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10 CFR 50.47(b)
10 CFR 50, Appendix E
10 CFR 50.54(q)
10 CFR 50.90
10 CFR 72.32
10 CFR 72.44(f)

TMI-21-009

March 4, 2021

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 Independent Spent Fuel Storage Installation Only Emergency Plan and Emergency Action Level Scheme

References:

1. Letter from J. Bradley Fewell (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Certification of Permanent Cessation of Power Operations for Three Mile Island Nuclear Station, Unit 1," dated June 20, 2017 (ML17171A151)
2. Letter from Michael P. Gallagher (Exelon Generation Company, LLC), to U.S. Nuclear Regulatory Commission, “Certification of Permanent Removal of Fuel from the Reactor Vessel for Three Mile Island Nuclear Station, Unit 1,” dated September 26, 2019 (Accession No. ML19269E480)
3. 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 (Accession No. ML19095A041)

4. 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 (Accession No. ML19095A009)
5. 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. 299 for Unit 1 RE: Permanently Defueled Emergency Plan And Emergency Action Level Scheme Changes (EPID L-2019-LLA-0144), dated December 2, 2020 (ML20261H925)
6. Letter from U.S. Nuclear Regulatory Commission to Mr. Bryan C. Hanson, (Exelon Generation Company, LLC), "Three Mile Island Nuclear Station, Units 1 and 2 - Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation (EPID L-2019-LLE-0016)" dated December 1, 2020 (ADAMS Accession No. ML20244A291)

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 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 after all irradiated fuel has been transferred from the Spent Fuel Pools (SFPs) to the Independent Spent Fuel Storage Installation (ISFSI). 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), 10 CFR Part 50, Appendix E, Section IV.B.2, and 10 CFR 72.44(f).

By letter dated June 20, 2017 (Reference 1), Exelon provided formal notification to the U.S. Nuclear Regulatory Commission (NRC) that Exelon had determined to permanently cease operations at TMI-1 on or about September 30, 2019. In Reference 2, Exelon provided formal notification in accordance with 10 CFR 50.82(a)(1)(ii) certifying all fuel has been permanently removed from the TMI-1 reactor vessel and placed in the SFP. Therefore, in accordance with 10 CFR 50.82(a)(2), the 10 CFR Part 50 license for TMI-1 no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel.

TMI-1 is in the process of constructing an ISFSI with irradiated fuel beginning to be transferred in late 2021. On April 5, 2019 Exelon submitted the Post-Shutdown Decommissioning Activities Report (PSDAR) (Reference 3) and the Spent Fuel Management Plan (SFMP) (Reference 4) for TMI-1. The PSDAR documents the TMI-1 expectation that all irradiated fuel be completely transferred to the ISFSI by the end of 2022.

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 de contaminated) known as Post-Defueling Monitored Storage (PDMS). Exelon maintains the emergency planning responsibilities for TMI-2, which is owned by TMI-2 Solutions, through a service agreement. This License Amendment Request (LAR) does not impact Exelon's ability to maintain the service agreement.

This change permits specific reductions in the size and makeup of the Emergency Response Organization due to the elimination of the design basis accident related to the spent fuel (fuel handling accident) based on the complete removal of all irradiated fuel from the spent fuel pools. To comport to the reduced scope of potential radiological accidents with all TMI-1 irradiated fuel in dry cask storage within the TMI-1 ISFSI, Exelon determined that replacement of the approved PDEP and Permanently Defueled Emergency Action Level (PD EAL) scheme (Reference 5) with the ISFSI Only Emergency Plan (IOEP) and the ISFSI Only Emergency Action Level scheme were warranted. 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 emergency plan continues to rely on previously granted exemptions from certain emergency planning requirements (Reference 6), as the basis for these exemptions has not changed and remains in effect. These proposed IOEP changes have been determined to represent changes in both the EAL scheme and the staffing level previously approved to implement the PDEP and therefore in accordance with the requirements of 10 CFR 50.54(q), require NRC approval prior to implementation.

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 emergency plan 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 IOEP. Attachment 3 provides the ISFSI Only EALs and Bases Document. Attachment 4 provides a comparison of the proposed ISFSI Only EAL Bases Document to the corresponding information contained in NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6 (Reference #). Attachment 5 contains a supporting calculation for this submittal.

In support of this license amendment discussions have been held with the Commonwealth of Pennsylvania and local response organizations. On January 21, 2021, the Commonwealth of Pennsylvania – Department of Environmental Protection Bureau of Radiation Protection (PA-BRP) and the Pennsylvania Emergency Management Agency (PEMA) received the draft proposed changes of the TMI Permanently Defueled Emergency Plan and EAL scheme. Attachment 6 contains acknowledgements from PA-BRP and PEMA that they have no comments or concerns at this time regarding the proposed TMI ISFSI Only Emergency Plan and EALs.

Exelon requests review and approval of the proposed license amendment by March 25, 2022, Once approved, the amendment will be implemented within 90-days following Exelon's submittal of written notification to the NRC that the irradiated fuel has been transferred out of the spent fuel pools and placed in dry storage within the ISFSI.

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.

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 4th day of March 2021.

Respectfully,

Gallagher, Michael P

Digitally signed by Gallagher, Michael P
Date: 2021.03.04 13:44:17 -05'00'

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

Attachments:
1. Description and Evaluation of Proposed Changes
2. Three Mile Island Nuclear Station Independent Spent Fuel Storage Installation (ISFSI) Only Emergency Plan (IOEP)
3. Three Mile Island Nuclear Station Independent Spent Fuel Storage Installation (ISFSI) Only Emergency Action Levels and Bases Document
4. Comparison Matrix Nuclear Energy Institute (NEI) 99-01, "Methodology for Development of Emergency Action Levels," Revision 6 to the Proposed Three Mile Island ISFSI Only Emergency Action Levels
5. TM-RP-20-04, Revision 1, "TMI-1 EAL Verification Calculations"
6. Acknowledgements from the Commonwealth of Pennsylvania Regarding the Acceptability of the Permanently Defueled Emergency Plan

cc: w/Attachments
NRC Regional Administrator, Region I
NRC Project Manager, NMSS/DUWP/RDB – Three Mile Island – Units 1 & 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 Nos. 50-289 and 50-320

DESCRIPTION AND EVALUATION OF PROPOSED CHANGES

Subject: **Independent Fuel Storage Installation (ISFSI) Emergency Plan (IOEP) and Emergency Action Level (EAL) Scheme**

1.0 SUMMARY DESCRIPTION

The proposed changes would change the Three Mile Island (TMI) Emergency Plan and Emergency Action Level (EAL) scheme to support the operation of the TMI, Unit 1, (TMI-1) Independent Fuel Storage Installation (ISFSI) and would be implemented after all irradiated fuel has been removed from the Spent Fuel Pools (SFPs) and placed in dry storage within the ISFSI. This request contains the proposed TMI ISFSI Only Emergency Plan (IOEP) and the ISFSI Only EAL (IOEP-EAL) scheme for U. S. Nuclear Regulatory Commission (NRC) review and approval. The Emergency Plan encompasses both TMI-1 and Three Mile Island Unit 2 (TMI-2). Exelon maintains the emergency planning responsibilities for TMI-2, which is owned by TMI-2 Solutions (subsidiary of EnergySolutions), through a service agreement. This amendment request does not impact Exelon's ability to maintain the service agreement.

Implementation of the IOEP and IOEP-EALs would involve the establishment of administrative controls for radiological source term accumulation limits and methods to control the accidental dispersal of the radiological source.

The proposed IOEP continues to rely on previously approved exemptions from certain emergency planning requirements (Reference 8.1) as the basis for these exemptions has not changed and remains in effect. The proposed TMI IOEP and ISFSI-Only EAL (IO-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. Additional changes to the TMI Site Emergency Plan (SEP) and EAL scheme are warranted to reflect the storage of all fuel in the ISFSI facility.

The proposed IO-EAL scheme is based on NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6, (Reference 8.2) as appropriate after the transfer of all irradiated fuel from the SFP to the ISFSI.

The Post-Shutdown Decommissioning Activities Report (PSDAR) (Reference 8.3) documented Exelon's expectation that all irradiated fuel would be completely transferred to the ISFSI by the end of 2022. To comport to the reduced scope of potential radiological accidents with all irradiated fuel being stored in dry cask storage within the ISFSI, Exelon determined that implementation of the IOEP and the IO-EAL scheme would be warranted. Consistent with that condition, the proposed emergency plan will be implemented within ninety (90) days following Exelon's submittal of written notification to the NRC that all irradiated nuclear fuel assemblies have been transferred out of the SFP and placed in dry storage within the ISFSI. Exelon has submitted a License Amendment Request to revise the TMI-1 Renewed Facility License to comport to the ISFSI-Only condition that there is no longer a requirement to return irradiated fuel to the SFPs (Reference 8.4). The proposed technical specification 5.2 stipulates that irradiated fuel shall not be stored in the SFPs (Reference 8.4).

TMI-1 will be using the NRC approved NAC International (NAC) MAGNASTOR Cask System (Certificate of Compliance (CoC) No. 1031) to store their irradiated fuel. The robust nature and high integrity of the irradiated fuel storage system selected for use at the ISFSI is designed to prevent the release of radioactivity in the event of an accident, including environmental phenomena (e.g., earthquake and flooding). As a result of the high integrity dry shielded canister's design and the substantial protection afforded the canisters, leakage of fission products from a canister is not considered to be a credible event.

2.0 BACKGROUND

By letter dated June 20, 2017 (Reference 8.5), Exelon provided formal notification to the U.S. Nuclear Regulatory Commission (NRC) that Exelon had determined to permanently cease operations at TMI-1 on or about September 30, 2019. In Reference 8.6, Exelon provided formal notification in accordance with 10 CFR 50.82(a)(1)(ii) certifying all fuel has been permanently removed from the TMI-1 reactor vessel and placed in the SFP. Therefore, in accordance with 10 CFR 50.82(a)(2), the 10 CFR Part 50 license for TMI-1 no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel.

On April 5, 2019 Exelon submitted the PSDAR (Reference 8.3) and the Spent Fuel Management Plan (SFMP) (Reference 8.7) for TMI-1. The PSDAR documents the TMI-1 expectation that all irradiated fuel be completely transferred to the ISFSI by the end of December of 2022.

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 TMI-2 Solutions, through a service agreement. This amendment request does not impact Exelon's ability to maintain the service agreement. 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 SFP.

By letter dated December 2, 2020 (Reference 8.8), the NRC issued the Permanently Defueled Emergency Plan (PDEP) and Permanently Defueled EAL scheme for TMI. The PDEP provides approved changes to the TMI SEP that reflect the significantly reduced risk associated with the irradiated fuel stored in the TMI-1 SFPs 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 approval of the PDEP was predicated on the approved exemptions from portions of 10 CFR 50.47(b), 10 CFR 50.47(c)(2) and 10 CFR Part 50, Appendix E, Section IV (Reference 8.1). The proposed IOEP continues to rely on these approved exemptions as the basis for these exemptions has not changed and remains in effect.

Amendment 6, to the standardized NAC MAGNASTOR Cask System CoC No. 1031 revised the CoC technical specifications removing the requirement to return irradiated fuel to a SFP once it has been transferred to the ISFSI (Reference 8.9). The revised MAGNASTOR technical specification would not require a user to maintain SFP related programs when a SFP is no longer required or exists.

3.0 REASON FOR PROPOSED CHANGES

The proposed amendment would replace the existing TMI PDEP and the associated PDEP EAL scheme (Reference 8.8) with the IOEP and the associated IO-EAL scheme to reflect the storage of all TMI-1 irradiated fuel in the TMI-1 ISFSI. The proposed changes reduce the scope of onsite emergency planning requirements to reflect the reduced scope of potential radiological accidents with all irradiated fuel in dry cask storage within the ISFSI and will allow the facility to transition to an emergency plan and EAL scheme specifically related to the storage of the irradiated fuel in the ISFSI. After all irradiated fuel is in dry cask storage within the ISFSI, the number and severity of potential radiological accidents possible at TMI are substantially lower.

There continues to be no need for offsite emergency response plans at TMI because no postulated design basis accident or reasonably conceivable beyond design basis accident can result in a radioactive release that exceeds Environmental Protection Agency (EPA) Protective Action Guides (PAGs) (Reference 8.10) beyond the site boundary. To comport to the reduced scope of potential radiological accidents with irradiated fuel in dry cask storage within the ISFSI, Exelon determined that replacement of the PDEP and associated EAL scheme with the IOEP and the IO-EAL scheme were warranted. The proposed changes are necessary to properly reflect the conditions of the facility and to maintain the effectiveness of the emergency plan.

The robust nature and high integrity of the irradiated fuel storage system selected for use at the ISFSI is designed to prevent the release of radioactivity in the event of an accident, including environmental phenomena (e.g., earthquake and flooding). As a result of the high integrity dry shielded canister's design and the substantial protection afforded the canisters, leakage of fission products from a canister is not considered to be a credible event.

The radioactive source term for an accidental release at the defueled reactor site is reduced by radioactive decay and transfer of irradiated fuel from the SFP to the ISFSI. Potential offsite doses were calculated at TMI-1 (Attachment 5) to verify that if a release of the remaining inventory of radioactive materials stored on site, after all the irradiated fuel has been transferred from the SFP to the ISFSI, were to occur, it would not exceed two times the applicable Offsite Dose Calculation Manual (ODCM),dose limits and therefore would not result in doses to the public above EPA PAGs beyond the unrestricted area boundary. Administrative controls will be in place to limit the dispersal of radioactive materials during decontamination and dismantling of radioactive systems, structures, and components (SSCs) contained in the non-operational nuclear unit.

The proposed revisions constitute a change in the emergency planning function commensurate with the ongoing and anticipated reduction in radiological source term at TMI-1.

4.0 PROPOSED CHANGES

Replacement of the TMI PDEP and associated EAL scheme with the IOEP and the IO-EAL scheme involves the following major changes to the TMI PDEP:

1) Removal of non-ISFSI-related emergency event types, including removal of emergency action levels related to the SFP,
2) Identification of the ISFSI Shift Supervisor (ISS) title as the position that assumes the Emergency Director (ED) responsibilities following an emergency declaration, and
3) Revision of the Emergency Response Organization (ERO).

The off-normal events and accidents addressed in the IOEP are related to the dry storage of irradiated nuclear fuel within the ISFSI and include only the off-normal, accident, natural phenomena, and hypothetical events and consequences presented in the Final Safety Analysis Report (FSAR) for the standardized NAC MAGNASTOR Cask System CoC No. 1031. The FSAR accident analyses demonstrate that none of the hypothetical accidents analyzed has any consequential effect on the public. After all fuel is removed from the TMI-1 SFPs, there will no longer be any potential for the accidents previously addressed by the TMI PDEP that would increase risk to the health and safety of the public. These accidents included events specifically related to the storage of the irradiated fuel in the SFPs. After the transfer of all of the irradiated fuel from the SFP to the ISFSI, the SFPs and supporting systems will be drained and de-energized consistent with the PSDAR (Reference 8.3).

4.1 Removal of Non-ISFSI Events from EAL Scheme

The initiating conditions (ICs) and EALs associated with emergency classification in the current emergency plan are based on NEI 99-01, Revision 6 (Reference 8.2). Specifically, Appendix C of NEI 99-01 contains a set of ICs and EALs for permanently defueled nuclear power plants that had previously operated under a 10 CFR Part 50 license and have permanently ceased operations.

After all irradiated fuel has been removed from the SFPs and placed in dry storage within the ISFSI, the NEI 99-01, Appendix C ICs and EALs that are associated with the SFPs are no longer required to be in the emergency plan. Additionally, certain ICs and EALs whose primary function is not associated with the SFPs are also no longer required to be in the emergency plan when administrative controls are established to limit source term accumulation and the offsite consequences of uncontrolled effluent releases.

Therefore, proposed revisions to the ICs are shown in Table 4-1 in ***Bold-Italics*** and the deletions are shown using ~~*italicized strikethrough*~~. The ICs being deleted are either associated only with SFP operation or are ICs for which administrative controls to limit possible effluent releases have been established.

Table 4-1: Emergency Plan Initiating Conditions Being Deleted or Revised

ALERT	UNUSUAL EVENT
~~*PD-RA1 Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem TEDE or 50 mRem thyroid CDE.*~~ *[EAL is being deleted in its entirety.]*	~~*PD-RU1 Release of gaseous or liquid radioactivity greater than 2 times the ODCM limits for 60 minutes or longer.*~~ *[EAL is being deleted in its entirety.]*
~~*PD-RA2 UNPLANNED rise in facility radiation levels that impedes facility access required to maintain spent fuel integrity.*~~ *[EAL is being deleted in its entirety.]*	~~*PD-RU2 UNPLANNED rise in facility radiation levels.*~~ *[EAL is being deleted in its entirety.]*
	~~*PD-MU1 UNPLANNED spent fuel pool temperature rise.*~~ *[EAL and Threshold being deleted in its entirety.]*

PD-HA1 HOSTILE ACTION within the ***TMI-1 ISFSI*** ~~*OWNER CONTROLLED AREA or airborne attack threat within 30 minutes*~~ ***is occurring or has occurred***. **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 ***TMI-1 ISFSI***~~*OWNER CONTROLLED AREA*~~.	PD-HU1 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*~~***2***. Notification by the Security Force of a SECURITY CONDITION that does not involve a HOSTILE ACTION.
	~~*PD-HU2 Hazardous Event affecting equipment necessary for spent fuel cooling.*~~ *[EAL is being deleted in its entirety.]*
PD-HA3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT. *[EAL is being retained in its entirety.]*	PD-HU3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT. *[EAL is being retained in its entirety.]*
	E-HU1 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 level. *[EAL is being retained in its entirety.]*

Deletion of PD-RA1 and PD-RU1

With all irradiated fuel removed from the SFP and relocated within dry casks placed in the ISFSI, there are no longer any credible accident scenarios that could pose a radiological risk at the exclusion area boundary. The remaining source term within the facility includes SFP water, residual water in the Reactor Coolant System and interfacing systems, resins used in waste processing, and activated reactor plant system piping.

