LEVELS.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> "AU2" is replaced with "RU2" to better signify a radiological event and to maintain continuity with the previous TMI action level scheme. Removed Emergency Classification Level ("ECL") information. Added Recognition Category ("Category"). Changed "Initiating Condition" to IC/EAL identifier. Replaced "plant" with "facility." Removed "Operating Mode Applicability" information as it does not apply in a permanently defueled condition. Removed "Example" from Emergency Action Levels since they are no longer examples. Modified EAL numbering and separated EALs 1 and 2 into EAL flowchart format. Added "OR" to reflect the EAL conditions that represent entry into the classification. Provided site-specific level indication that corresponds to fuel pool level entry condition into Spent Fuel Pool abnormal operating procedure. Provided Area Radiation Monitoring for specific location.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>Basis:</p> <p>This IC addresses elevated plant radiation levels caused by a decrease in water level above irradiated (spent) fuel or other UNPLANNED events. The increased radiation levels are indicative of a minor loss in the ability to control radiation levels within the plant or radioactive materials. Either condition is a potential degradation in the level of safety of the plant.</p> <p>A water level decrease will be primarily determined by indications from available level instrumentation. Other sources of level indications may include reports from plant personnel or video camera observations (if available). A significant drop in the water level may also cause an increase in the radiation levels of adjacent areas that can be detected by monitors in those locations.</p> <p>The effects of planned evolutions should be considered. Note that EAL #1 is applicable only in cases where the elevated reading is due to an UNPLANNED water level drop. EAL #2 excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials.</p> <p>Escalation of the emergency classification level would be via IC PD-AA1 or PD-AA2.</p>	<p>TMI Basis:</p> <p>This IC addresses a loss in water level above irradiated fuel sufficient to cause elevated radiation levels. This condition could be a precursor to a more serious event and is also indicative of a minor loss in the ability to control radiation levels within the facility. It is therefore a potential degradation in the level of safety of the facility.</p> <p>EAL #1 Basis:</p> <p>A water level loss will be primarily determined by indications from available level instrumentation. Other sources of level indications may include reports from facility personnel (e.g., from a refueling crew) or video camera observations (if available) or from any other temporarily installed monitoring instrumentation. A significant drop in the water level may also cause a rise in the radiation levels of adjacent areas that can be detected by Spent Fuel Bridge Radiation monitor (RM-G-9).</p> <p>Spent Fuel Pool (SFP) water level of 342'6" (mean sea level), is the entry condition for OP-TM-AOP-035, Loss of Spent Fuel Pool Cooling, and is lower than the SFP low level alarm at 343' 6". The IC level corresponds to 23.167' above the top of fuel assemblies and is read on SF-LI-1219A/B.</p> <p>The effects of planned evolutions should be considered. Note that EAL #1 is applicable only in cases where the elevated reading is due to an UNPLANNED water level drop.</p> <p>EAL #2 Basis:</p> <p>This excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials.</p> <p>Escalation of the emergency classification level would be via IC PD-RA1 OR PD-RA2.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • Wording in the TMI basis is modified to align with the previous wording in the TMI basis for EAL RU2, which is slightly different than the wording in NEI 99-01. • Replaced "plant" with "facility." • Added Basis for the site-specific level indication. • Replaced "AA1" and "AA2" with "RA1" and "RA2," respectively, to better describe escalation pathway.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>PD-AA2</p> <p>ECL: Alert</p> <p>Initiating Condition: UNPLANNED rise in plant radiation levels that impedes plant access required to maintain spent fuel integrity.</p> <p>Operating Mode Applicability: Not Applicable</p> <p>Example Emergency Action Levels: (1 or 2)</p> <p>(1) UNPLANNED dose rate greater than 15 mR/hr in ANY of the following areas requiring continuous occupancy to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity:</p> <p>(site-specific area list)</p> <p>(2) UNPLANNED Area Radiation Monitor readings or survey results indicate a rise by 100 mR/hr over NORMAL LEVELS that impedes access to ANY of the following areas needed to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity.</p> <p>(site-specific area list)</p>	<p>PD-RA2</p> <p>Category: R-Abnormal Rad Levels/ Radiological Effluents</p> <p>PD-RA2 UNPLANNED rise in facility radiation levels that impedes access required to maintain spent fuel integrity.</p> <p><u>Emergency Action Level (EAL):</u></p> <p>1. UNPLANNED dose rate > 15 mR/hr in ANY of the following areas required for continuous occupancy to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity:</p> <ul style="list-style-type: none"> Control Room Central Alarm Station (by survey) <p>OR</p> <p>2. UNPLANNED Area Radiation Monitor readings or survey results indicate a rise of > 100 mR/hr over NORMAL LEVELS that impedes access to ANY of the following areas needed to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity:</p> <ul style="list-style-type: none"> Fuel Handling Building Operating Floor SFP Cooling Pump /Heat Exchanger Area NSCCW Pump / Heat Exchanger Areas 	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> "AA2" is replaced with "RA2" to better signify a radiological event and to maintain continuity with the previous TMI action level scheme. Removed Emergency Classification Level ("ECL") information. Added Recognition Category ("Category"). Changed "Initiating Condition" to IC/EAL identifier. Removed "Operating Mode Applicability" information as it does not apply in a permanently defueled condition. Removed "Example" from Emergency Action Levels since they are no longer examples. Replaced "plant" with "facility." Changed format of EALs to separate EALs 1 and 2 into distinct EALs. Added "OR" to reflect the EAL conditions that represent entry into the classification. Added site-specific areas to EAL #1. Added site-specific areas to EAL #2.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>Basis:</p> <p>This IC addresses increased radiation levels that impede necessary access to areas containing equipment that must be operated manually or that requires local monitoring, in order to maintain systems needed to maintain spent fuel integrity. As used here, 'impede' includes hindering or interfering, provided that the interference or delay is sufficient to significantly threaten necessary plant access. It is this impaired access that results in the actual or potential substantial degradation of the level of safety of the plant.</p> <p>This IC does not apply to anticipated temporary increases due to planned events</p>	<p>TMI Basis:</p> <p>This IC addresses increased radiation levels that impede necessary access to areas containing equipment that must be operated manually or that requires local monitoring, in order to maintain systems needed to maintain spent fuel integrity. As used here, 'impede' includes hindering or interfering, provided that the interference or delay is sufficient to significantly threaten necessary facility access. It is this impaired access that results in the actual or potential substantial degradation of the level of safety of the facility.</p> <p>This IC does not apply to anticipated temporary increases due to planned events.</p> <p>This IC addresses elevated radiation levels in certain facility rooms/areas sufficient to preclude or impede personnel from performing actions necessary to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity. As such, it represents an actual or potential substantial degradation of the level of safety of the facility.</p> <p>Assuming all facility equipment is operating as designed, normal operation is capable from the Control Room (CR). The areas listed in EAL #2 are facility areas that contain equipment which require a manual/local action necessary when moving fuel or manipulating SFP cooling equipment.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • Replaced "plant" with "facility." • Maintained additional wording consistent with the previous wording in the basis for TMI EAL RA3, revised to reflect the defueled condition of the facility ("to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity").