Deletion of PD-RA2, PD-RU2, PD-MU1, and PD-HU2

PD-RA2, PD-RU2, PD-MU1, and PD-HU2 provide protection with fuel stored in the SPF. With all irradiated fuel removed from the SFP and relocated within dry casks placed in the ISFSI,

there are no longer any credible accident scenarios that could pose a radiological risk at the exclusion area boundary. There is no longer a need to provide the protection that these EALs afforded.

Modification of PD-HA1 and PD-HU1

With respect to the aircraft-related EALs; Interim Compensatory Measures (ICM) Order EA-02-026, "Issuance of Order for Interim Safeguards and Security Compensatory Measures for - Three Mile Island Nuclear Station, Unit 1" (Reference 8.11), Section B.5.b mitigation strategies was issued and subsequent security-based ICs and EALs were provided to licensees in NRC Bulletin (BL) 2005-02, "Emergency Preparedness and Response Actions for Security Based Events" (Reference 8.12). BL 2005-02 was addressed to all holders of operating licenses for nuclear power reactors, except those who had permanently ceased operation and had certified that fuel has been removed from the reactor vessel.

In 2009, the NRC amended its security regulations adding new security requirements pertaining to nuclear power reactors. This rulemaking established and updated generically applicable security requirements similar to those previously imposed by Commission orders issued after the terrorist attacks of September 11, 2001. In the Statements of Consideration (SoC) for the Final Rule for Power Reactor Security Requirements (Reference 8.13), the Commission stated, in part:

> *"Current reactor licensees comply with these requirements through the use of the following 14 strategies that have been required through an operating license condition. These strategies fall into the three general areas identified by §§ 50.54(hh)(2)(i), (ii), and (iii). The firefighting response strategy reflected in § 50.54(hh)(2)(i) encompasses the following elements: ....*
>
> *7. Spent fuel pool mitigation measures"*

As such, the staff maintained EALs for potential or actual aircraft threats for facilities transitioning into decommissioning with irradiated fuel stored in a SFP, in addition to maintaining the mitigative strategies license conditions required by NRC Order EA-02-026.

The SoC further stated, in part:

> *"The NRC believes that it is inappropriate that § 50.54(hh) should apply to a permanently shutdown defueled reactor where the fuel was removed from the site or moved to an ISFSI. The Commission notes that the § 50.54(hh) do not apply to any current decommissioning facilities that have already satisfied the§ 50.82(a) requirements."*

On November 28, 2011, the NRC issued a letter that rescinded Item B.5.b of the ICM Order EA-02-026 (Reference 8.14). The rulemaking codified generically applicable security requirements previously issued by orders and updated the existing power reactor security requirements.

The NRC has subsequently incorporated the strategies and guidelines under 10 CFR 50.54(h)(2) into 10 CFR 50.155(b)(2), Extensive Damage Mitigation Guidelines (EDMGs) (Reference 8.15). 10 CFR 50.155(b)(2) provides strategies and guidelines to maintain or restore SFP cooling capabilities under the circumstances associated with loss of large areas of the plant impacted by the event, due to explosions or fire. However, as stated in 10 CFR 50.155(a)(2)(iv), this section does not apply after the certifications for permanent shutdown and

removal of fuel under 10 CFR 50.82(a)(1) have been submitted, and all of the irradiated fuel has been removed from the SFPs.

Neither the ICM Order EA-12-026 nor 10 CFR 155(b)(2) continue to apply to TMI after all of the irradiated fuel has been transferred to the ISFSI. Additionally, Exelon has requested the removal of the Mitigation Strategy License Condition form the TMI-1 Renewed Facility License (Reference 8.4). Therefore, the ICs deleted also include those associated with the mitigative strategies and response procedures for potential or actual aircraft attack procedures as the irradiated fuel has been removed from the SFP and is stored in the ISFSI.

4.2 Replacement of the "Shift Manager" with the "ISFSI Shift Supervisor"

As provided in the PDEP, the Shift Manager (SM) position is staffed 24-hours per day, is the Onsite individual who initially assumes the role of the Emergency Director (ED), and who has authority and responsibility for control and mitigation of the emergency, including emergency response resources, coordination of radiological assessment activities, and recovery implementation. In the proposed TMI IOEP the SM position is to be replaced by the ISFSI Shift Supervisor (ISS).

The ISS will be at TMI-1 ISFSI on a continuous, 24 hour per day basis, and will be the senior management position during off-hours. This position is responsible for monitoring ISFSI conditions and managing the activities at the TMI-1 ISFSI. This position assumes overall command and control of the response as the ED and is responsible for monitoring conditions and approving all onsite activities. The IOEP identifies non-delegable responsibilities, along with other designated tasks. Exelon considers this an administrative change which will not impact the timing or performance of existing emergency response duties.

4.3 Emergency Response Organization Revision

The PDEP provides for two (2) ERO augmented positions: 1) Technical Coordinator and 2) Radiation Protection Coordinator. The proposed IOEP replaces these positions with a Resource Manager and an individual trained in radiological monitoring and assessment.

A Resource Manager is provided to assist in assessing the event and obtaining needed resources. The Resource Manager is required to be in contact with the ED within two (2) hours of the classification of an Unusual Event or an Alert. The Resource Manager augments the ED by assisting in assessing the emergency condition and coordinating the required resources, including serving as the public information interface. Services provided to the ED by the Resource Manager can be provided remotely and do not necessitate an onsite response by the Resource Manager. By responding remotely, the actual response time is decreased with no negative impact to services and functional responsibilities provided by the Resource Manager. The Resource Manager's functional responsibilities could be performed in a timely manner either by reporting to the site or performing the function remotely in the specified timeframe.

In addition, TMI proposes that, for a classified event involving radiological consequences, a minimum of one person trained in radiological monitoring and assessment will report to the ISFSI within four hours of the emergency declaration.

The proposed IOEP also provides that additional personnel resources may be directed to report to TMI to provide additional support as needed to assess radiological conditions, support maintenance and repair activities, develop and implement corrective action plans, and assist

with recovery actions. The augmentation personnel are available from TMI-1 staff, Exelon, and from various contractors.

5.0 TECHNICAL EVALUATION

5.1 Radiological Consequences of Design Basis Events

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.

Chapter 6 of the TMI-1 Defueled Safety Analysis Report (DSAR) describes the Abnormal Operational Transients and Design Basis Accident (DBA) scenarios applicable to TMI-1. However, after permanent cessation of power operations and transfer of all irradiated fuel from the SFP to dry storage within the ISFSI, the remaining accident scenarios postulated in the DSAR are no longer possible. The ISFSI is a passive storage system that does not rely on electric power for heat transfer. After removal of the irradiated fuel from the SFP, there are no credible fuel related accidents for which actions of a Certified Fuel Handler (CFH), SM, or Non-Certified Operator (NCO) are required to prevent occurrence or to mitigate the consequences. There is no credible accident resulting in radioactive releases requiring offsite protective measures.

The robust design and construction of the spent fuel storage system selected for use at the ISFSI prevents the release of radioactivity in the event of an off-normal or accident event as described in the ISFSI NAC Storage System FSAR. Leakage of fission products from a canister confinement boundary breach is not considered to be a credible event, given the high integrity nature of the canister’s design and the additional protection afforded by the storage casks.

The TMI-1 PSDAR (Reference 8.3) identified that TMI-1 will decommission using a SAFSTOR method in which most plant fluid systems are drained and the plant is left in a stable condition until final decontamination and dismantlement activities begin. The PSDAR provided that TMI-1 expects to have all irradiated fuel transferred to the ISFSI by the end of 2022.

After all the irradiated fuel has been removed from the SFPs, the estimated radiological inventory (non-fuel) that remains at the TMI-1 reactor facility is primarily attributable to activated reactor components and structural materials.

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 SFP.

There are no credible accident scenarios that can mobilize a significant portion of this inventory for release. As a result, the potential accidents that could occur during decommissioning the reactor facility have negligible offsite and onsite radiological consequences.

With all irradiated fuel in dry storage within the ISFSI, the radiological status of the facility required for implementing this proposed IOEP is summarized as follows:

- The remaining radiological source term at TMI will not create an unplanned/ unanticipated increase in radiation or in liquid or airborne radioactivity levels outside of the site boundary that would result in doses to the public above EPA PAG limits at the site boundary.
- Source term accumulation from activities during decontamination and dismantlement of radioactive SSCs are administratively controlled at a level that would preclude declaring an Unusual Event.
- Necessary radiological support personnel will be administratively required to be onsite during active decontamination and dismantlement of radioactive SSCs.

The IOEP and certain ICs and EALs do not apply to decontamination and dismantlement of radioactive SSCs; since administrative controls to limit possible effluent releases will be established.

NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," (Reference 8.16) supports this conclusion in the following statement:

> *"The staff has reviewed activities associated with decommissioning and determined that many decommissioning activities not involving spent fuel that are likely to result in radiological accidents are similar to activities conducted during the period of reactor operations. The radiological releases from potential accidents associated with these activities may be detectible. However, work procedures are designed to minimize the likelihood of an accident and the consequences of an accident, should one occur, and procedures will remain in place to protect health and safety while the possibility of significant radiological accident exists."*

NUREG-0586 also makes the following supportive statement:

> *"The staff has considered available information, including comments received on the draft of Supplement 1 of NUREG-0586, concerning the potential impacts of non-spent fuel related radiological accidents resulting from decommissioning. This information indicates, that with the mitigation procedures in place, the impacts of radiological accidents are neither detectible nor destabilizing. Therefore, the staff makes the generic conclusion that impacts of non-spent fuel related radiological accidents are SMALL. The staff has considered mitigation and concludes that no additional measures are likely to be sufficiently beneficial to be warranted."*

Accordingly, administrative controls that are designed to minimize the likelihood and consequence of an off-normal or accident event would be implemented when decontamination or dismantling activities of radioactive SSCs are being performed. Implementation of the IOEP would involve TMI establishing administrative controls for radiological source term accumulation limits and methods to control the accidental dispersal of the radiological source.

Examples of radiological source term accumulation limits are based on:

- Radioactive materials collected on filter media and resins (dose rate limit)
- Contaminated materials collected in shipping containers (dose rate limit)
- Surface or fixed contamination on work areas that may create airborne radioactive material (activity limits)
- Radioactive liquid storage tank (activity concentration limits)

An example of a method to control accidental dispersal of the radiological source term is limitation on dispersal mechanisms that may cause a fire (e.g., limits on combustible material loading, use of fire watch to preclude fire, etc.) or placement of a berm around a radioactive liquid storage tank. If the dispersal control fails, the limits on source term would preclude exceeding the site boundary source term limit.

As discussed in the previously granted exemption from various emergency planning requirements contained in 10 CFR 50.47 and 10 CFR 50, Appendix E (Reference 8.1), an analysis of the potential radiological impact of a design basis accident at TMI in a permanently defueled condition indicates that any releases beyond the site boundary are below EPA PAG exposure levels, as detailed in Reference 8.10. The basis for these exemptions has not changed and remains in effect for the proposed emergency plan changes.

5.2 Radiological Consequences of Postulated Events

Although the limited scope of design basis accidents that remain applicable to the TMI facility justifies a reduction in the necessary scope of emergency response capabilities, TMI also assessed beyond design basis events using past industry precedence, including information contained in Appendix I, “Radiological Accidents,” of NUREG-0586 (Reference 8.16).

5.2.1 TMI-1

Under the previous facility condition of fuel stored within the SFPs, the most severe postulated beyond design basis event involved a highly unlikely sequence of events that causes heatup of the irradiated fuel, postulated to occur without any heat transfer, such that the zircaloy fuel cladding reaches ignition temperature (adiabatic heat up). The resultant zircaloy fire could lead to the release of large quantities of fission products to the atmosphere. However, after removal of the irradiated fuel from the SFPs, the configuration of the irradiated fuel stored in dry storage precludes the possibility of such a scenario.

With this previously limiting beyond design basis scenario no longer possible, TMI assessed the following beyond design basis events associated with performance of decommissioning activities with all irradiated fuel stored in the TMI-1 ISFSI. A summary of the assessments is provided below.

1. Cask Events (Fuel Related Accident)

   TMI-1 is the holder of a general license for the storage of irradiated fuel in an ISFSI at power sites in accordance with the provisions of 10 CFR 72.210 and 10 CFR 72.212. The generally licensed ISFSI at TMI-1 is used for interim onsite dry storage of spent nuclear fuel assemblies in the NAC International (NAC) MAGNASTOR Cask System (NAC Certificate of Compliance (CoC) No. 1031, Amendment 9) (Reference8.17).

As documented in the MAGNASTOR FSAR (Reference 8.18), the system will withstand all of the evaluated normal conditions and off-normal and postulated accident events without release of radioactive material or excessive radiation exposure to workers or the general public. There are no evaluated normal conditions, or off-normal or accident events that result in damage to the canister producing a breach in the confinement boundary. Analysis of the off-normal and accident events, including drop events, demonstrate that MAGNASTOR is in compliance with the requirements of 10 CFR 72.24 and 10 CFR 72.122 for off-normal and accident events. The MAGNASTOR design ensures subcriticality under normal conditions, and off-normal and accident events. The canister is designed to withstand normal conditions, or off-normal or accident events, including a 24-inch end drop in the concrete cask and a tip-over of the concrete cask, without precluding the subsequent removal of the fuel.

The analyses demonstrate that MAGNASTOR meets the regulatory requirements of 10 CFR 72 and the guidance of NUREG-1536,"Standard Review Plan for Dry Cask Storage Systems" in excess of regulatory requirements (Reference 8.19). Therefore, no radiological release would be expected to occur in excess of regulatory requirements.

2. Radioactive Material Handling Accident (Non-Fuel Related Event)

The limiting non-fuel related event involves the release of radioactive material from a concentrated source, such as filters, resins, and shipping containers (as discussed in NUREG-0586, Appendix 1) (Reference 8.16).

For a permanently defueled plant with no fuel in the pools, it is very unlikely that the initiating conditions for Unusual Event or Alert would occur given the programmatic controls (radiation protection, fire protection, safety, chemical control, etc.) which will continue until license termination. Additionally, limits will be placed on the amount of dispersible radioactive material stored in any one location during decontamination and dismantlement so that it is not reasonably possible to exceed two (2) times the ODCM limit in the event of a radioactive release. By limiting the potential release of radioactive materials to not exceed two (2) time the ODCM limit it can be concluded that the radiological release thresholds given in PD-1 in NEI 99-01 (Reference 8.2) for an Unusual Event (two (2) time the ODCM limit) or an Alert (10 mrem TEDE) will not occur.

After all irradiated fuel has been moved to the ISFSI, there will be no concentrated source of radioactive material available to be released to the environment in an amount that could exceed two (2) times the ODCM limit at the site boundary. Attachment 5 provides the calculation to support that any fire or release involving radiological materials currently stored on site will not produce a radiation dose exceeding 2 times ODCM limits.

The areas considered in the calculation, where potential fires could occur that would result in a release of radioactivity, are those areas listed as containing radioactive materials in the Fire Hazard Analysis (FHAR) and used in decommissioning. They are:

- Auxiliary and Fuel Handling Buildings
- Chemical Cleaning Building
- Hittman Solidification Building
- Reactor Building
- Interim Solid Waste Staging Facility (ISWSF/Carport) (Calc Attachment 2)

- Original Once Through Steam Generator (OTSG) Storage Facility

For liquid releases, the TMI-1 DSAR states that there are no credible accidents that could exceed 10 CFR 20 limits. Also, Attachment 5 addresses a liquid release resulting from a breach in the spent fuel pool.

During decontamination and dismantlement activities, administrative controls will be applied to limit the total amount of activity that could accumulate in a concentrated source such that a release to the environment would not exceed two (2) time the ODCM limit.

It is expected that representative material samples will be taken and analyzed prior to actual decontamination/dismantlement work. Using the methodology consistent with this calculation, container/filter maximum radioactivity limits will be derived.

The results of the above assessment indicate that the projected radiological doses at the controlled area boundary are less than the EPA PAGs.

5.2.2 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 8.20) 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 8.2).

5.2.3 Summary

In summary, there continues to be a low likelihood of any postulated event resulting in radiological releases requiring offsite protective measures, and there is no credible radioactive material event (non-fuel related) resulting in radiological releases requiring declaration of an emergency.

5.3 ISFSI Only Emergency Plan (IOEP)

The TMI IOEP is provided in Attachment 2 to this submittal for NRC review and approval. This proposed emergency plan is associated with EALs for events related to the ISFSI. The IOEP addresses the applicable regulations stipulated in 10 CFR 50.47, “Emergency Plans” (as exempted), 10 CFR 50, Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities” (as exempted), and 10 CFR 72.32, “Emergency Plan,” and is consistent with the applicable guidelines established in NUREG-0654/FEMA-REP-1 (Reference 8.21).

The IOEP describes the station’s plan for responding to emergencies while all irradiated fuel is in dry storage within an ISFSI. Currently, irradiated fuel is stored only in the SFPs. After all irradiated fuel at TMI-1 is in dry storage within the ISFSI, the number and severity of potential radiological accidents is significantly less than when fuel was stored in the SFPs.

The TMI IOEP conservatively provides that the emergency planning zone for the ISFSI is the area within the site boundary. At TMI, the site boundary completely encompasses the controlled area. The controlled area, as defined in 10 CFR 72.3, “Definitions,” means the area immediately

surrounding an ISFSI for which Exelon exercises authority over its use and within which ISFSI operations are performed.

The controlled area is established to limit dose to the public during normal operations and design basis accidents in accordance with the requirements of 10 CFR 72.104, “Criteria for radioactive materials in effluents and direct radiation from an ISFSI or MRS,” and 10 CFR 72.106, “Controlled area of an ISFSI or MRS.” Exelon's analysis of the radiological impact of potential accidents at the ISFSI conclude that any releases beyond the ISFSI controlled area are expected to be less than the EPA PAGs. The controlled area is completely enclosed within the site boundary. Thus, any radiological releases beyond the site boundary will also be less than the EPA PAGs.

Based on the reduced number and consequences of potential radiological events at TMI with all TMI-1 irradiated fuel in dry storage within the ISFSI, there will continue to be no need for offsite emergency response plans for the protection of the public beyond the site boundary. Additionally, the scope of the onsite emergency preparedness organization and corresponding requirements in the emergency plan may be reduced without an undue risk to the public health and safety.

The analysis of the potential radiological impact of an accident in a condition with all irradiated fuel stored in the ISFSI indicates that any releases beyond the site boundary are below the EPA PAG exposure levels as detailed in Reference 8.10. Exposure levels, which warrant pre-planned response measures, are limited to onsite areas. For this reason, radiological emergency planning is focused onsite.

5.4 ISFSI Only Emergency Action Levels

Attachment 3 provides the site-specific EAL technical bases document, which contains the proposed TMI ISFSI-Only Emergency Action Level (IOEAL) scheme for NRC review and approval. The current TMI EAL Scheme was approved by the NRC on December 2, 2020 (Reference 8.8). The new ISFSI EAL scheme is to be implemented by the TMI IOEP (provided in Attachment 2).

Deletions from the currently approved EAL scheme are listed in Section 4.1, “Elimination of Spent Fuel Pool Initiating Conditions and EALs,” Table 4-1, “Emergency Plan Initiating Conditions Being Deleted,” above.

Attachment 4 provides a comparison of the proposed EALs to NEI 99-01 (Reference 8.2).

5.4.1 Related Documents

Supporting evaluations/calculations for establishing appropriate radioactive material administrative control limits are provided in Attachment 5 to this submittal.

5.4.2 Operating Modes and Applicability

The proposed EALs are only applicable after the final spent nuclear fuel assembly has been transferred out of the SFPs and placed in dry storage within the ISFSI.

5.4.3 State and Local Government Review of Proposed Changes

In support of this license amendment discussions have been held with the Commonwealth of Pennsylvania. On January 21, 2021, the Commonwealth of Pennsylvania – Department of Environmental Protection Bureau of Radiation Protection (PA-BRP) and the Pennsylvania

Emergency Management Agency (PEMA) received the draft proposed changes of the TMI ISFSI Only Emergency Plan and EAL scheme. Attachment 6 contains acknowledgement from the Commonwealth of Pennsylvania indicating that they have no comments or concerns at this time regarding the proposed TMI ISFSI Only Emergency Plan and EALs.

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 50, Appendix E, Section IV.B.1.

6.0 REGULATORY EVALUATION

The proposed emergency plan does not meet all standards of 10 CFR 50.47(b) and requirements of 10 CFR Part 50, Appendix E. However, TMI previously received exemptions from portions of 10 CFR 50.47(b), 10 CFR 50.47(c)(2), and 10 CFR 50, Appendix E, Section IV, (Reference 8.1). The basis for these exemptions has not changed and remains in effect for the emergency plan changes requested in this document. Considering the previously approved exemptions, the emergency plan, as revised, will continue to meet the remaining applicable requirements in 10 CFR Part 50, Appendix E and the remaining applicable planning standards of 10 CFR 50.47(b).

6.1 No Significant Hazards Consideration

In accordance with 10 CFR 50.90, “Application for amendment of license, construction permit, or early site permit,” Exelon requests NRC approval of a reduction in effectiveness of the site Emergency Plan as a result of changes to the emergency plan and the removal of several EALs, to be implemented after all irradiated fuel has been removed from the SFP and placed in dry storage within the ISFSI. The proposed IOEP and ISFSI Only EAL Technical Bases Document are commensurate with the reduction in radiological source term at TMI. The PSDAR documents the time period that TMI-1 expects to have all irradiated fuel transferred to the ISFSI. To comport to the reduced scope of potential radiological accidents with all TMI-1 irradiate fuel in dry cask storage within the TMI-1 ISFSI, Exelon proposes a new emergency plan and corresponding EAL scheme.

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 TMI emergency plan and EAL scheme commensurate with the hazards associated with a permanently shut down and defueled facility that has transferred all irradiated fuel from the SFP to dry cask storage within the ISFSI.

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.

Because TMI-1 has permanently ceased power operations, the generation of fission products has ceased, and the remaining source term continues to decay. This continues to significantly reduce the consequences of previously evaluated postulated accidents.

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 amendment constitutes a revision of the emergency planning function commensurate with the ongoing and anticipated reduction in radiological source term at TMI-1.

   The proposed amendment does not involve a physical alteration of the plant. No new or different types of equipment will be installed and there are no physical modifications to existing equipment as a result of the proposed amendment. Similarly, the proposed amendment would not physically change any SSC involved in the mitigation of any postulated accidents. Thus, no new initiators or precursors of a new or different kind of accident are created. Furthermore, the proposed amendment does not create the possibility of a new failure mode associated with any equipment or personnel failures. The credible events for the ISFSI remain unchanged.

   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.

   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 IFSFI Only Emergency Plan (IOEP) will continue to provide the necessary response staff with the appropriate guidance to protect the health and safety of the public.

   The proposed amendment does not involve a change in the plant’s design, configuration, or operation. The proposed amendment does not affect either the way in which the plant SSCs perform their safety function or their design margins. Because there is no change to the physical design of the plant, there is no change to these margins.

   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.

6.2 Applicable Regulatory Requirements/Criteria

Exelon intends to meet the applicable emergency regulatory requirements as discussed below with the previously granted exemptions (Reference 8.1). The basis for these exemptions has not changed and remains in effect. The 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 (1) of Section 50.47(b) states, in part:

  “[E]ach principal response organization has staff to respond and to augment its initial response on a continuous basis.”

- Planning Standard (2) of Section 50.47(b) states, in part:

  “On-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available…”

- Planning Standard (4) of section 10 CFR 50.47(b) (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~~."

- Planning Standard (8) of Section 50.47(b) states, in part:

  “Adequate emergency facilities and equipment to support the emergency response are provided and maintained.”

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.A of Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities,” to 10 CFR Part 50, states, in part:

“The organization for coping with radiological emergencies shall be described, including definition of authorities, responsibilities, and duties of individuals assigned to the licensee’s emergency organization…”

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~~."

Section IV.E of Appendix E states, in part:

“Adequate provisions shall be made and described for emergency facilities and equipment…”. As identified in 10 CFR 72.13, “Applicability,” the applicable

emergency plan requirements for an ISFSI associated with a general license are specified in 10 CFR 72.32(c) and (d).

The proposed IO-EAL scheme format is based on NEI 99-01, Revision 6 (Reference 8.2), as appropriate after the transfer of the irradiated fuel from the SFP to the ISFSI. NRC endorsed NEI 99-01, Revision 6, by letter dated March 28, 2013 (Reference 8.22). The proposed revisions constitute a change in the emergency planning function commensurate with the ongoing and anticipated reduction in radiological source term at TMI-1.

The proposed amendment is being submitted to the NRC pursuant to 10 CFR 50.90 for the purpose of revising the TMI SEP to establish an emergency plan appropriate for a permanently defueled facility with irradiated fuel in dry cask storage within the ISFSI and a commensurate EAL scheme, predicated on approval of the exemptions granted in Reference 8.1. Additionally, the proposed changes are considered a change to the EAL scheme development methodology. 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.

6.3 Precedent

Similar changes to emergency plans and associated EAL schemes approved by the NRC for plants that have transitioned to ISFSI-only status include: (1) Fort Calhoun Station on January 10, 2020 (Reference 8.23); (2) Vermont Yankee Station on March 30, 2018 (Reference 8.24); (3) San Onofre Nuclear Generating Station on November 30, 2017 (Reference 8.25); and (4) Crystal River Unit 3 Nuclear Generating Station on March 22, 2017 (Reference 8.26).

6.4 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 the 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 5.1 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 Theodore B. Smith (U.S. Nuclear Regulatory Commission) to Mr. Bryan C. Hanson, (Exelon Generation Company, LLC), "Three Mile Island Nuclear Station, Units 1 and 2 - Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation (EPID L-2019-LLE-0016)" dated December 1, 2020 (ADAMS Accession No. ML20244A291)

8.2 Nuclear Energy Institute (NEI) 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors," dated November 2012 (ADAMS Accession No. ML12326A805)

8.3 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)

8.4 Letter from Michael P. Gallagher, (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission – "License Amendment Request – Proposed Revision to License Conditions and Permanently Defueled Technical Specifications and Revised for Permanent Removal of Irradiated Fuel from the Spent Fuel Pool (ISFSI-Only Technical Specifications)," dated December 16, 2020 (ADAMS Accession No. ML20351A451)

8.5 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 (ADAMS Accession No. ML17171A151)

8.6 Letter from Michael P. Gallagher (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, “Certification of Permanent Removal of Fuel from the Reactor Vessel for Three Mile Island Nuclear Station, Unit 1,” dated September 26, 2019 (ADAMS Accession No. ML19269E480)

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 Theodore B. Smith (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. 299 for Unit 1 Re: Permanently Defueled Emergency

Plan and Emergency Action Level Scheme," dated December 2, 2020 (ADAMS Accession No. ML20261H925)

8.9 Letter from John M. Goshen (U.S. Nuclear Regulatory Commission) to Wren Fowler (NAC International), “Issuance of Certificate of Compliance No. 1031, Amendment No. 6 for the MAGNASTOR® Cask System (CAC NO. L25069),” dated November 30, 2106 (ADAMS Accession No ML16319A068)

8.10 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)

8.11 Letter from Samuel J. Collins (U.S. Nuclear Regulatory Commission) to Oliver D. Kingsley, Jr. (Exelon Generation Company, LLC), “Issuance of Order for Interim Safeguards and Security Compensatory Measures for - Three Mile Island Nuclear Station, Unit 1,” dated February 25, 2002 (ADAMS Accession Nos. ML020510333 and ML020510635)

8.12 NRC Bulletin (BL) 2005-02, "Emergency Preparedness and Response Actions for Security Based Events," dated July 18, 2005 (ADAMS Accession No. ML051740058)

8.13 Federal Register, Volume 74, No. 58, Nuclear Regulatory Commission, 10 CFR Parts 50, 52, 72 and 73, "Power Reactor Security Requirements," dated March 27, 2009 (pages 13926-13993)

8.14 Letter from Eric J. Leads (U.S. Nuclear Regulatory Commission) to Holders of Licenses for Operating Power Reactors, "Rescission or Partial Rescission of Certain Power Reactor Security Orders Applicable to Nuclear Power Plants," dated November 28, 2011 (ADAMS Accession No. ML111220447)

8.15 Federal Register, Volume 84, No. 154, Nuclear Regulatory Commission, 10 CFR Parts 50 and 52, "Mitigation of Beyond-Design-Basis Events," dated August 9, 2019 (pages 39684-39722)

8.16 NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1," Published November 2002

8.17 Letter from John McKirgan (U.S. Nuclear Regulatory Commission) to Wren Fowler (NAC International), “Amendment No. 9 to Certificate of Compliance No. 1031 for the MAGNASTOR® Cask System,” dated November 10, 2020 (ADAMS Accession No ML20307A118)

8.18 "MAGNASTOR® (Modular Advanced Generation Nuclear All-purpose STORage), Final Safety Analysis Report, Proprietary Version, Docket 72-1031," Revision 10, dated February 2019

8.19 NUREG-1536, “Standard Review Plan for Dry Cask Storage Systems,” dated January 1997

8.20 990-3017, “Three Mile Island Unit No. 2 Fire Protection Program Evaluation, Revision 12, dated May 18, 2018

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 Letter, Mark Thaggard (U.S. Nuclear Regulatory Commission) 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)

8.23 Letter from Jack D. Parrott (U.S. Nuclear Regulatory Commission) to Mary. J. Fisher (Omaha Public Power District), “Fort Calhoun Station, Unit No. 1 - Issuance of Amendment to Change the Emergency Plan and Emergency Action Level Scheme to Reflect an ISFSI-Only Configuration (EPID NO. L-2019- LLA-0057),” dated January 10, 2020 (ADAMS Accession No. ML19346D680)

8.24 Letter from Jack D. Parrott (U.S. Nuclear Regulatory Commission) to Corey Daniels (Entergy Nuclear Operations, Inc.) – "Vermont Yankee Nuclear Power Station – “Issuance of Amendment to Change the Emergency Plan and Emergency Action Level Scheme to Reflect an ISFSI-Only Configuration (EPID NO. L-2017-EPR-0001),” dated March 30, 2018 (ADAMS Accession No. ML18053A112)

8.25 Letter from Marlayna G. Vaaler (U.S. Nuclear Regulatory Commission) to Thomas J. Palmisano (Southern California Edison Company) – “San Onofre Nuclear Generating Station, Units 1, 2, and 3 - Issuance of Amendments to Revise the Permanently Defueled Emergency Plan (CAC Nos. L53160, L53161, and L53162)”, dated November 30, 2017 (ADAMS Accession No. ML17310B482)

8.26 Letter from John B. Hickman (U.S. Nuclear Regulatory Commission) to Terry D. Hobbs (Crystal River Nuclear Plant) – “Crystal River Unit 3 Nuclear Generating Plant – Issuance of Amendment Approving Independent Spent Fuel Storage Installation (ISFSI)-Only Emergency Plan, and ISFSI-Only Emergency Action Level Bases Manual (TAC NO. L53129)," dated March 22, 2017 (ADAMS Accession No. ML17048A473)

ATTACHMENT 2

THREE MILE ISLAND NUCLEAR STATION

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) ONLY EMERGENCY PLAN (IOEP)

EXELON GENERATION

THREE MILE ISLAND

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) ONLY

EMERGENCY PLAN (IOEP)

REVISION HISTORY

REVISION	EFFECTIVE DATE	REVISION	EFFECTIVE DATE
0	TBD		

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PART I

1.0 INTRODUCTION

The INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) Only Emergency Plan (IOEP) describes the plan for responding to emergencies that may arise at the Three Mile Island Nuclear Station (TMI) ISFSI. 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 placed all spent fuel previously maintained in the stations Spent Fuel Pool into dry cask storage on the TMI-1 ISFSI. In this condition, no reactor operations can take place and all irradiated fuel is removed from the Spent Fuel Pools (SFPs).

Exelon maintains the emergency planning responsibilities for TMI-2, which is owned by TMI-2 Solutions (subsidiary of EnergySolutions), through a service agreement.

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

As provided in the ISFSI storage system Final Safety Analysis (FSAR), the analysis of the potential radiological impacts of postulated off-normal, natural phenomenon, and accident events in an ISFSI only condition indicates that any releases would result in a DOSE to the public below the radiation limits established in 10 CFR 72.106(b). Exposure levels, which warrant pre-planned response measures, are generally limited to the ISFSI pad and nearby vicinity, and for this reason; radiological emergency planning is focused on this area.

1.1 PURPOSE

The purpose of the IOEP is to assure an adequate level of preparedness 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 IOEP has been developed to respond to potential radiological emergencies at TMI. 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 on December 1, 2020 (ADAMS Accession Number: ML20244A292 and ML20244A293). 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.

2.0 DISCUSSION

2.1 OVERVIEW OF ISFSI ONLY EMERGENCY PLAN (IOEP)

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 be requested to provide assistance.

Emergency services are provided by local public and private entities as provided in Part II, Section 1.

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 Nuclear Energy Institute (NEI) 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6, November 2012 (NEI 99-01), 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)).

Exelon is responsible for planning and implementing emergency measures associated with the TMI site. 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 EPIPs is included in Appendix B.

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

2.2 FACILITY DESCRIPTION

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.

TMI-1 is owned by Exelon Generation. TMI-1 formerly consisted of a single unit Babcock and Wilcox (B&W) Company (Currently AREVA) pressurized water reactor (PWR). 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-1 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). All spent fuel has been transferred to the TMI-1 ISFSI which is located to the south of the TMI-1 facility. The TMI-1 ISFSI is a robust and high integrity facility for the spent fuel storage system. The ISFSI is designed to prevent the release of radioactivity in the event of accidents, including environmental phenomena (e.g. earthquake).