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>PD-SU1</p> <p>ECL: Notification of Unusual Event</p> <p>Initiating Condition: UNPLANNED spent fuel pool temperature rise.</p> <p>Operating Mode Applicability: Not Applicable</p> <p>Example Emergency Action Levels:</p> <p>(1) UNPLANNED spent fuel pool temperature rise to greater than (site-specific °F).</p> <p>Basis:</p> <p>This IC addresses a condition that is a precursor to a more serious event and represents a potential degradation in the level of safety of the plant. If uncorrected, boiling in the pool will occur, and result in a loss of pool level and increased radiation levels.</p> <p>Escalation of the emergency classification level would be via IC PD-AA1 or PD-AA2.</p>	<p>PD-MU1</p> <p>Category: S –System Malfunction Spent Fuel Pool</p> <p>PD-MU1 UNPLANNED Spent Fuel Pool temperature rise.</p> <p><u>Emergency Action Level (EAL):</u></p> <p>1. UNPLANNED Spent Fuel Pool temperature rise to > 160°F.</p> <p>TMI Basis:</p> <p>This IC addresses a condition that is a precursor to a more serious event and represents a potential degradation in the level of safety of the facility. If uncorrected, boiling in the pool will occur, and result in a loss of pool level and increased radiation levels.</p> <p>Whenever irradiate fuel is stored in the spent fuel pool, the pool water temperature shall be maintained below 160°F (Reference 2). This is the entry point into OP-TM-AOP-035, Loss of Spent Fuel Pool Cooling. Operators will provide initial mitigation for a loss of SFP Cooling based on SFP high temperature alarm set at 130°F. Based on Calculations in the Decom SFP Thermal Hydraulic Analysis (Reference 4) for a loss of SFP Cooling at 488 days after shutdown the heat up rate in the SFP would be approximately 1.35 °F/Hr. Using the Entry Condition for the Loss of Spent Fuel Pool Cooling Procedure as the EAL provides the precursor for additional action and still provides approximately 70 hours to mitigate before SFP boiling were to occur.</p> <p>Escalation of the emergency classification level would be via PD-RA1 or PD-RA2.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> Removed Emergency Classification Level ("ECL") information. Added Recognition Category ("Category"). "SU1" is replaced with "MU-1." "AA2" is replaced with "RA2" to better signify a malfunction and to maintain continuity with the previous TMI action level scheme. Removed "Operating Mode Applicability" information as it does not apply in a permanently defueled condition. Removed "Example" from Emergency Action Levels since they are no longer examples. Added site-specific temperature for the Spent Fuel Pool and justification for 160°F in Basis. Replaced "plant" with "facility." Added site-specific information for the bases for the 160°F EAL threshold. Replaced "AA1" with "RA1" and replaced "AA2" with "RA2" to better signify a radiological event and to maintain continuity with the previous TMI action level scheme.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>PD-HU1</p> <p>ECL: Notification of Unusual Event</p> <p>Initiating Condition: Confirmed SECURITY CONDITION or threat.</p> <p>Operating Mode Applicability: Not Applicable</p> <p>Example Emergency Action Levels: (1 or 2 or 3)</p> <p>(1) A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the (site-specific security shift supervision).</p> <p>(2) Notification of a credible security threat directed at the site.</p> <p>(3) A validated notification from the NRC providing information of an aircraft threat.</p> <p>Basis:</p> <p>This IC addresses events that pose a threat to plant personnel or the equipment necessary to maintain cooling of spent fuel, and thus represent a potential degradation in the level of plant safety. Security events which do not meet one of these EALs are adequately addressed by the requirements of 10 CFR § 73.71 or 10 CFR § 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under IC PD-HA1.</p> <p>Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event. Classification of these events will initiate appropriate threat-related notifications to plant personnel and OROs.</p>	<p>PD-HU1</p> <p>Category: H–Hazards and Other Conditions Affecting Facility Safety</p> <p>PD-HU1 Confirmed SECURITY CONDITION or threat.</p> <p><u>Emergency Action Level (EAL):</u></p> <ol style="list-style-type: none"> 1. Notification of a credible security threat directed at the site as determined per SY-AA-101-132, Security Assessment and Response to Unusual Activities. <p>OR</p> <ol style="list-style-type: none"> 2. A validated notification from the NRC providing information of an aircraft threat. <p>OR</p> <ol style="list-style-type: none"> 3. Notification by the Security Force of a SECURITY CONDITION that does <u>not</u> involve a HOSTILE ACTION. <p>TMI Basis:</p> <p>This IC addresses events that pose a threat to facility personnel or spent fuel cooling system equipment, and thus represent a potential degradation in the level of facility safety. Security events which do not meet one of these EALs are adequately addressed by the requirements of 10 CFR § 73.71 or 10 CFR § 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under ICs PD-HA1.</p> <p>Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event. Classification of these events will initiate appropriate threat-related notifications to facility personnel and OROs.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • Removed Emergency Classification Level ("ECL") information. • Added Recognition Category ("Category"). • Changed "Initiating Condition" to IC/EAL identifier. • Removed "Operating Mode Applicability" information as it does not apply in a permanently defueled condition. • Removed "Example" from Emergency Action Levels since they are no longer examples. • Changed format and order of EALs to separate EALs 1, 2, and 3 into distinct EAL ICs. • Added "OR" to reflect the EAL conditions that represent entry into the classification. • Added security procedure to aide determining the notification of a credible threat. • Security Force is provided as the site-specific security shift supervision. • Replaced "plant" with "facility."