TMI-2 is owned by TMI-2 Solutions. 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 TMI-2 Solutions.

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.

2.3 SUMMARY OF EMERGENCY ACTIONS

This Plan is activated by the ISFSI Shift Supervisor (ISS), who assumes the position of EMERGENCY DIRECTOR (ED) upon DECLARATION of an emergency based upon CLASSIFICATION of an event according to the EMERGENCY ACTION LEVEL (EAL) criteria. The emergency measures described in the subsequent sections and implementing procedures are implemented in accordance with the CLASSIFICATION and nature of the emergency at the direction of the ED. Regulatory authorities and OFFSITE support organizations are notified in accordance with this Plan. The ED has authority and responsibility for control and mitigation of the emergency, including emergency response resources, coordination of radiological ASSESSMENT ACTIONS, recovery implementation, and coordination of emergency response activities. The following sections of this Plan describe the detailed plans and actions of the TMI EMERGENCY RESPONSE ORGANIZATION (ERO), including interfaces with OFFSITE support organizations.

3.0 REFERENCES

References consulted in the writing of this 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.

3.1. 10 CFR 20, “Standards for Protection Against Radiation”

3.2. 10 CFR 50.47, "Emergency plans"

3.3. 10 CFR 50.72, "Immediate notification requirements for operating nuclear power reactors"

3.4. 10 CFR 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities"

3.5. 10 CFR 72.13, "Applicability"

3.6. 10 CFR 72.32, "Emergency Plan"

3.7. 10 CFR 72.44, "License conditions"

3.8. 10 CFR 72.75, "Reporting requirements for specific events and conditions"

3.9. 10 CFR 72.106, "Controlled area of an ISFSI or MRS""

3.10. NUREG-1140, Final Report published January 1988, "A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees”

3.11. NUREG-0586, “Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities”

3.12. NUREG-0654/FEMA-REP-1, “Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (November 1980)

3.13. NUREG-0728, "Report to Congress, “NRC Incident Response Plan"

3.14. NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities"

3.15. US NRC Regulatory Guide 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors", Revision 4, July, 2003

3.16. NRC Information Notice No. 85-44, "Emergency Communication System Monthly Test"

3.17. NRC Information Notice No. 90-08, "KR-85 Hazards from Decayed Fuel"

3.18. EPA-400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," October 1991 (reprinted May 1992)

3.19. American Nuclear Insurers Bulletin #5B (1981), "Accident Notification Procedures for Liability Insured"

3.20. Letter from U.S. Nuclear Regulatory Commission to, Bryan C. Hanson (Exelon Generation Company, LLC) "Three Mile Island Nuclear Station, Units 1 and 2 – Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation (EPID L-2019-LLE-0016)," dated December 1, 2020 (ML20244A292 and ML20244A293)

3.21. TMI -1 Defueled Safety Analysis Report (DSAR)

3.22. TMI-2 Post Defueled Monitored Storage Safety Analysis Report (PDMS SAR)

3.23. MAGNASTOR® Cask System, Certificate of Compliance No. 1031, Final Safety Analysis Report, and Technical Specifications

3.24. NEI 99-01, Rev. 6, “Development of Emergency Action Levels for Non-Passive Reactors”

3.25. Environmental Protection Agency, “Protective Action Guide and Planning Guidance for Radiological Incidents,” Draft for Interim Use and Public Comment (March 2013)

3.26. 10 CFR 72.3, “Definitions”

4.0 DEFINITIONS AND ABBREVIATIONS

4.1 DEFINITIONS

This section provides definitions that are used in this document. Terms capitalized in the text of the definitions indicate that they are defined elsewhere in this section.

ACCIDENT ASSESSMENT - consists of a variety of actions taken to determine the nature, effects and severity of an accident.

ACCOUNTABILITY - A procedural or discretionary PROTECTIVE ACTION taken for all persons within the ISFSI PROTECTED AREA, which involves the gathering of personnel into pre-designated areas, and the subsequent verification that the location of these personnel is known.

ALERT - See definition in Part II, Section 4.2.

ANNUAL - Frequency of occurrence equal to once per calendar year, January 1 to December 31.

ASSESSMENT ACTIONS - Actions taken during or after an emergency for the purpose of obtaining and processing the information that will be used to make the decisions to implement specific emergency measures.

BIENNIAL - Frequency of occurrence equal to once per two calendar year periods.

CLASSIFICATION - The comparison of conditions, indications, and reports associated with an off-normal, natural phenomenon, or accident event to the approved emergency classification system to determine the most accurate EMERGENCY ACTION LEVEL. The classification of emergencies is divided into two (2) categories or conditions, in ascending order of severity they are (1) UNUSUAL EVENT and (2) ALERT.

COMMAND AND CONTROL - When in COMMAND AND CONTROL of the event, the designated individual has overall responsibility for the TMI emergency response efforts.

CORRECTIVE ACTION - Those emergency measures taken to lessen or terminate an emergency situation to prevent an uncontrolled release of radioactive material, or to reduce the magnitude of a release. CORRECTIVE ACTIONS include, but are not limited to, equipment repair or shutdown, installation of emergency structures, firefighting, repair, and damage control.

DECLARATION - Official determination by the EMERGENCY DIRECTOR that conditions at the ISFSI meet the criteria for an EMERGENCY ACTION LEVEL warranting CLASSIFICATION of an emergency at the UNUSUAL EVENT or ALERT CLASSIFICATION.

DECONTAMINATION - The reduction or removal of radioactive material contamination from a structure, area, material, object, or person. Decontamination may be accomplished by (1) treating the surface so as to remove or decrease the contamination, (2) letting the material stand so that the radioactivity is decreased as a result of natural decay, and (3) covering the contamination.

DESIGN BASIS ACCIDENT (DBA) - Credible accident events as analyzed in the ISFSI storage system Final Safety Analysis Reports (FSARs).

DOSE - A generic term that means absorbed dose, dose equivalent, effective dose equivalent, deep dose equivalent, committed dose equivalent, committed effective dose equivalent, or TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE).

DOSE RATE - The amount of ionizing (or nuclear) radiation to which an individual would be exposed per unit of time. As it would apply to DOSE RATE to a person, it is usually expressed as rems per hour or in submultiples of this unit, such as millirems per hour. The DOSE RATE is commonly used to indicate the level of radioactivity in a contaminated area.

EMERGENCY ACTION LEVEL (EAL) - A pre-determined, site-specific, observable threshold for an INITIATING CONDITION that when met or exceeded places TMI in a given EMERGENCY CLASSIFICATION LEVEL.

EMERGENCY CLASSIFICATION LEVEL (ECL) - One of a set of names or titles established by the Nuclear Regulatory Commission (NRC) for grouping off-normal events or conditions according to potential or actual effects or consequences, and the resulting response actions. The EMERGENCY CLASSIFICATION LEVELS applicable to TMI, in ascending order of severity, are:

- UNUSUAL EVENT
- ALERT

EMERGENCY DIRECTOR (ED) - The Director of the facility in COMMAND AND CONTROL of the event. The ISFSI Shift Supervisor fills the role of ED throughout an event.

EMERGENCY PLAN IMPLEMENTING PROCEDURES (EPIPS) - Specific procedures describing actions needed to implement the IOEP and describing the methods established to maintain and monitor the IOEP.

EMERGENCY RESPONSE FACILITY (ERF) - The security center of the station from which the ISFSI can be monitored. The facility containing the communication equipment necessary for both normal and emergency conditions. It is operated under the direction of the ISS/ED and serves as the primary location for event CLASSIFICATION, emergency DECLARATION and Notifications to OFFSITE agencies, ASSESSMENT ACTIONS, and CORRECTIVE ACTION direction.

EMERGENCY RESPONSE ORGANIZATION (ERO) - Organization of personnel who may be called upon during an emergency to perform duties to mitigate accident conditions at TMI.

EMERGENCY RESPONSE PERSONNEL - Personnel who may be called upon during an emergency to perform duties to mitigate accident conditions at TMI.

ESSENTIAL PERSONNEL - TMI-1 personnel that either have assigned emergency response duties, are security personnel, are required for maintaining the safe operation of the ISFSI, or are personnel either identified as essential by the ISS/ED or performing critical tasks under the direction of the ISS/ED.

EXCLUSION AREA/EXCLUSION AREA BOUNDARY (EAB) - 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.

EXERCISE - An event that tests the integrated capability of a major portion of the basic elements existing within emergency preparedness plan and organization.

HOSTAGE - See definition in Addendum 1.

HOSTILE ACTION - See definition in Addendum 1.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) - A complex designed and constructed for the interim storage of spent nuclear fuel, solid reactor-related Greater Than Class C (GTCC) waste, and other radioactive materials associated with spent fuel and reactor-related GTCC waste storage.

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

INTEGRATED DRILL - A drill that incorporates multiple demonstration requirements to be conducted in connection with one another.

LEAD AGENCY - Pennsylvania Emergency Management Agency (PEMA)

LOCAL GOVERNMENT AGENCIES - Dauphin and Lancaster Counties

OFFSITE - The area around the station that lies beyond the EAB.

ONSITE - The area around the station that lies within the EAB.

PROTECTIVE ACTIONS - Those emergency measures taken for the purpose of preventing or minimizing radiological, or other hazard, exposures to affected population groups.

RADIOLOGICALLY CONTROLLED AREA (RCA) - An area within the restricted area posted in accordance with procedure for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials.

TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE) - The sum of the effective DOSE equivalent (for external exposure) and the committed effective DOSE equivalent (for internal exposure).

UNUSUAL EVENT (UE) - See definition in Part II, Section 4.1.

4.2 ACRONYMS

BRP	Bureau of Radiation Protection (Pennsylvania)
CFR	Code of Federal Regulations
DBA	DESIGN BASIS ACCIDENT
DLR	Dosimeter of Legal Record
DSAR	Defueled Safety Analysis Report
EAB	EXCLUSION AREA BOUNDARY
EAL	EMERGENCY ACTION LEVEL
ECL	EMERGENCY CLASSIFICATION LEVEL
ED	EMERGENCY DIRECTOR
EP	Emergency Preparedness
ENS	Emergency Notification System (NRC)
EPIPS	EMERGENCY PLAN IMPLEMENTING PROCEDURES
ERF	EMERGENCY RESPONSE FACILITY
ERO	EMERGENCY RESPONSE ORGANIZATION
HMC	Hershey Medical Center
ISFSI	INDEPENDENT SPENT FUEL STORAGE INSTALLATION
ISS	ISFSI Shift Supervisor
IOEP	ISFSI-Only Emergency Plan
NRC	United States Nuclear Regulatory Commission
PA	Protected Area
PEMA	Pennsylvania Emergency Management Agency
RCA	RADIOLOGICALLY CONTROLLED AREA
TEDE	TOTAL EFFECTIVE DOSE EQUIVALENT
UE	UNUSUAL EVENT

PART II

1.0 ASSIGNMENT OF RESPONSIBILITY (ORGANIZATION CONTROL)

Planning Standard 50.47(b)(1) (as exempted in Reference 3.20) – Primary responsibilities for emergency response by the nuclear facility licensee and by State and local organizations have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis.

1.1 EMERGENCY RESPONSE AND RESPONSIBILITIES

The ISFSI Shift Supervisor (ISS) is at the station 24 hours a day and is the senior management position at the station during off-hours. This position is responsible for monitoring TMI-1 ISFSI conditions, managing TMI-1 ISFSI activities, and monitoring TMI-2 conditions.

The individual in charge of the TMI emergency response is given the title of EMERGENCY DIRECTOR (ED). When an off-normal, natural phenomenon, or accident event becomes apparent, the ISS shall assess the condition and declare an emergency if warranted. When an emergency is declared the ISS assumes the position of the EMERGENCY DIRECTOR (ED).

The on-shift personnel, as described in Part II, Section 2.1, are available 24 hours per day. The on-shift personnel are capable of performing all required response actions, including manning of communications, until individuals arrive to augment shift personnel. The ERO maintains the depth and capability for continuous 24-hour coverage of the emergency response for a protracted period.

1.2 OFFSITE RESPONSE ORGANIZATIONS (ORO)

Agreements are maintained with OFFSITE organizations who do not take part in the organizational control of the emergency, that provide assistance when called upon during an emergency or during the recovery phase. These agreements identify the emergency measures to be provided, the mutually accepted criteria for implementation, and the arrangements for exchange of information. The actual letters and memoranda of agreement are maintained in Emergency Preparedness files, with the exception of the law enforcement, which is maintained by Security. These organizations provide services of:

a) Fire protection,
b) Rescue operations,
c) Ambulance services,
d) Medical and hospital services, and
e) Law enforcement.

Pennsylvania Emergency Management Agency (PEMA)

PEMA is the LEAD AGENCY and is required to be notified within 30 minutes after declaring an emergency. PEMA is available on a 24-hour basis to receive emergency communications from

TMI staff and will implement/coordinate the Commonwealth's response as part of the Comprehensive Emergency Management Plan.

County Support

Dauphin and Lancaster Counties Emergency Management Agencies will be notified within 30 minutes after declaring an emergency. The Counties will aid in supplying emergency management support (fire, medical support).

Pennsylvania State Police

Local Law Enforcement Agency to provide emergency assistance per the Site Security Plan. The Letter of Agreement is maintained by the Site Security Department).

Londonderry Volunteer Fire Department

Arrangements have been made with the Londonderry Volunteer Fire Department to provide the primary response for fire and emergency medical services(ambulance). The Londonderry Fire Department is approximately 5 miles from the TMI facility, which allows for timely response from the initial notification.

Hershey Medical Center

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.

2.0 EMERGENCY RESPONSE ORGANIZATION (ERO)

Planning Standard 50.47(b)(2) – On-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available and the interfaces among various onsite response activities and offsite support and response activities are specified.

2.1 ON-SHIFT POSITIONS

TMI-1 has personnel on-shift at all times that provide the initial response to an event. Members of the on-shift organization are trained on their responsibilities and duties in the event of an emergency and are capable of performing all necessary response actions until the augmentation personnel arrive or the event is terminated. The normal shift staffing assignments include the roles and responsibilities for their emergency response functions.

2.1.1 ISFSI SHIFT SUPERVISOR (ISS)/EMERGENCY DIRECTOR (ED)

The ISS is the on-shift individual who makes the initial event CLASSIFICATION and assumes the role of ED upon emergency DECLARATION and has the authority and responsibility to immediately and unilaterally initiate any emergency actions. If the ISS is unavailable or incapacitated, another on-shift person, qualified as ED, will assume the ED duties.

The ED has the authority to suspend any security measure described in the Physical Security Plan as necessary to facilitate response to emergency conditions.

The non-delegable responsibilities of the ISS/ED include the following:

- Event CLASSIFICATION and emergency DECLARATION
- Authorization of radiation exposure in excess of 10 CFR 20 limits

Key delegable responsibilities of the ED include the following:

- Notification of OFFSITE agencies (federal, state, and local)
- Management of available station resources
- Initiation of assessment and mitigative/CORRECTIVE ACTIONS
- Initiation of ONSITE PROTECTIVE ACTIONS
- Decision to call for OFFSITE law enforcement, firefighting or ambulance assistance
- Augmentation of the EMERGENCY RESPONSE ORGANIZATION as deemed necessary
- Coordination or suspension of Security activities
- Termination of the emergency condition when appropriate
- Performance of initial radiological assessment
- Maintain a record of event activities

2.2 SECURITY

Station Security is administered by the Security Plan and Security personnel report to the ED when implementing the IOEP. Security personnel assist the ED as directed.

2.3 AUGMENTED POSITION

The ERO is responsible for implementing the actions described in this Plan. The ERO is made up of on-shift personnel (described in Part II, Section 2.1), augmented by the Resource Manager, and Radiological Assessment Personnel (if required). Supplemental personnel are contacted as needed.

2.3.1 RESOURCE MANAGER

The Resource Manager will be in contact with the ED within two (2) hours of CLASSIFICATION. The Resource Manager will augment the ED by assisting in assessment of the emergency conditions (refer to Table 2-1) and coordinating required resources, including public information interface. The Resource Manager does not need to physically report to TMI to perform their responsibilities. Supplemental personnel shall report at the discretion of the ED and/or the Resource Manager.

2.3.2 RADIOLOGICAL ASSESSMENT PERSONNEL

For a declared emergency involving radiological consequences (e.g. E-HU1), a minimum of one person trained in radiological monitoring and assessment will report to the ISFSI within four hours of the emergency DECLARATION to assist the ED.

2.4 SUPPLEMENTAL PERSONNEL

Additional personnel resources may be directed to report to TMI to provide support as needed to assess radiological conditions, conduct maintenance and repair activities, develop and implement CORRECTIVE ACTION plans, and assist with recovery actions. The supplemental personnel are available from TMI staff, Exelon personnel, and may be requested from various contractors as needed.

2.5 FUNCTIONAL RESPONSIBILITIES

Table 2-1 below lists the functional responsibilities of on-shift and augmented positions that fulfill emergency staffing capabilities.