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>Basis (cont):</p> <p>Security plans and terminology are based on the guidance provided by NEI 03-12, <i>Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]</i>.</p> <p>EAL #1 references (site-specific security shift supervision) because these are the individuals trained to confirm that a security event is occurring or has occurred. Training on security event confirmation and classification is controlled due to the nature of Safeguards and 10 CFR § 2.39 information.</p> <p>EAL #2 addresses the receipt of a credible security threat. The credibility of the threat is assessed in accordance with (site-specific procedure).</p> <p>EAL #3 addresses the threat from the impact of an aircraft on the plant. The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may also be provided by NORAD through the NRC. Validation of the threat is performed in accordance with (site-specific procedure).</p> <p>Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Security Plan.</p> <p>Escalation of the emergency classification level would be via IC PD-HA1.</p>	<p>TMI Basis (cont):</p> <p>Security plans and terminology are based on the guidance provided by NEI 03-12, <i>Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]</i>.</p> <p>EAL #1 Basis:</p> <p>Addresses the receipt of a credible security threat. The credibility of the threat is assessed in accordance with SY-AA-101-132.</p> <p>EAL #2 Basis:</p> <p>Addresses the threat from the impact of an aircraft on the facility. The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may also be provided by NORAD through the NRC. Validation of the threat is performed in accordance with OP-TM-AOP-008, Security Threat/Intrusion.</p> <p>EAL #3 Basis:</p> <p>References Security Force because these are the individuals trained to confirm that a security event is occurring or has occurred. Training on security event confirmation and classification is controlled due to the nature of Safeguards and 10 CFR § 2.39 information.</p> <p>Escalation of the emergency classification level would be via IC PD-HA1.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> Paragraph regarding Security-sensitive information was not included based on it being more relevant for EAL Developers (same paragraph is in the Developer Notes) than end-users. Replaced "plant" with "facility."