TABLE 2-1
EMERGENCY RESPONSE ORGANIZATION STAFFING AND RESPONSIBILITY

FUNCTIONAL AREA	LOCATION	SHIFT STAFFING	AUGMENTED OFFSITE RESPONSE
Assessment of Condition	EMERGENCY RESPONSE FACILITY	EMERGENCY DIRECTOR (a)	Resource Manager
Emergency Direction and Control	EMERGENCY RESPONSE FACILITY	EMERGENCY DIRECTOR (a)	---
Notifications / Communications	EMERGENCY RESPONSE FACILITY	EMERGENCY DIRECTOR (a)	---
Radiological ACCIDENT ASSESSMENT and PROTECTIVE ACTIONS	EMERGENCY RESPONSE FACILITY / On Scene	EMERGENCY DIRECTOR (a)	Resource Manager (b)
			RP Support (c)
CORRECTIVE ACTIONS	EMERGENCY RESPONSE FACILITY / On Scene	EMERGENCY DIRECTOR (a)	Resource Manager (b) / Supplemental / Support Personnel
Firefighting	On Scene	Per Fire Protection Program Plan	OFFSITE Response Organization
Rescue and First Aid Treatment	On Scene	(d)	OFFSITE Response Organization
Security	Per Security Plan	Per Security Plan	---

(a) One person comprising the on-shift minimum staff. May perform concurrent functions.

(b) One person comprising the augmented ERO. May perform concurrent functions.

(c) For a declared emergency involving radiological consequences (E-HU1), a minimum of one person trained in radiological monitoring and assessment will report to the TMI-1 ISFSI within four (4) hours of the emergency DECLARATION.

(d) Provided by on-shift personnel who may be assigned other functions.

3.0 EMERGENCY RESPONSE SUPPORT AND RESOURCES

Planning Standard 50.47(b)(3) (as exempted in Reference 3.20) – Arrangements for requesting and effectively using assistance resources have been made, and other organizations capable of augmenting the planned response have been identified.

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 C.

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.

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 B.

4.0 EMERGENCY CLASSIFICATION SYSTEM

Planning Standard 50.47(b)(4) (as exempted in Reference 3.20) – 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.

TMI utilizes NEI 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors" as its basis for classifying emergencies. The CLASSIFICATION system referenced in NEI 99-01, Rev. 6 has been endorsed by the NRC and offers a standard method for classifying emergencies. Addendum 1 provides the site and ISFSI Only EALs.

This Plan addresses two (2) CLASSIFICATIONS of emergencies (UNUSUAL EVENT and ALERT), which represent a hierarchy of emergencies based on potential accidents that could occur at TMI. Once indications are available that an EAL is met, the event is assessed and classified, and the corresponding EMERGENCY CLASSIFICATION LEVEL is promptly declared as soon as possible.

4.1 UNUSUAL EVENT

EVENTS ARE IN PROGRESS OR HAVE OCCURRED WHICH INDICATE A POTENTIAL DEGRADATION OF THE LEVEL OF SAFETY AT TMI OR INDICATE A SECURITY THREAT TO FACILITY PROTECTION HAS BEEN INITIATED. NO RELEASES OF RADIOACTIVE MATERIAL REQUIRING OFFSITE RESPONSE OR MONITORING ARE EXPECTED. STATE AND LOCAL GOVERNMENT AGENCIES, AND THE NRC ARE NOTIFIED OF AN UNUSUAL EVENT.

The purpose of the UNUSUAL EVENT CLASSIFICATION is to bring the on-shift staff to a state of readiness and to provide for systematic handling of event information and its related decision making.

4.2 ALERT

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

As in the case of the UNUSUAL EVENT, the ALERT CLASSIFICATION includes emergency situations which are not expected to threaten the public, but for which notification of the State and LOCAL GOVERNMENT AGENCIES, and the NRC is required.

On-shift staffing will be supplemented by the augmented ERO at the ALERT Level.

4.3 EMERGENCY ACTION LEVELS AND POSTULATED ACCIDENTS

Both EMERGENCY CLASSIFICATION LEVELS are characterized by EALs consisting of specific instrument readings and/or observations which are used to tell the TMI-1 ISS that an INITIATING CONDITION has been met. These EALs are used to assure that the initial CLASSIFICATION of emergencies can be accomplished rapidly, allowing for the prompt identification of the nature of mitigating activities needed.

EALs and INITIATING CONDITIONS are provided under the following categories for TMI:

- Hazards and Other Conditions
- ISFSI Malfunction

Specific guidance for classifying emergencies is found in EPIPs and Addendum 1, TMI ISFSI Only Emergency Action Levels and Technical Bases.

EALs shall be reviewed with State and LOCAL GOVERNMENT AGENCIES on an ANNUAL basis.

5.0 NOTIFICATION METHODS AND PROCEDURES

Planning Standard 50.47(b)(5) (as exempted in Reference 3.20) – Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow-up messages to response organizations has been established.

5.1 NOTIFICATION AND MOBILIZATION OF TMI EMERGENCY RESPONSE PERSONNEL

The EPIPs provide direction for alerting and notifying ONSITE EMERGENCY RESPONSE PERSONNEL of the initial CLASSIFICATION or any escalation of an emergency by verbal announcement over portable radios. Each emergency CLASSIFICATION may result in augmentation personnel being notified to respond. EPIPs provide direction for augmentation should it be deemed appropriate.

5.2 BASES FOR NOTIFICATION OF OFFSITE AGENCIES

The notification of personnel and EMERGENCY RESPONSE ORGANIZATIONS is commensurate with the hazard posed by the emergency. The EMERGENCY CLASSIFICATION SYSTEM described in Part II, Section 4.0 is the primary bases for notification and has been mutually agreed upon by applicable state and federal response organizations.

The ED is responsible for identifying the appropriate emergency CLASSIFICATION, declaring the emergency and initiating emergency notifications.

Notification to the LEAD AGENCY and LOCAL GOVERNMENT AGENCIES is required within 30 minutes of emergency DECLARATION, escalation, or change in radiological release status.

The following OFFSITE agencies, at a minimum, will receive emergency messages:

- PEMA
- Dauphin County
- Lancaster County

5.3 EMERGENCY MESSAGES

Notification of an emergency is provided verbally to the State and LOCAL GOVERNMENT providing them with applicable information utilizing an established message format that describes the accident status. The content of the initial notification and follow-up message form has been established in conjunction with the Commonwealth of Pennsylvania and includes the date and time of the incident, the class of emergency, and the EAL. Appropriate identification of the caller and time of the notification are also provided.

Follow-up messages will be provided as directed by EPIPs.

5.4 NRC EVENT NOTIFICATION

The NRC Operations Center will be notified immediately following notification of the appropriate state and LOCAL GOVERNMENT AGENCIES, and not later than 60 minutes after the time of initial emergency DECLARATION, escalation, termination or entry into the recovery phase via the Event Notification System (ENS). Notification to the NRC is the responsibility of the ED.

5.5 SUPPORT ORGANIZATIONS

Medical, local law enforcement agency, and firefighting support services are notified for assistance via the public 9-1-1 system, using the commercial telephone, as the situation dictates. Cellular or satellite phones may be used as the back-up means of communication.

6.0 EMERGENCY COMMUNICATIONS

Planning Standard 50.47(b)(6) (as exempted in Reference 3.20) – Provisions exist for prompt communications among principal response organizations to emergency personnel.

Provisions exist for prompt communications between principal response organizations and EMERGENCY RESPONSE PERSONNEL. The communications systems listed int Table 6-1 provide 24-hour ONSITE and OFFSITE communications capability. Communication systems are tested to verify proper operation at the testing frequency specified in Table 6-1. Communication systems that are listed with a testing frequency of “Frequent Use” indicates that the associated equipment is normally used at a sufficiently high regularity (e.g. multiple times each day), such that separate additional testing is not needed. Functionality is verified through normal (frequent) use of the system.

TABLE 6-1
Communication Systems

Communication System	Testing Frequency
Commercial telephone system	Frequent Use
Portable radios	Frequent Use
NRC FTS Network (ENS)	Monthly
Mobile communications devices (cellular or satellite phones)	Quarterly*

* Performance of drill requirements specified in Part II, Section 14, satisfies the testing frequency

7.0 PUBLIC INFORMATION

Planning Standard 50.47(b)(7) (as exempted in Reference 3.20) – The principal points of contact with the news media for dissemination of information during an emergency are established in advance, and procedures for coordinated dissemination of information to the public are established.

As the principle point of contact for the dissemination of information during an event at the TMI, Exelon Corporate Communications Department personnel will be notified of a declared emergency. Corporate Communications Department will monitor media activity and coordinate with senior management disseminating public information per communication protocols. As necessary, news conference(s) can be conducted at the site or other coordinated location. Corporate Communications Department personnel, or senior TMI management will represent the facility as the spokesperson. If an event occurs at the TMI, information will be disseminated to the public in a timely manner.

The Corporate Communications Department personnel address any misinformation related to a declared emergency.

8.0 EMERGENCY FACILITY AND EQUIPMENT

Planning Standard 50.47(b)(8) – Adequate emergency facilities and equipment to support the emergency response are provided and maintained.

This section of the Plan identifies and describes the emergency response facilities, the communication systems, the assessment facilities and equipment, the first aid and medical facilities, and protective equipment and supplies that can be utilized during an emergency.

8.1 EMERGENCY RESPONSE FACILITY

EMERGENCY RESPONSE FACILITY (ERF) is staffed in accordance with Part II, Section 2.0, and provides availability of communications systems as specified in Part II, Section 6.0. The ERF is open on a continuous basis. There is no activation needed.

The emergency COMMAND AND CONTROL functions are managed within the ERF. Within the ERF, the ED (or other personnel as directed) can assess conditions, evaluate the magnitude and potential consequences of abnormal conditions, initiate preventative and CORRECTIVE ACTIONS; and perform notifications.

Radiological conditions as a result of DBAs specified in the ISFSI storage system FSARs do not inhibit staffing of the ERF.

8.2 EMERGENCY EQUIPMENT

This section describes the monitoring instruments used to initiate emergency measures and provide continuing assessment of conditions throughout the course of an emergency.

8.2.1 PORTABLE RADIATION AND CONTAMINATION MONITORING INSTRUMENTS

Portable radiation and contamination monitoring instruments and sampling equipment normally utilized and maintained by the radiation protection personnel and are available for emergency use.

8.2.2 COMMUNICATION SYSTEMS

Communication systems are identified and tested as described in Part II, Section 6.

8.2.3 EMERGENCY SUPPLIES

Emergency equipment and supplies necessary to carry out the provisions of the IOEP and EPIPs are maintained at the ERF. Emergency kits are maintained in accordance with the EPIPs and contain self-reading dosimeters. Sufficient reserves of instruments/equipment are provided to replace those which are removed from emergency kits for calibration or repair. Calibration of instruments has been established at intervals recommended by instrument suppliers, or as required by Federal regulations.

8.2.4 FIRST AID FACILITIES

First aid supplies and equipment are located at the TMI ERF. Qualified personnel are available 24 hours per day to provide medical treatment as referenced in Part II, Section 12.

9.0 ACCIDENT ASSESSMENT

Planning Standard 50.47(b)(9) (as exempted in Reference 3.20) – Adequate methods, systems, and equipment for assessing and monitoring actual or potential consequences of a radiological emergency condition are in use.

The ASSESSMENT ACTIONS required to evaluate a particular emergency depend on the specific nature and CLASSIFICATION of the emergency. The ED is responsible for the initial measurement of ISFSI DOSE RATES after an off-normal, natural phenomenon, or accident event. The EALs identify the parameter value to determine the emergency condition. CLASSIFICATION of events is performed by the ED in accordance with the EAL scheme.

If the measured ISFSI DOSE RATES exceed the EAL threshold, the ED then performs a radiological release assessment in the vicinity of the affected storage module or cask. After completing the assessment, the ED contacts the Resource Manager to assist in interpreting the radiological release assessment results.

Notification of a radiological release assessment is in accordance with Part II, Section 5.0.

10.0 PROTECTIVE ACTIONS

Planning Standard 50.47(b)(10) (as exempted in Reference 3.20) – A range of protective actions has been developed for emergency workers and the public.

PROTECTIVE ACTIONS for ONSITE personnel are provided for their health and safety. Implementation guidelines for ONSITE PROTECTIVE ACTIONS are provided in EPIPs.

Additionally, the EPIPs provide for a range of PROTECTIVE ACTIONS (e.g. relocation of personnel and personnel take cover) to protect ONSITE personnel during HOSTILE ACTIONS.

10.1 SITE EGRESS CONTROL METHODS

All non-ESSENTIAL PERSONNEL are evacuated from the facility at the discretion of the ED. In the event of a suspected radiological release, personnel are monitored for radioactive contamination prior to leaving the facility. Portable radiation survey meters are available to monitor for potential contamination.

10.2 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.

10.3 ACCOUNTABILITY

ACCOUNTABILITY should be considered and used as a PROTECTIVE ACTION whenever a site wide risk to health or safety exists and prudence dictates. If personnel ACCOUNTABILITY is required, at the direction of the ED all individuals at the site (including employees without emergency assignments, visitors, and contractor personnel) shall be notified of the emergency.

ACCOUNTABILITY of all personnel inside the ISFSI PROTECTED AREA (PA) should be accomplished within 60 minutes of the ACCOUNTABILITY announcement (provided ACCOUNTABILITY is still determined to be necessary). If personnel are unaccounted for, teams shall be dispatched to locate the 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.

Non-ESSENTIAL PERSONNEL located outside of the ISFSI PA but within the SITE BOUNDARY will be directed to report to an assembly area or exit the site, as appropriate.

The ED is responsible for controlling access to the site when the IOEP is activated.

11.0 RADIOLOGICAL EXPOSURE CONTROL

Planning Standard 50.47(b)(11) – Means for controlling radiological exposures, in an emergency, are established for emergency workers. The means for controlling radiological exposures shall include exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides.

11.1 EXPOSURE GUIDELINES

TMI maintains a radiological exposure control program to assure that protection against radiological exposure, as set forth in 10 CFR Part 20 is provided. This program is implemented through the radiological protection procedures which cover both normal and emergency radiation protection measures.

Means for controlling radiological exposures in an emergency are established for emergency workers. The means for controlling radiological exposures shall include exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides in EPA-400-R92-001 (EPA-400).

During an emergency, DOSES above normal occupational radiation exposure limits may be authorized by the ED (non-delegable responsibility) for activities such as saving a life, preservation of valuable equipment, or controlling exposure. Table 11-1 contains the guidelines for emergency exposure criteria, which is consistent with the EPA-400 Table 2-2, “Guidance on Dose Limits for Workers Performing Emergency Services”.

11.2 RADIATION PROTECTION

The purpose of a Radiation Protection Program is to assure that radiation DOSES received by personnel are kept as low as reasonably achievable (ALARA) and do not exceed the prescribed limits for both normal and emergency conditions. The established measures to provide this assurance include access control, personnel monitoring, and contamination control.

11.3 ACCESS CONTROL

During a declared emergency, radiological surveys of the ISFSI area will be performed to determine the actual extent of the radiological conditions. As necessary, the ED will ensure RCAs and access controls are established to prevent personnel from entering the area. Recovery and CORRECTIVE ACTIONS will be planned and executed in a manner that minimizes exposure to personnel.

11.4 PERSONNEL EXPOSURE MONITORING

Personal dosimeters are utilized to monitor the exposure of personnel during normal or emergency conditions. Emergency workers will receive Dosimeter of Legal Record (DLR) badges and personal self-reading dosimeters capable of measuring expected exposures on a real time basis. Adequate supplies of dosimeters are maintained for use during an emergency. Procedures

describe in detail the types of personal dosimeter devices, the manner in which they are to be used, who is to wear them, and how they are to be cared for.

Emergency worker DOSE records are maintained in accordance with facility procedures.

11.5 CONTAMINATION CONTROL

Various contamination control measures are utilized. These include access control measures and means for the DECONTAMINATION of personnel, areas, and equipment. These activities are addressed in facility procedures and are briefly described below.

All personnel are monitored for radioactive contamination prior to leaving the RCA. During normal or emergency conditions, contamination should be removed from any part of a person's body prior to their leaving the RCA. All personnel DECONTAMINATION, even during an emergency, will be performed under the supervision of personnel trained in radiological monitoring and assessment and in accordance with established procedures.

Portable contamination monitoring instruments are available to frisk personnel for potential contamination.

Documentation of surveys, contamination, and DECONTAMINATION activities shall be maintained in accordance with facility procedures.

Table 11-1
Emergency Worker Guidelines

Guideline DOSE Limit (Rem TEDE)	Activity	Condition
5	All	Personnel should be kept within normal 10 CFR 20 limits during bona fide emergencies, except as authorized for activities as indicated below.
10	Protecting valuable property	Lower DOSE not practicable.
25	Lifesaving or protection of large populations	Lower DOSE not practicable.
> 25	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.

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12.0 MEDICAL AND HEALTH SUPPORT

Planning Standard 50.47(b)(12) – Arrangements are made for medical services for contaminated injured individuals.

Medical assistance is available ONSITE and OFFSITE for treatment of TMI personnel. Various means of transportation are available to transport individuals for radiological and non-radiological injuries.

The individuals and organizations providing emergency medical assistance as identified in this section either have the capability for evaluation of radiation exposure and uptake or they are provided this capability from Exelon in the form of personnel and/or equipment. Exelon assures that persons providing these services are adequately prepared to handle contaminated individuals through detailed training classes, drills and EXERCISES. Letters of Agreement with OFFSITE organizations and individuals for medical support are listed in Appendix C.

12.1 ONSITE FIRST AID

First aid assistance at TMI is designed to handle a wide range of injuries. This task is accomplished by ONSITE individuals trained in basic first aid procedures.

12.2 MEDICAL TRANSPORTATION

Transportation of injured personnel is available via local emergency medical services, TMI vehicles, or private vehicles. When personnel are transported to the Hershey Medical Center (HMC) while in a contaminated condition, a person trained in radiological monitoring will be dispatched to monitor and maintain radiological controls.

12.3 OFFSITE MEDICAL SUPPORT

HMC have medical facilities capable of handling various types of injuries. HMC are capable of treating patients with injuries of a non-radiological or radiological nature. When personnel are transported to OFFSITE medical facility while in a contaminated condition, a person trained in radiological monitoring will be dispatched to monitor and maintain radiological controls.

13.0 EMERGENCY TERMINATION AND RECOVERY

Planning Standard 50.47(b)(13) – General plans for recovery and reentry are developed.

Exelon has established general plans described in the following sections to conduct recovery from potential emergencies at TMI. The recovery organization will be based on the normal TMI organization and would function with the senior management position being responsible for site activities.

13.1 EMERGENCY TERMINATION AND NOTIFICATION

Termination of an emergency status is the responsibility of the ED. The ED is also responsible for providing notification of the emergency termination and initiation of recovery operations to the NRC, State and LOCAL GOVERNMENT AGENCIES, the TMI ERO and other organizations that may be providing ONSITE support.

13.2 RECOVERY OPERATIONS

Recovery operations begin immediately following emergency termination and will address the specific emergency circumstances. Recovery planning includes equipment to be repaired or replaced, licensing implications, special training requirements, OFFSITE support, and determination of causes and consequences. Site procedures addressing Recovery operations provide an outline for a short-term recovery plan.

The senior management position shall be responsible for the development and implementation of the recovery plan and shall provide for detailed monitoring of the implementation and status reporting. The senior management position also has the authority to revise or halt activities as circumstances dictate.

The ISFSI recovery will be terminated by the TMI senior management position after the ISFSI has been returned to a stable condition.

14.0 EXERCISE AND DRILLS

Planning Standard 50.47(b)(14) – Periodic exercises are (will be) conducted to evaluate major portions of emergency response capabilities, periodic drills are (will be) conducted to develop and maintain key skills, and deficiencies identified as a result of exercises or drills are (will be) corrected.

14.1 EXERCISE AND DRILL

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. 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.

EXERCISE and drill scenarios are developed to provide reasonable assurance that anticipatory responses will not result from preconditioning of participants. EXERCISE and drill scenarios, as appropriate, emphasize coordination among ONSITE and OFFSITE response organizations. The scenarios for use in EXERCISES and drills include, at a minimum, the following:

- Basic objective(s) and appropriate evaluation criteria,
- Date(s), time period, place(s), and participating organizations,
- Simulation lists,
- Time schedule of real and simulated initiating events,
- Narrative summary describing the conduct of the EXERCISES or drills to include such things as simulated casualties, OFFSITE fire department assistance, search and rescue of personnel, use of protective clothing, and
- List of controllers and participants.

In accordance with applicable portions to Section IV.G to NSIR/DPR-ISG-01, the scenario will vary from year to year.

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.

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

14.2 EQUIPMENT AND PROFICIENCY DRILLS

Drills are conducted to provide supervised instruction, training and practice opportunities for ERO members. Drills may be performed as part of the BIENNIAL EXERCISE, INTEGRATED DRILL or as an independent drill. A drill may be a component of an EXERCISE. Drills are supervised and evaluated by qualified personnel. Drills are conducted, in addition to the EXERCISE at the frequencies indicated below:

14.2.1 COMMUNICATION DRILLS

A communications drill with State and LOCAL GOVERNMENT AGENCIES is conducted ANNUALLY. A communications drill with NRC Headquarters is conducted ANNUALLY. Communication drills include the aspect of understanding the content of messages.

14.2.2 FIRE DRILLS

Fire drills are conducted in accordance with TMI Fire Protection Program.

14.2.3 SECURITY DRILLS

Security drills will be conducted in accordance with the TMI Security Plan.

14.2.4 MEDICAL EMERGENCY DRILLS

A medical emergency drill, involving a simulated contaminated individual, which contains provisions for participation by local support services organizations (i.e., ambulance and support hospital), is conducted ANNUALLY. The OFFSITE portions of the medical drill may be performed as part of the required BIENNIAL EXERCISE or INTEGRATED DRILL.

14.2.5 RADIATION PROTECTION DRILLS

A Radiation Protection drill to demonstrate radiation monitoring personnel to demonstrate ability to perform radiological survey and assessment will be conducted ANNUALLY.

14.2.6 AUGMENTATION DRILLS

An unannounced augmentation drill is conducted ANNUALLY. This drill involves implementation of the ERO callout system procedure and documentation of the estimated response time for each responder. This drill demonstrates the capability to augment the ED after an emergency is declared.

14.2.7 CRITIQUE AND EVALUATION

A critique will be performed as soon as practicable after drills and EXERCISES to evaluate the ability of the participating organizations to respond as indicated in this IOEP. The ability of EMERGENCY RESPONSE PERSONNEL to self-evaluate weaknesses and identify areas for improvement is the key to successful EXERCISE / drill conduct.

EXERCISE and drill objectives are evaluated against measurable demonstration criteria. Following the conclusion of each EXERCISE or drill, a critique, including participants and evaluators, is conducted to evaluate the ability of the ERO to implement the IOEP and its implementing procedures.

A formal evaluation in the form of a written critique report is prepared following an EXERCISE or drill involving the evaluation of designated objectives. The report evaluates and documents the ability of the ERO to respond to a simulated emergency situation. The report will also contain reference to corrective action program documents and recommendations. The Emergency Preparedness Specialist is responsible for ensuring that items identified in the critique are correctly dispositioned, appropriate assignment of responsibility is made, and that corrective actions are implemented in accordance with the corrective action program.

15.0 RADIOLOGICAL EMERGENCY RESPONSE TRAINING

Planning Standard 50.47(b)(15) – Radiological emergency response training is provided to those who may be called on to assist in an emergency.

15.1 EMERGENCY RESPONSE PERSONNEL TRAINING

Requirements for EMERGENCY PREPAREDNESS training are specified in the EMERGENCY PREPAREDNESS Training Program. This program identifies the level and the depth to which individuals are to be trained.

15.2 EMERGENCY PREPAREDNESS TRAINING PROGRAM

The training for ERO personnel is developed from the position-specific responsibilities as defined in this IOEP. Members of the ERO receive initial training and ANNUAL retraining. They also receive recurring Emergency Plan-related training ANNUALLY through General Employee Training and position-specific training as appropriate.

Specific training requirements for ERO, supplemental, and support personnel are delineated below:

15.2.1 ISS/EMERGENCY DIRECTORS AND RESOURCE MANAGERS

Trained such that proficiency is maintained on the topics listed below. These subjects shall be covered as a minimum initially and on an ANNUAL basis.

- Emergency CLASSIFICATION
- State and LOCAL GOVERNMENT AGENCIES, and NRC notifications
- ERO activation
- DOSE RATE meter operation
- Radiological release assessment
- Emergency exposure control
- PROTECTIVE ACTIONS for ONSITE personnel
- ISFSI DBAs and Accident Assessment
- Review of applicable drill identified deficiencies and Human Performance Concerns

15.2.2 RADIOLOGICAL ASSESSMENT PERSONNEL

Radiation Protection Technicians (TMI or Non-TMI) who may be called to supplement the ERO are trained in the course of their normal work to be able to provide support for radiological ACCIDENT ASSESSMENT and PROTECTIVE ACTIONS. Support activities include access control; radiological coverage (e.g., monitoring, surveys, and support) for personnel conducting repairs, CORRECTIVE ACTIONS, search and rescue, first aid, firefighting, contaminated injury response (including transport); as well as providing personnel monitoring and dosimetry.

15.2.3 MEDICAL SUPPORT PERSONNEL

HMC personnel are invited to receive training, as outlined in Part II, Section 15.3.

15.2.4 SECURITY AND LAW ENFORCEMENT PERSONNEL

Station Security personnel are trained in accordance with the Security Plan. Local Law Enforcement Agency support personnel are invited to receive training, as outlined in Part II, Section 15.3.

15.2.5 FIRST AID AND RESCUE TEAMS

Selected individuals assigned on-shift ERO responsibility receive first aid training equivalent to Red Cross Adult First Aid/CPR/AED). Station personnel are trained to report any injury or medical emergency to the ISS, then provide first aid treatment within their level of competency. Responding support personnel are invited to receive training as outlined in Part II, Section 15.3.

15.2.6 OTHER PERSONNEL

Personnel who are badged for unescorted access to the ISFSI PA receive initial and ANNUAL refresher training on general facility procedures and policies. This training includes required actions to be taken if an emergency is declared at TMI.

Personnel assigned to work at the station who do not require unescorted access to the ISFSI PA, including visitors, receive information on the actions to be taken if an emergency is declared at TMI.

15.3 SUPPORT ORGANIZATIONS TRAINING

Annual training is made available to non-TMI support organizations, that may be called upon to provide assistance in the event of an emergency (e.g. firefighting, medical services, transport of injured, etc.).

The training made available is structured to meet the needs of that organization with respect to the nature of their support. Training topics such as event notification, basic radiation protection, and interface activities between the OFFSITE organization and TMI are made available.

16.0 MAINTAINING EMERGENCY PREPAREDNESS

Planning Standard 50.47(b)(16) – Responsibilities for plan development and review and for distribution of emergency plans are established, and planners are properly trained.

16.1 EMERGENCY PREPAREDNESS RESPONSIBILITIES

16.1.1 ISFSI SENIOR MANAGEMENT POSITION

Exelon is responsible for the maintenance of TMI EMERGENCY PREPAREDNESS Program. The issuance and control of this Plan and the activities associated with EMERGENCY PREPAREDNESS at TMI shall be the overall responsibility of the TMI-1 ISFSI senior management position.

16.1.2 EMERGENCY PREPAREDNESS SPECIALIST POSITION

The overall Emergency Plan is maintained by Corporate Emergency Preparedness.

The specific responsibilities include, but are not limited to, the following:

- Maintaining and updating this IOEP and associated procedures, and documenting reviews and revisions
- Overseeing the EMERGENCY PREPAREDNESS Training Program and ensuring that proper records are maintained to document training of the ERO, and ensuring that the ERO is notified of updates to the IOEP or EPIPs
- Overseeing and documenting the EMERGENCY PREPAREDNESS drill and EXERCISE Program
- Documenting and maintaining the EMERGENCY PREPAREDNESS facilities and equipment
- Documenting and maintaining the EMERGENCY PREPAREDNESS interfaces with OFFSITE agencies by (a) ensuring that all the Letters and Memoranda of Agreement with support organizations are reviewed ANNUALLY and updated as needed; and (b) ensuring that the OFFSITE Response Organizations are notified of updates to the IOEP
- Performing and documenting appropriate evaluations of the EMERGENCY PREPAREDNESS Program and of declared emergency events
- Ensuring an independent review of the EMERGENCY PREPAREDNESS Program is conducted to meet the requirements of 10 CFR 50.54(t).

Individuals assigned the duties of maintaining the IOEP maintain an adequate knowledge of regulations, planning techniques, and the latest applications of emergency equipment and supplies. All recommendations for changes to this document or associated implementing procedures are reviewed in accordance with 10 CFR 50.54(q) and 72.44(f), by individuals trained in performing such evaluations.

16.2 REVIEW AND UPDATING OF THE IOEP AND SUPPORTING PROCEDURES

It is important that a state of EMERGENCY PREPAREDNESS be maintained at all times. The IOEP is reviewed ANNUALLY and updated, as needed. The ANNUAL IOEP review/update includes required changes identified during 10 CFR 50.54(t) reviews, assessments, training, drills, and EXERCISES.

Any needed changes shall be incorporated in the IOEP, IOEP Emergency Action Level Technical Bases Manual, and appropriate implementing procedures. The IOEP, IOEP Emergency Action Level Technical Bases Manual, and EPIPs are distributed on a controlled basis.

Changes to the IOEP, IOEP Emergency Action Level Technical Bases Manual, and EPIPs are subject to evaluation under 10 CFR 50.54(q) and 10 CFR 72.44(f).

16.2.1 EALS STATE AND LOCAL GOVERNMENT AGENCY REVIEW

The EALs shall be made available for review with State and LOCAL GOVERNMENT AGENCIES ANNUALLY.

16.2.2 EMERGENCY RESPONSE DIRECTORY

Names and telephone numbers of the ERO, supplemental personnel, and applicable supporting OFFSITE organizations shall be reviewed and updated at least QUARTERLY.

16.2.3 LETTERS AND MEMORANDA OF AGREEMENT

Every two years, each Letter or Memorandum of Agreement with support organizations is reviewed and verified current in order to assure the availability of assistance from each supporting organization.

16.3 MAINTENANCE AND INVENTORY OF EMERGENCY EQUIPMENT AND SUPPLIES

Periodic inventory, testing, and calibration of emergency equipment and supplies are conducted in accordance with EPIPs. 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 EPIPs 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.

PART III

APPENDIX A

CROSS REFERENCE IOEP SECTION TO PLANNING STANDARDS / REQUIREMENTS / CRITERIA AND PROCEDURES

IOEP Part II Section	Planning Standard (10 CFR 50.47)	Planning Requirement (Appendix E.IV)**	NUREG-0654, Section II Evaluation Criteria	Procedure
1.0	(b)(1)*	A.1*, 2, 4*, 7*	A	EP-TM-112
2.0	(b)(2)	A.1*, 2, 4*; C.1*	B	EP-TM-112
3.0	(b)(3)*	A.6, 7*	C	EP-TM-112
4.0	(b)(4)*	B.1*, 2; C.1*, 2*	D	EP-TM-1002 Add. 1 EP-TM-111
5.0	(b)(5)*	A.6, 7*; C.1*; D.1*,3*; E*	E	EP-TM-114
6.0	(b)(6)*	C.1*; D.1*, 3*; E*	F	EP-AA-121, EP-AA-124
7.0	(b)(7)*	Exempted*	G	EP-TM-112
8.0	(b)(8)	E*; G	H	EP-AA-121, EP-AA-124
9.0	(b)(9)*	A.4*; B.1*; C.2*; E*	I	EP-AA-110
10.0	(b)(10)*	C.1*; E*	J	EP-TM-113
11.0	(b)(11)	E*	K	EP-TM-113
12.0	(b)(12)	A.6, 7*; E*	L	EP-TM-112
13.0	(b)(13)	H	M	EP-TM-115
14.0	(b)(14)	E9*; F*	N	EP-TM-122
15.0	(b)(15)	F*	O	TQ-TM-113
16.0	(b)(16)	G	P	EP-AA-120, EP-AA-124

* Refer to the **TMI** exemptions from portions of 10 CFR 50.47 and Appendix E for applicability.

APPENDIX B

INDEX OF EMERGENCY PLAN IMPLEMENTING PROCEDURES

Document	Document Title
EP-TM-1002 Addendum 1	INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) ONLY EMERGENCY ACTION LEVELS AND TECHNICAL BASES
EP-AA-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 AND RECOVERY
EP-AA-120	EMERGENCY PLAN ADMINISTRATION
EP-AA-121	EMERGENCY RESPONSE FACILITIES AND EQUIPMENT READINESS
EP-TM-122	DRILLS AND EXERCISE PROGRAM
EP-AA-123	COMPUTER PROGRAMS
EP-AA-124	INVENTORIES AND SURVEILLANCES
TQ-TM-113	TRAINING AND QUALIFICATION FOR DECOMMISSIONING THREE MILE ISLAND ERO

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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

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

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 (fire and ambulance service)
   - South Central Emergency Medical Services Inc. (ambulance)
   - Hershey Medical Center

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 (Primary)
   - 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, Dauphin, and Lancaster, counties are contained as part of the agreement with PEMA.

5. Other Agencies

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

ATTACHMENT 3

THREE MILE ISLAND NUCLEAR STATION

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) ONLY EMERGENCY ACTION LEVELS AND BASES DOCUMENT

EXELON GENERATION

THREE MILE ISLAND NUCLEAR STATION
INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) ONLY
EMERGENCY ACTION LEVELS
AND TECHNICAL BASES

REVISION HISTORY

Rev. 0,		

TABLE OF CONTENTS

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, has removed all irradiated fuel from the Spent Fuel Pool (SFP), and will store the spent fuel onsite for an extended period of time in an ISFSI. 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 (TEDE).

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 A 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 or to perform confirmatory radiation monitoring, if deemed necessary, 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., a SECURITY CONDITION).

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 (ED) 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 a 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.

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 conditions remains within the limits imposed by the 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 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.

While the EALs have been developed to address possible or anticipated events and conditions which may warrant emergency classification, a provision for classification based on the EDs 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.

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.

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. Example of such events would be a SECURITY CONDITION.

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 Emergency Response Facility (ERF) 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 ISFSI Shift Supervisor (ISS). The ISS will assess and evaluate the situation; classify the event as required based on impact to the site per the EALs; and provide the appropriate response.