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>PD-HA1</p> <p>ECL: Alert</p> <p>Initiating Condition: HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.</p> <p>Operating Mode Applicability: Not Applicable</p> <p>Example Emergency Action Levels: (1 or 2)</p> <p>(1) A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the (site-specific security shift supervision).</p> <p>(2) A validated notification from NRC of an aircraft attack threat within 30 minutes of the site.</p> <p>Basis:</p> <p>This IC addresses the occurrence of a HOSTILE ACTION within the OWNER CONTROLLED AREA or notification of an aircraft attack threat. This event will require rapid response and assistance due to the possibility of the attack progressing to the PROTECTED AREA, or the need to prepare the plant and staff for a potential aircraft impact.</p> <p>Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event.</p> <p>Security plans and terminology are based on the guidance provided by NEI 03-12, <i>Template for the Security Plan, Training and Qualification Plan</i>,</p>	<p>PD-HA1</p> <p>Category: H– Hazards and Other Conditions Affecting Facility Safety</p> <p>PD-HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.</p> <p>Emergency Action Level (EAL):</p> <p>1. A validated notification from NRC of an aircraft attack threat < 30 minutes from the site.</p> <p>OR</p> <p>2. Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA.</p> <p>TMI Basis:</p> <p>This IC addresses the notification of an aircraft attack threat or an occurrence of a HOSTILE ACTION within the OWNER CONTROLLED AREA. This event will require rapid response and assistance due to the possibility of the attack progressing to the PROTECTED AREA, or the need to prepare the facility and staff for a potential aircraft impact.</p> <p>Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event.</p> <p>Security plans and terminology are based on the guidance provided by NEI 03-12, <i>Template for the Security Plan, Training and Qualification Plan</i>,</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> Removed Emergency Classification Level ("ECL") information. Added Recognition Category ("Category"). Changed "Initiating Condition" to IC/EAL identifier. Removed "Operating Mode Applicability" information as it does not apply in a permanently defueled condition. Removed "Example" from Emergency Action Levels since they are no longer examples. Changed format and order of EALs to separate EALs 1 and 2 into distinct EALs. Added "OR" to reflect the EAL conditions that represent entry into the classification. Security Force is provided as the site-specific security shift supervision. Replaced "plant" with "facility."