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-1002, Independent Spent Fuel Installation Emergency Plan

5.2.2 EP-TM-1002, Addendum 1, Emergency Action Levels and Technical Bases

5.3 Commitments

None

6.0 ACRONYMS & DEFINITIONS

6.1 Acronyms

CFR ..... Code of Federal Regulations
DSAR ..... Defueled Safety Analysis Report
EAL ..... EMERGENCY ACTION LEVEL
ECL ..... EMERGENCY CLASSIFICATION LEVEL
EPA ..... Environmental Protection Agency
FEMA ..... Federal Emergency Management Agency
ISFSI ..... INDEPENDENT SPENT FUEL STORAGE INSTALLATION
IC..... Initiating Condition
NEI ..... Nuclear Energy Institute
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

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.

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

HOSTILE ACTION: An act toward TMI-1 ISFSI 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 TMI-1 ISFSI. Non-terrorism-based EALs should be used to address such activities.

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): See definition in IOEP, Section I.

PROJECTILE: An object directed toward the TMI-1 ISFSI 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.

UNUSUAL EVENT (UE): Refer to Section 3.1.1

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-HU1 Confirmed SECURITY CONDITION or threat.	**PD-HA1** HOSTILE ACTION within the TMI-1 ISFSI is occurring or has occurred.
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.

ALERT	UNUSUAL EVENT
Hazards and Other Conditions Affecting Facility Safety	
Security **PD-HA1** HOSTILE ACTION within the TMI-1 ISFSI is occurring or has occurred. **Emergency Action Level (EAL):** Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within theTMI-1 ISFSI.	**PD-HU1** 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. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION.

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. **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 a HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**PD-HU3** 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 conditions occur.

ALERT		UNUSUAL EVENT
ISFSI Malfunction		
ISFSI		**E-HU1** 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.

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 on the ISFSI pad until the Department of Energy takes possession of the spent fuel.

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 Defueled Safety Analysis Report (DSAR), 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 DSAR.

The Permanently Defueled (PD) Recognition Category 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.

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. Once all of the irradiated fuel has been removed from the spent fuel pool the spectrum of potential emergency events that may occur are again greatly reduced. Based on industry precedence, some of Hazard Recognition Category (PD-H) ICs and EALs, as reflected in this document, are being maintained.

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. A significant amount of the radioactive material contained within a cask must escape its packaging and enter the 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.

PD-HA1

Initiating Condition:

HOSTILE ACTION within the TMI-1 ISFSI is occurring or has occurred.

Emergency Action Level (EAL):

Notification by the Security Force that a HOSTILE ACTION is occurring or has occurred within the TMI-1 ISFSI.

Basis:

This IC addresses an occurrence of a HOSTILE ACTION within the TMI-1 ISFSI.

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.

This EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in theTMI-1 ISFSI.

Basis Reference(s):

1. NEI 99-01 Rev 6, PD-HA1
2. Station Security Plan

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. 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 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.

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:

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
3. SY-AA-101-132, Security Assessment and Response to Unusual Activities

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 facility equipment because of a 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

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 storage 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

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" 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 1031 NAC MAGNASTOR® Canister

ATTACHMENT 4

THREE MILE ISLAND NUCLEAR STATION

COMPARISON MATRIX NUCLEAR ENERGY INSTITUTE (NEI) 99-01, "METHODOLOGY FOR DEVELOPMENT OF EMERGENCY ACTION LEVELS," REVISION 6 TO THE PROPOSED THREE MILE ISLAND ISFSI ONLY EMERGENCY ACTION LEVELS

COMPARISON MATRIX
NUCLEAR ENERGY INSTITUTE (NEI) 99-01, "METHODOLOGY FOR DEVELOPMENT OF EMERGENCY ACTION LEVELS," REVISION 6 TO THE PROPOSED THREE MILE ISLAND ISFSI ONLY EMERGENCY ACTION LEVELS

DISCUSSION:

The proposed changes discussed herein to the Emergency Action Level (EAL) scheme support the operation of Three Mile Island, Unit 1, (TMI-1) Independent Fuel Storage Installation (ISFSI) and would be implemented after all irradiated fuel has been removed from the Spent Fuel Pool (SFP) and placed in dry storage within the ISFSI. The EALs encompasses both TMI-1 and Three Mile Island Unit 2 (TMI-2). Exelon maintains the emergency planning responsibilities for TMI-2, which is owned by TMI-2 Solutions, through a service agreement.

By letter dated December 2, 2020 (Reference 1), the NRC issued the Permanently Defueled Emergency Plan (PDEP) and Permanently Defueled EAL (PD-EAL) scheme for TMI. In Exelon's licensing amendment request (LAR) for the PDEP and Permanently Defueled EAL scheme (Refence 2), Exelon provided a "Comparison Matrix for Permanently Defueled EALs Based on NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6" (NEI 99-01) (Reference 2). The comparison matrix provided herein, provides a similar comparison of the EALs that are proposed for inclusion in the ISFSI Only EAL scheme, utilizing the comparison matrix provided in Attachment 4 of the PDEP and PD-EAL LAR (Reference 2) as the bases for the remaining EALs.

The following Table provides a comparison of the proposed EALs for inclusion in the ISFSI Only EAL scheme to NEI 99-01 and the currently approved PDEP EALs (Reference 1). The first column represents the NEI 99-01 Appendix C - Permanently Defueled Station ICs/EALs (Reference 2), the second column represents the EAL wording in the currently approved PD-EAL scheme (Reference 1) as marked up to reflect the proposed changes to the ISFSI Only EALs, and the third column presents the differences between the proposed EALs and NEI 99-01. In the second column, the wording from the current EALs (Reference 1) is provided with the proposed deletions indicated by ~~*italicized strikethrough*~~ and additions are indicated by ***bold italics***. In the third column, comparison items that are indicated by "**ISFSI Only Change**" are those comparisons that have been added to address the proposed ISFSI Only EAL changes, the remaining comparisons are repeated from the PD-EAL submittal (Attachment 4, Reference 3).

REFERENCES:

1. Letter from Theodore B. Smith (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. 299 for Unit 1 Re: Permanently Defueled Emergency Plan and Emergency Action Level Scheme," dated December 2, 2020 (ADAMS Accession No. ML20261H925)
2. Nuclear Energy Institute (NEI) 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors," dated November 2012 (ADAMS Accession No. ML 12326A805)
3. Letter from Michael P. Gallagher, (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission – "License Amendment Request – Proposed Changes to the Three Mile Island Emergency Plan for Permanently Defueled Emergency Plan and Emergency Action Level Scheme, dated July 1, 2019 (ADAMS Accession No. ML19182A182)

NEI 99-01 Rev 6 Appendix C - Permanently Defueled Station ICs/EALs	Proposed ISFSI Only EAL TMI	Comparison
PD-HU1 **ECL:** Notification of Unusual Event **Initiating Condition:** Confirmed SECURITY CONDITION or threat. **Operating Mode Applicability:** Not Applicable **Example Emergency Action Levels:** (1 or 2 or 3) (1) A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the (site-specific security shift supervision). (2) Notification of a credible security threat directed at the site. (3) A validated notification from the NRC providing information of an aircraft threat. **Basis:** 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. 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.	**PD-HU1** **Category:** H – Hazards and Other Conditions Affecting Facility Safety **PD-HU1** 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~~**2**. Notification by the Security Force of a SECURITY CONDITION that does **not** involve a HOSTILE ACTION. **TMI 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.	• 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. • **ISFSI Only Change:** Deleted EAL 2 regarding aircraft threat and renumbered EAL 3 to EAL 2 • 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. • **ISFSI Only Change:** Deleted basis statement regarding communication between the Security Shift Supervision and the Control Room since the Security Shift Supervisor will be the Emergency Director. • Replaced "plant" with "facility."

NEI 99-01 Rev 6 Appendix C - Permanently Defueled Station ICs/EALs	**Proposed ISFSI Only EAL TMI**	**Comparison**
Basis (cont): 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 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. EAL #2 addresses the receipt of a credible security threat. The credibility of the threat is assessed in accordance with (site-specific procedure). 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). 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. Escalation of the emergency classification level would be via IC PD-HA1.	**TMI Basis (cont):** 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.*~~ EAL #~~*3*~~***2*** 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.	• **ISFSI Only Change:** Deleted EAL 2 Basis regarding aircraft threat as EAL 2 is proposed for deletion and renumbered EAL 3 to EAL 2 • 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."

NEI 99-01 Rev 6 Appendix C - Permanently Defueled Station ICs/EALs	Proposed ISFSI Only EAL TMI	Comparison
PD-HA1 **ECL:** Alert **Initiating Condition:** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes. **Operating Mode Applicability:** Not Applicable **Example Emergency Action Levels:** (1 or 2) (1) A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the (site-specific security shift supervision). (2) A validated notification from NRC of an aircraft attack threat within 30 minutes of the site. **Basis:** 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.	**PD-HA1** **Category:** H – Hazards and Other Conditions Affecting Facility Safety **PD-HA1** HOSTILE ACTION within the ***TMI-1 ISFSI*** ~~*OWNER CONTROLLED AREA or airborne attack threat within 30 minutes*~~ ***is occurring or has occurred***. **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 ***TMI-1 ISFSI*** ~~*OWNER CONTROLLED AREA*~~. **TMI Basis:** This IC addresses ~~*the notification of an aircraft attack threat or*~~ an occurrence of a HOSTILE ACTION within the ***TMI-1 ISFSI*** ~~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*~~**.**	• Removed Emergency Classification Level ("ECL") information. • Added Recognition Category ("Category"). • Changed "Initiating Condition" to IC/EAL identifier • **ISFSI Only Change:** Added wording to IC to be consistent with remaining EAL. • 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. • Switched order of EALs. • **ISFSI Only Change:** Deleted EAL regarding aircraft threat and removed numbering since there is only a single EAL. • **ISFSI Only Change:** Revised EAL to indicate area of concern was the TMI-1 ISFSI. • Security Force is provided as the site-specific security shift supervision. • **ISFSI Only Change:** Deleted Basis regarding aircraft threat since the EAL is being deleted. • **ISFSI Only Change:** Revised Basis to indicate are of concern was the TMI-1 ISFSI. • Replaced "plant" with "facility."

NEI 99-01 Rev 6 Appendix C - Permanently Defueled Station ICs/EALs	Proposed ISFSI Only EAL TMI	Comparison
Basis (cont): 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 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. 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. 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. 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	**TMI Basis (cont):** ~~*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. ~~*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.*~~	• **ISFSI Only Change:** Deleted basis statement regarding communication between the Security Shift Supervision and the Control Room since the Security Shift Supervisor will be the Emergency Director. • Replaced "plant" with "facility." • **ISFSI Only Change:** Deleted EAL#1 Basis regarding aircraft threat as EAL is proposed for deletion.

readiness. This EAL is met when the threat-related information has been validated in accordance with (site-specific procedure). 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. 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.	~~*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 ***TMI-1 ISFSI*** ~~*OWNER CONTROLLED AREA*~~.	• **ISFSI Only Change:** Removed numbering since there is only a single EAL. • **ISFSI Only Change:** Revised Basis to indicate are of concern was the TMI-1 ISFSI. • 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.

NEI 99-01 Rev 6 Appendix C - Permanently Defueled Station ICs/EALs	Proposed ISFSI Only EAL TMI	Comparison
PD-HU3 **ECL:** Notification of Unusual Event **Initiating Condition:** Other conditions exist which in the judgment of the Emergency Director warrant declaration of a (NO)UE. **Operating Mode Applicability:** Not Applicable **Example Emergency Action Levels:** (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. **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 a NOUE.	**PD-HU3** **Category:** H – Hazards and Other Conditions Affecting Facility Safety **PD-HU3** 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 storage occurs. **TMI 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.	• 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 systems" 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 storage. **ISFSI Only Change:** Revised "cooling" to "storage" to better represent the condition for fuel stored in casks. • Removed numbering from EAL since it's a single EAL. • Replaced "plant" with "facility." • Replace NOUE with "UNUSUAL EVENT."

NEI 99-01 Rev 6 Appendix C - Permanently Defueled Station ICs/EALs	Proposed ISFSI Only EAL TMI	Comparison
PD-HA3 **ECL:** Alert **Initiating Condition:** Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert. **Operating Mode Applicability:** Not Applicable **Example Emergency Action Levels:** (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. **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.	**PD-HA3** **Category:** H – Hazards and Other Conditions Affecting Facility Safety **PD-HA3** 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*~~ ***facility*** equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels. **TMI 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.	• 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" and "site" with "facility." • **ISFSI Only Change:** Replaced "**site** equipment" with "**facility** equipment."

NEI 99-01 Rev 6 Appendix C - Permanently Defueled Station ICs/EALs	Proposed ISFSI Only EAL TMI	Comparison
E-HU1 **ECL:** Notification of Unusual Event **Initiating Condition:** Damage to a loaded cask CONFINEMENT BOUNDARY. **Operating Mode Applicability:** All **Example Emergency Action Levels:** (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.	**E-HU1** **Category:** E– ISFSI Malfunction **E-HU1** 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.	• 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. • Removed "on-contact" before radiation monitor reading. Bases provides that this may be determined at some distance from the cask.

NEI 99-01 Rev 6 Appendix C - Permanently Defueled Station ICs/EALs	Proposed ISFSI Only EAL TMI	Comparison
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 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. 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. Security-related events for ISFSIs are covered under ICs HU1 and HA1.	**TMI 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.	• 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. • **ISFSI Only Change:** Deleted reference to R IC PD-RU1 since it is no longer used. • Added "PD" to references HU1 and HA1 to reflect the appropriate references in the proposed EALs. • **ISFSI Only Change:** Removed quotes from on-contact since it is not used in the EAL.

ATTACHMENT 5

THREE MILE ISLAND NUCLEAR STATION

TM-RP-20-04, REVISION 1, "TMI-1 EAL VERIFICATION CALCULATIONS"

TMI-1 EAL Verification Calculations

Prepared by: / Date	Reviewed by: / Date	Approved by: / Date
Dennis Viola/R. D. Holmes 2/18/21	**Linda Parlatore 2/22/21**	**/s/ R. D. Holmes 2/23/21**

1.0 Purpose

This calculation is to ensure any fire or release involving radiological materials will not produce a radiation dose exceeding 2 times the TMI Offsite Dose Calculation Manual (ODCM) limits, Reference 8.4.

2.0 Problem Statement

Assess the offsite radiological consequences of severe hypothetical fire in radiological controlled areas as listed in the Permanently Defueled Fire Hazards Analysis Report (FHAR) Reference 8.1. Also assess the consequences associated with radioactive release to the environment. Compare the calculation results against the criteria that doses from such postulated release would not exceed two times the applicable ODCM limits.

3.0 Background

Decommissioning processes at TMI-1 have changed component configurations and usage requirements, necessitating a revisit to historical dose calculation ensuring that any release to offsite areas is minimized.

The areas to be considered in this document are those areas listed as containing radioactive materials in the FHAR and used in decommissioning:

- Auxiliary and Fuel Handling Buildings
- Chemical Cleaning Building
- Hittman Solidification Building
- Reactor Building
- Interim Solid Waste Staging Facility (ISWSF/Carport)
- Original Once Through Steam Generator (OTSG) Storage Facility

3.1 Analysis of Area Contents:

- Auxiliary and Fuel Handling Buildings, Chemical Cleaning Building, Hittman Solidification Building and Reactor Building – Quantities of radioactive materials in these areas are enclosed in steel vessels. These vessels are separated from general areas by concrete enclosures with no significant amounts of combustible materials. This containment and segregation from combustible materials makes the probability of a significant release very unlikely. A generic radioactive materials fire area calculation of 1 Curie of material released indicates very low (~1E-3 millirem per hour) dose for a one-hour exposure at site boundary.

- The Spent Primary Filter High Integrity Container was removed from the TMI-1 Auxiliary Building. This shielded container is designed to be transported for shipment when at capacity and is not a permanent plant component. It is currently in the Waste Module Structure awaiting shipment. A calculation for a postulated fire involving this component was performed using 1% of radioactive materials released in accordance with references 8.8 and 8.9. and is included here as a bounding calculation.

- The Interim solid Waste Storage Facility (ISWSF) Building is used for storage of low-level waste. All significant quantities of radioactive materials are stored in closed metal containers. Fire loading outside these containers is near zero. Calculation is performed using 1% of radioactive materials released in accordance with references 8.8 and 8.9.

- Original OTSG Storage Facility has a fire loading of essentially zero as described in FHAR. The building contents include a significant amount of radioactive materials entirely contained and sealed within the heavy wall steel components which are in turn stored in a concrete building. Programmatic controls limit the fire loading and minimizes the likelihood of a fire and radioactive release. While a release of 1% of the radioactive materials within the metal components could exceed the ODCM limits, there is no mechanism for this release.

- The doses associated with Spent Fuel Pool water being released directly to the environment is essentially zero. The Radioactive components of the Fuel Pool water has total gamma activity of 4.26 E-4 uCi/ml and Tritium activity of 1.24E-1 uCi/ml.