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>Basis (cont): <i>Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program].</i></p> <p>As time and conditions allow, these events require a heightened state of readiness by the plant staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Alert declaration will also heighten the awareness of Offsite Response Organizations, allowing them to be better prepared should it be necessary to consider further actions.</p> <p>This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.</p> <p>EAL #1 is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes any action directed against an ISFSI that is located within the OWNER CONTROLLED AREA.</p> <p>EAL #2 addresses the threat from the impact of an aircraft on the plant, and the anticipated arrival time is within 30 minutes. The intent of this EAL is to ensure that threat-related notifications are made in a timely manner so that plant personnel and OROs are in a heightened state of readiness.</p> <p>This EAL is met when the threat-related information has been validated in accordance with (site-specific procedure).</p> <p>The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of</p>	<p>TMI Basis (cont): <i>Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program].</i></p> <p>As time and conditions allow, these events require a heightened state of readiness by the facility staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Alert declaration will also heighten the awareness of Offsite Response Organizations (ORO), allowing them to be better prepared should it be necessary to consider further actions.</p> <p>This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.</p> <p>EAL #1 Basis:</p> <p>The EAL addresses the threat from the impact of an aircraft on the facility, and the anticipated arrival time is within 30 minutes. The intent of this EAL is to ensure that threat-related notifications are made in a timely manner so that facility personnel and OROs are in a heightened state of readiness. This EAL is met when the threat-related information has been validated in accordance with OP-TM-AOP-008, Security Threat/Intrusion.</p> <p>The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> Replaced "plant" with "facility."

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>Basis (cont):</p> <p>the plane may be provided by NORAD through the NRC.</p> <p>In some cases, it may not be readily apparent if an aircraft impact within the OWNER CONTROLLED AREA was intentional (i.e., a HOSTILE ACTION). It is expected, although not certain, that notification by an appropriate Federal agency to the site would clarify this point. In this case, the appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. The emergency declaration, including one based on other ICs/EALs, should not be unduly delayed while awaiting notification by a Federal agency.</p> <p>Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Security Plan.</p>	<p>TMI Basis (cont):</p> <p>the plane may be provided by NORAD through the NRC</p> <p>In some cases, it may not be readily apparent if an aircraft impact within the OWNER CONTROLLED AREA was intentional (i.e., a HOSTILE ACTION). It is expected, although not certain, that notification by an appropriate Federal agency to the site would clarify this point. In this case, the appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. The emergency declaration, including one based on other ICs/EALs, should not be unduly delayed while awaiting notification by a Federal agency.</p> <p>EAL #2 Basis:</p> <p>This EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes any action directed against an ISFSI that is located outside the facility PROTECTED AREA.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • Paragraph regarding Security-sensitive information was not included based on it being more relevant for EAL Developers (same paragraph is in the Developer Notes) than end-users. • Replaced "plant" with "facility."

NEI99-01 Rev6 Appendix C—Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>PD-HU2 ECL: Notification of Unusual Event</p> <p>Initiating Condition: Hazardous event affecting SAFETY SYSTEM equipment necessary for spent fuel cooling.</p> <p>Operating Mode Applicability: Not Applicable</p> <p>Example Emergency Action Levels:</p> <p>(1) a. The occurrence of ANY of the following hazardous events:</p> <ul style="list-style-type: none"> • Seismic event (earthquake) • Internal or external flooding event • High winds or tornado strike • FIRE • EXPLOSION • (site-specific hazards) • Other events with similar hazard characteristics as determined by the Shift Manager <p>AND</p> <p>b. The event has damaged at least one train of a SAFETY SYSTEM needed for spent fuel cooling.</p> <p>AND</p> <p>c. The damaged SAFETY SYSTEM train(s) cannot, or potentially cannot, perform its design function based on EITHER:</p> <ul style="list-style-type: none"> • Indications of degraded performance • VISIBLE DAMAGE 	<p>PD-HU2 Category: H—Hazards and Other Conditions Affecting Facility Safety</p> <p>PD-HU2 Hazardous Event affecting equipment necessary for spent fuel cooling.</p> <p>Emergency Action Level (EAL):</p> <p>1. a) The occurrence of ANY of the following hazardous events:</p> <ul style="list-style-type: none"> • Seismic event (earthquake) • Internal or external flooding event • High winds or tornado strike • FIRE • EXPLOSION • Other events with similar hazard characteristics as determined by the Shift Manager <p>AND</p> <p>b) The event has damaged at least one train of a system needed for Spent Fuel Cooling</p> <p>AND</p> <p>c) The damaged train(s) <u>cannot</u>, or potentially <u>cannot</u>, perform its design function based on EITHER:</p> <ul style="list-style-type: none"> • Indications of degraded performance • VISIBLE DAMAGE 	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • Removed Emergency Classification Level ("ECL") information. • Added Recognition Category ("Category"). • Changed "Initiating Condition" to IC/EAL identifier. • Removed "SAFETY SYSTEM" as the item is not applicable in the permanently shut down defueled condition. Revised to clarify that the EAL applies to systems, components or equipment that are needed for spent fuel cooling. • Removed "Operating Mode Applicability" information as it does not apply in a permanently defueled condition. • Removed "Example" from Emergency Action Levels since they are no longer examples. • Changed numbering format of EALs. • Replaced "plant" with "facility."

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>Basis:</p> <p>This IC addresses a hazardous event that causes damage to at least one train of a SAFETY SYSTEM needed for spent fuel cooling. The damage must be of sufficient magnitude that the system(s) train cannot, or potentially cannot, perform its design function. This condition reduces the margin to a loss or potential loss of the fuel clad barrier, and therefore represents a potential degradation of the level of safety of the plant.</p> <p>For EAL 1.c, the first bullet addresses damage to a SAFETY SYSTEM train that is in service/operation since indications for it will be readily available.</p> <p>For EAL 1.c, the second bullet addresses damage to a SAFETY SYSTEM train that is not in service/operation or readily apparent through indications alone. Operators will make this determination based on the totality of available event and damage report information. This is intended to be a brief assessment not requiring lengthy analysis or quantification of the damage.</p> <p>Escalation of the emergency classification level could, depending upon the event, be based on any of the Alert ICs; PD-AA1, PD-AA2, PD-HA1 or PD-HA3.</p>	<p>TMI Basis:</p> <p>This IC addresses a hazardous event that causes damage to at least one train of a system needed for spent fuel cooling. The damage must be of sufficient magnitude that the system(s) train cannot, or potentially cannot, perform its design function. This condition reduces the margin to a loss or potential loss of the fuel clad barrier, and therefore represents a potential degradation of the level of safety of the facility.</p> <p>For the first bullet in EAL 1.c, indications of degraded performance apply to in service/operating systems or components that are needed for spent fuel cooling.</p> <p>For the second bullet in EAL 1.c, VISIBLE DAMAGE applies to equipment needed for spent fuel cooling that is not in service/operating or readily apparent through indications alone. Operators will make this determination based on the totality of available event and damage report information. This is intended to be a brief assessment not requiring lengthy analysis or quantification of the damage.</p> <p>Escalation of the emergency classification level could, depending upon the event, be based on any of the Alert ICs: PD-RA1, PD-RA2, PD-HA1 or PD-HA3.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • Replaced "plant" with "facility." • Removed "SAFETY SYSTEM" as the item is not applicable in the permanently shut down defueled condition. Revised to clarify that the EAL applies to systems, components or equipment that are needed for spent fuel cooling. • Clarified discussion of Basis discussion for EAL 1.c to more closely represent the wording in the EAL. • Replaced "AA1" with "RA1" and replaced "AA2" with "RA2" to better signify a radiological event and to maintain continuity with the previous TMI action level scheme.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>PD-HU3</p> <p>ECL: Notification of Unusual Event</p> <p>Initiating Condition: Other conditions exist which in the judgment of the Emergency Director warrant declaration of a (NO)UE.</p> <p>Operating Mode Applicability: Not Applicable</p> <p>Example Emergency Action Levels:</p> <p>(1) Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.</p> <p>Basis:</p> <p>This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for a NOUE.</p>	<p>PD-HU3</p> <p>Category: H—Hazards and Other Conditions Affecting Facility Safety</p> <p>PD-HU3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT.</p> <p>Emergency Action Level (EAL):</p> <p>Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the facility or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of equipment required for spent fuel cooling occurs.</p> <p>TMI Basis:</p> <p>This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for an UNUSUAL EVENT.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • Removed Emergency Classification Level ("ECL") information. • Added Recognition Category ("Category"). • Changed "Initiating Condition" to IC/EAL identifier. • Removed "Operating Mode Applicability" information as it does not apply in a permanently defueled condition. • Removed "Example" from Emergency Action Levels since they are no longer examples. • Removed number from EAL. • Removed "SAFETY SYSTEM" as the item is not applicable in the permanently shut down defueled condition. Revised to clarify that the EAL applies to systems, components or equipment that are needed for spent fuel cooling. • Removed numbering from EAL since it's a single EAL. • Replaced "plant" with "facility." • Replace NOUE with "UNUSUAL EVENT."

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>PD-HA3 ECL: Alert</p> <p>Initiating Condition: Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.</p> <p>Operating Mode Applicability: Not Applicable</p> <p>Example Emergency Action Levels:</p> <p>(1) Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.</p> <p>Basis:</p> <p>This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for an Alert.</p>	<p>PD-HA3 Category: H—Hazards and Other Conditions Affecting Facility Safety</p> <p>PD-HA3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT.</p> <p><u>Emergency Action Level (EAL):</u></p> <p>Other conditions exist which, in the judgment of the Emergency Director, indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the facility or a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.</p> <p>TMI Basis:</p> <p>This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for an ALERT.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> Removed Emergency Classification Level ("ECL") information. Added Recognition Category ("Category"). Changed Initiating Condition to IC/EAL identifier. Removed "Operating Mode Applicability" information as it does not apply in a permanently defueled condition. Removed "Example" from Emergency Action Levels since they are no longer examples. Removed number from EAL since it's a single EAL. Replaced "plant" with "facility."

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>E-HU1</p> <p>ECL: Notification of Unusual Event</p> <p>Initiating Condition: Damage to a loaded cask CONFINEMENT BOUNDARY.</p> <p>Operating Mode Applicability: All</p> <p>Example Emergency Action Levels:</p> <p>(1) Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading greater than (2 times the site-specific cask specific technical specification allowable radiation level) on the surface of the spent fuel cask.</p>	<p>E-HU1</p> <p>Category: E – ISFSI Malfunction</p> <p>E-HU1 Damage to a loaded cask CONFINEMENT BOUNDARY.</p> <p><u>Emergency Action Level (EAL):</u></p> <p>Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by a radiation reading > 2 times the ISFSI Technical Specification allowable levels.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> Removed Emergency Classification Level ("ECL") information. Added "Recognition Category" ("Category"). Changed "Initiating Condition" to IC/EAL identifier. Removed "Operating Mode Applicability" information as it does not apply in a permanently defueled condition. Removed "Example" from Emergency Action Levels since they are no longer examples. Removed numbering from EAL since it's a single EAL. Using generic reference which will be addressed in the ISFSI Technical Specifications.

NEI99-01 Rev6 Appendix C – Permanently Defueled Station ICs/EALs	Proposed EAL Matrix for TMI	Comparison
<p>Basis:</p> <p>This IC addresses an event that results in damage to the CONFINEMENT BOUNDARY of a storage cask containing spent fuel. It applies to irradiated fuel that is licensed for dry storage beginning at the point that the loaded storage cask is sealed. The issues of concern are the creation of a potential or actual release path to the environment, degradation of one or more fuel assemblies due to environmental factors, and configuration changes which could cause challenges in removing the cask or fuel from storage.</p> <p>The existence of "damage" is determined by radiological survey. The technical specification multiple of "2 times", which is also used in Recognition Category A IC AU1, is used here to distinguish between non-emergency and emergency conditions. The emphasis for this classification is the degradation in the level of safety of the spent fuel cask and not the magnitude of the associated dose or dose rate. It is recognized that in the case of extreme damage to a loaded cask, the fact that the "on-contact" dose rate limit is exceeded may be determined based on measurement of a dose rate at some distance from the cask.</p> <p>Security-related events for ISFSIs are covered under ICs HU1 and HA1.</p>	<p>TMI Basis:</p> <p>This IC addresses an event that results in damage to the CONFINEMENT BOUNDARY of a storage cask containing spent fuel. It applies to irradiated fuel that is licensed for dry storage beginning at the point that the loaded storage cask is sealed. The word cask, as used in this EAL, refers to the storage container in use at the site for dry storage of irradiated fuel. The issues of concern are the creation of a potential or actual release path to the environment, degradation of any fuel assemblies due to environmental factors, and configuration changes which could cause challenges in removing the cask or fuel from storage.</p> <p>The existence of "damage" is determined by radiological survey. The cask technical specification multiple of "2 times," which is also used in Recognition Category R IC PD-RU1, is used here to distinguish between non-emergency and emergency conditions. The emphasis for this classification is the degradation in the level of safety of the spent fuel cask and not the magnitude of the associated dose or dose rate. It is recognized that in the case of extreme damage to a loaded cask, the fact that the "on-contact" dose rate limit is exceeded may be determined based on measurement of a dose rate at some distance from the cask.</p> <p>Security-related events for ISFSIs are covered under ICs PD-HU1 and PD-HA1.</p>	<p><input type="checkbox"/> No Change <input checked="" type="checkbox"/> Difference <input type="checkbox"/> Deviation</p> <ul style="list-style-type: none"> • The sentence referring to the "word cask" is being provided for clarification. • "AU1" is replaced with "RU1" reflect the appropriate references in the proposed EALs. • Added "PD" to references to RU1, HU1 and HA1 to reflect the appropriate references in the proposed EALs.

ATTACHMENT 5

THREE MILE ISLAND NUCLEAR STATION

**ACKNOWLEDGEMENT FROM THE COMMONWEALTH OF PENNSYLVANIA REGARDING
THE ACCEPTABILITY OF THE PERMANENTLY DEFUELED EMERGENCY PLAN**



June 27, 2019

To: Mr. Robert Brady
Three Mile Island Generating Station
441 S. P.O. Box 480
Middletown, PA 17057

Re: License Amendment Request for the Permanently Defueled Emergency Plan and Revised
Emergency Action Level Scheme

Dear Mr. Brady,

A review of the proposed changes prior to the formal submission of the License Amendment Request (LAR) for the Permanently Defueled Emergency Plan and revised Emergency Action Level scheme has been performed by the Bureau of Radiation Protection. A meeting to discuss comments was held with Exelon personnel on June 24, 2019, and comments were resolved to the satisfaction of the Commonwealth of Pennsylvania. The State has no further comments at this time but reserves the right to further comment during the formal LAR review and approval process.

Should you require any further information, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Janati".

Rich Janati, Chief
Division of Nuclear Safety
Bureau of Radiation Protection
(717) 787-2163
rjanati@pa.gov