4.0 Assumptions

4.1 Inhalation pathway is used to calculate whole body and organ dose at Site Boundary.
4.2 Fire detection and suppression systems are not considered in these calculations.
4.3 The total time from fire initiation to extinguishment is 1 hour, as per fire load classification of “LOW” in FHAR.
4.4 Radioactive materials contained in these buildings are wholly contained in metal packaging or system components and piping.
4.5 Areas containing surface contamination are of low activity levels and entirely contained in structures.
4.6 Controlled and monitored ventilation systems will remain operable in buildings until components are deenergized and abandoned. However, no installed process reduction such as filtration is considered in these calculations.
4.7 Building design will retain isolation features such as airlocks to prevent release.
4.8 A radioactive release of 1% of radioactive materials in metal containers involved in fire scenarios will be used in accordance with references 8.8 and 8.9.
4.9 An assumption of a breach of the fuel pool will allow most if not all of its contents to remain within the Fuel Handling Building structure. Calculation will assume 1% release to the environment to be consistent with fire calculations.

5.0 Methodology

Waste stream analysis results are input into a Dose-to-Curie process using RADMAN or MICROSHIELD software to determine available radionuclide inventory. The release fraction of this inventory is then utilized in a dose assessment process. Dose projection is performed for an airborne ground level release using dose factors for each radionuclide, inhalation pathway, and the most restrictive age group and organ factors. The result of the calculation is the offsite dose per second, and the total dose for a 1-hour duration is then calculated for the result.

Liquid release component is calculated using OpenEMS spreadsheet for dose calculations. Appropriate target organ dose results will be calculated and evaluated.

Once all of the spent fuel has been moved from the spent fuel pools to dry storage the ODCM dose rate limit will not be a useful basis for the Unusual Event initiating condition, as there will be no source of noble gases remaining within the plant. Industry guidance (Ref. 8.13) does not explicitly address an emergency classification scheme for this plant condition, only the use of an Unusual Event and Alert for a permanently defueled plant with spent fuel in the pools.

6.0 Conclusions

None of the scenarios evaluated result in exceeding two times the applicable ODCM dose limits for a fire involving remaining radioactive materials or release of Spent Fuel Pool Inventory.

The largest amount of radioactive materials that have any potential to release during a fire event was the Spent Primary Filter High Integrity Container (Filter HIC). This container was removed from the Auxiliary Building and placed in the Waste Module Structure awaiting shipment. This container had the potential to exceed Site Boundary limits in case of fire, the threat was eliminated by removing it.

This Filter HIC calculation is bounding for all other radioactive material release calculations resulting from fire on the TMI-1 Site. Filter HIC is planned to remain in waste modules preventing any release of radioactive materials until shipped to the appropriate radioactive waste processing facility. While this hypothetical release does not exceed any 10CFR20 limits for offsite release, it is bounding for all other potential accidental releases to the environment, as listed in Attachments 1 through 5 in this document.

The current conditions and nuclide and curie content in the station will only decrease between now and license termination. The worst-case condition evaluated demonstrates that the resulting dose would be less than two times the applicable ODCM limits. In addition, the limit of 2 times the ODCM (Ref. 8.4) Specification, or 3000 mrem/y to any organ will not be reached.

The TMI ODCM liquid and particulate airborne release dose limits are as follows:

Release type	Quarter Organ dose limit (mrem)	Quarter Whole Body dose limit (mrem)	Annual Organ dose limit (mrem)	Annual Whole Body dose limit (mrem)
Liquid	5	1.5	10	3
Airborne Particulate	7.5	7.5	15	15

All of the doses from the postulated releases analyzed result in less than two times the TMI ODCM dose limits listed above.

7.0 Calculations

RADMAN or MICROSHIELD reports for areas and components are attached with the dose calculations for a 1-hour period at Site boundary as follows:

Attachment 1 – Spent Primary Filter High Integrity Container (Filter HIC) – removed into storage for shipment
- 4.25 mrem for 1-hour exposure at Site boundary

Attachment 2 – Interim Solid Waste Storage Facility (ISWSF) fire calculation
- 1.47 E-01 mrem for 1-hour exposure at Site boundary

Attachment 3 – Generic Radioactive Materials Area fire calculation
- 4.89 E-03 mrem for 1-hour exposure at Site boundary

Attachment 4 – Spent Fuel Pool release calculations (via OpenEMS)
- 3.33E-01 mrem dose for 1% leakage to environment

Attachment 5 – 2019 DAW Nuclide Distribution Report

8.0 References

8.1 Three Mile Island Unit 1 Permanently Defueled Fire Hazards Analysis Report, Document 990-1745, Revision A
8.2 10CFR20, Standards for Protections Against Radiation
8.3 Reg Guide 1.191, Fire Protection Program for Nuclear Power Plants During Decommissioning and Permanent Shutdown.
8.4 CY-TM-170-300, Offsite Dose Calculation Manual (ODCM)
8.5 Nuclides and Isotopes, Chart of the Nuclides, Seventeenth Edition
8.6 RAF TM-19-001, TMI Unit 1 2019 DAW Waste Stream Update
8.7 RAF TM-17-003, TMI Unit 1 2017 DAW Waste Stream Update
8.8 RAF 6612-97-002, Estimated off site dose from a fire of a generic Radioactive Materials Area
8.9 RAF 6612-97-003, Estimated off site dose for a postulated fire at the Respirator Laundry Facility
8.10 RADMAN User Manual
8.11 MICROSHIELD User Manual
8.12 OpenEMS effluent release program, Canberra Industries
8.13 NEI 99-01,” Development of Emergency Action Levels for Non-Passive Reactors” (Nov. 2012)

Attachment 1
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Offsite dose from fire at Filter Cask

D_i = Inhalation pathway X/Q at or beyond restricted area boundary

Inhalation Pathway using DAW distribution

Q_i = 1% of average activity becomes airborne

Decayed to 7/1/2019

Q_i = 1% of average activity becomes airborne

NUCLIDE	Average activity	Q_i (1% act)	R_i	D_i	$[Q_a i_d a]$
H-3	9.24E+00	9.24E-02	1.27E+03	6.80E-04	7.98E-02
C-14	7.85E-01	7.85E-03	3.59E+04	6.80E-04	1.92E-01
Cr-51	0.00E+00	0.00E+00	2.10E+04	6.80E-04	0.00E+00
Mn-54	0.00E+00	0.00E+00	1.98E+06	6.80E-04	0.00E+00
Fe-55	2.31E-04	2.31E-06	1.24E+05	6.80E-04	1.95E-04
Co-57	0.00E+00	0.00E+00	3.18E+04	6.80E-04	0.00E+00
Co-58	0.00E+00	0.00E+00	1.34E+06	6.80E-04	0.00E+00
Co-60	1.24E+00	1.24E-02	8.72E+06	6.80E-04	7.35E+01
Ce-139	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Fe-59	2.31E-04	2.31E-06	1.88E+05	6.80E-04	2.95E-04
Ni-59	2.59E-01	2.59E-03	6.64E+04	6.80E-04	1.17E-01
Ni-63	6.25E+02	6.25E+00	8.21E+05	6.80E-04	3.49E+03
Zn-65	1.47E-02	1.47E-04	1.24E+06	6.80E-04	1.24E-01
Sr-89	0.00E+00	0.00E+00	2.42E+06	6.80E-04	0.00E+00
Sr-90	0.00E+00	0.00E+00	1.08E+08	6.80E-04	0.00E+00
Y-90	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Nb-94	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Nb-95	5.79E-05	5.79E-07	7.51E+05	6.80E-04	2.96E-04
Zr-95	2.60E-05	2.60E-07	2.69E+05	6.80E-04	4.76E-05
Tc-99	8.94E+01	8.94E-01	1.11E+06	6.80E-04	6.75E+02
Ru-103	0.00E+00	0.00E+00	7.83E+05	6.80E-04	0.00E+00
Ag-110m	0.00E+00	0.00E+00	6.75E+06	6.80E-04	0.00E+00
Sb-124	0.00E+00	0.00E+00	3.16E+04	6.80E-04	0.00E+00
Sb-125	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00

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NUCLIDE	Average activity	Q_i (1% act)	R_i	D_i	$[Q_a i_d a]$
Te-125m	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
I-129	1.94E+00	1.94E-02	7.92E+07	6.80E-04	1.04E+03
I-131	0.00E+00	0.00E+00	1.62E+07	6.80E-04	0.00E+00
Sn-113	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Cs-134	0.00E+00	0.00E+00	1.01E+06	6.80E-04	0.00E+00
Cs-136	0.00E+00	0.00E+00	1.94E+05	6.80E-04	0.00E+00
Cs-137	4.35E+01	4.35E-01	8.48E+05	6.80E-04	2.51E+02
Ba-137m	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Ba/La-140	0.00E+00	0.00E+00	2.03E+06	6.80E-04	0.00E+00
Ce-141	0.00E+00	0.00E+00	6.14E+05	6.80E-04	0.00E+00
Ce/Pr-144	7.14E+00	7.14E-02	1.34E+07	6.80E-04	6.51E+02
Np-237/Pu-242	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Pu-238	0.00E+00	0.00E+00	2.18E+10	6.80E-04	0.00E+00
Pu-239/240	1.62E-01	1.62E-03	2.47E+10	6.80E-04	2.72E+04
Pu-241	6.22E-01	6.22E-03	4.89E+08	6.80E-04	2.07E+03
Am-241	3.29E-02	3.29E-04	8.03E+09	6.80E-04	1.80E+03
Cm-242	0.00E+00	0.00E+00	5.23E+08	6.80E-04	0.00E+00
Cm-243/244	0.00E+00	0.00E+00	6.35E+09	6.80E-04	0.00E+00
U-233/234	0.00E+00	0.00E+00	7.28E+08	6.80E-04	0.00E+00
U-235	0.00E+00	0.00E+00	8.09E+07	6.80E-04	0.00E+00
U-238	0.00E+00	0.00E+00	3.71E+08	6.80E-04	0.00E+00
total	7.79E+02	7.70E+00			3.73E+04 µCi/sec

1.18E-03	mrem dose per second at receptor location
4.25E+00	mrem dose after 1 hour at site boundary

This calculation was left in place for bounding information. The filter cask was removed from the station and stored in the waste modules and is no longer under consideration for offsite dose.

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Offsite dose from fire at ISWSF

Inhalation Pathway using DAW distribution

D_i = Inhalation pathway X/Q at site boundary

Q_i = 1% of average activity becomes airborne

R_i = Inhalation Pathway Dose Factor

NUCLIDE	Average activity	Q_i (1% act)	R_i	D_i	$[Q_a i_d a]$
H-3	1.19E-01	1.19E-03	1.27E+03	6.80E-04	1.03E-03
C-14	1.95E-01	1.95E-03	3.59E+04	6.80E-04	4.76E-02
Cr-51	1.30E+00	1.30E-02	2.10E+04	6.80E-04	1.86E-01
Mn-54	4.10E-01	4.10E-03	1.98E+06	6.80E-04	5.52E+00
Fe-55	2.80E+00	2.80E-02	1.24E+05	6.80E-04	2.36E+00
Co-57	0.00E+00	0.00E+00	3.18E+04	6.80E-04	0.00E+00
Co-58	2.63E+00	2.63E-02	1.34E+06	6.80E-04	2.40E+01
Co-60	1.08E+01	1.08E-01	8.72E+06	6.80E-04	6.40E+02
Ce-139	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Fe-59	0.00E+00	0.00E+00	1.88E+05	6.80E-04	0.00E+00
Ni-59	0.00E+00	0.00E+00	6.64E+04	6.80E-04	0.00E+00
Ni-63	7.71E+00	7.71E-02	8.21E+05	6.80E-04	4.30E+01
Zn-65	0.00E+00	0.00E+00	1.24E+06	6.80E-04	0.00E+00
Sr-89	0.00E+00	0.00E+00	2.42E+06	6.80E-04	0.00E+00
Sr-90	3.56E-02	3.56E-04	1.08E+08	6.80E-04	2.61E+01
Y-90	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Nb-94	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Nb-95	2.58E-01	2.58E-03	7.51E+05	6.80E-04	1.32E+00
Zr-95	0.00E+00	0.00E+00	2.69E+05	6.80E-04	0.00E+00
Tc-99	6.75E-01	6.75E-03	1.11E+06	6.80E-04	5.09E+00
Ru-103	0.00E+00	0.00E+00	7.83E+05	6.80E-04	0.00E+00
Ag-110m	0.00E+00	0.00E+00	6.75E+06	6.80E-04	0.00E+00
Sb-124	0.00E+00	0.00E+00	3.16E+04	6.80E-04	0.00E+00
Sb-125	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00

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NUCLIDE	Average activity	Q_i (1% act)	R_i	D_i	$[Q_a i_d a]$
Te-125m	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
I-129	1.01E-01	1.01E-03	7.92E+07	6.80E-04	5.44E+01
I-131	0.00E+00	0.00E+00	1.62E+07	6.80E-04	0.00E+00
Sn-113	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Cs-134	6.68E-01	6.68E-03	1.01E+06	6.80E-04	4.59E+00
Cs-136	0.00E+00	0.00E+00	1.94E+05	6.80E-04	0.00E+00
Cs-137	4.13E+00	4.13E-02	8.48E+05	6.80E-04	2.38E+01
Ba-137m	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Ba/La-140	0.00E+00	0.00E+00	2.03E+06	6.80E-04	0.00E+00
Ce-141	0.00E+00	0.00E+00	6.14E+05	6.80E-04	0.00E+00
Ce/Pr-144	2.76E-01	2.76E-03	1.34E+07	6.80E-04	2.51E+01
Np-237/Pu-242	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Pu-238	0.00E+00	0.00E+00	2.18E+10	6.80E-04	0.00E+00
Pu-239/240	8.12E-04	8.12E-06	2.47E+10	6.80E-04	1.36E+02
Pu-241	6.68E-02	6.68E-04	4.89E+08	6.80E-04	2.22E+02
Am-241	1.40E-03	1.40E-05	8.03E+09	6.80E-04	7.64E+01
Cm-242	0.00E+00	0.00E+00	5.23E+08	6.80E-04	0.00E+00
Cm-243/244	0.00E+00	0.00E+00	6.35E+09	6.80E-04	0.00E+00
U-233/234	0.00E+00	0.00E+00	7.28E+08	6.80E-04	0.00E+00
U-235	0.00E+00	0.00E+00	8.09E+07	6.80E-04	0.00E+00
U-238	0.00E+00	0.00E+00	3.71E+08	6.80E-04	0.00E+00
total	3.22E+01	3.21E-01			1.29E+03 µCi/sec

4.09E-05	mrem dose per second
1.47E-01	mrem dose after 1 hour at receptor location

Attachment 3
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<u>Dose from a fire at generic rad material area</u>	D_i = Inhalation pathway X/Q at site boundary
Inhalation Pathway using DAW distribution	Q_i = 1% of average activity becomes airborne
All Activities normalized to a sum of 1 Curie	R_i = Inhalation Pathway Dose Factor
	3.17E-8 = number of seconds in 1 year

NUCLIDE	Average activity	Normalized activity	Q_i (1% act)	R_i	D_i	$[Q_iR_iD_i]$
H-3	0.00E+00	0.00E+00	0.00E+00	1.27E+03	6.80E-04	0.00E+00
C-14	5.29E-04	6.90E-03	6.90E-05	3.59E+04	6.80E-04	1.69E-03
Cr-51	3.53E-03	4.61E-02	4.61E-04	2.10E+04	6.80E-04	6.58E-03
Mn-54	5.63E-04	7.35E-03	7.35E-05	1.98E+06	6.80E-04	9.89E-02
Fe-55	1.11E-02	1.45E-01	1.45E-03	1.24E+05	6.80E-04	1.22E-01
Co-57	1.03E-04	1.34E-03	1.34E-05	3.18E+04	6.80E-04	2.91E-04
Co-58	6.85E-03	8.94E-02	8.94E-04	1.34E+06	6.80E-04	8.15E-01
Co-60	2.83E-02	3.69E-01	3.69E-03	8.72E+06	6.80E-04	2.19E+01
Ce-139	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Fe-59	0.00E+00	0.00E+00	0.00E+00	1.88E+05	6.80E-04	0.00E+00
Ni-59	0.00E+00	0.00E+00	0.00E+00	6.64E+04	6.80E-04	0.00E+00
Ni-63	1.69E-03	2.21E-02	2.21E-04	8.21E+05	6.80E-04	1.23E-01
Zn-65	0.00E+00	0.00E+00	0.00E+00	1.24E+06	6.80E-04	0.00E+00
Sr-89	0.00E+00	0.00E+00	0.00E+00	2.42E+06	6.80E-04	0.00E+00
Sr-90	2.38E-04	3.11E-03	3.11E-05	1.08E+08	6.80E-04	2.28E+00
Y-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Nb-94	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Nb-95	1.69E-03	2.21E-02	2.21E-04	7.51E+05	6.80E-04	1.13E-01
Zr-95	3.11E-03	4.06E-02	4.06E-04	2.69E+05	6.80E-04	7.42E-02
Tc-99	1.83E-03	2.39E-02	2.39E-04	1.11E+06	6.80E-04	1.80E-01
Ru-103	0.00E+00	0.00E+00	0.00E+00	7.83E+05	6.80E-04	0.00E+00
Ag-110m	0.00E+00	0.00E+00	0.00E+00	6.75E+06	6.80E-04	0.00E+00
Sb-124	0.00E+00	0.00E+00	0.00E+00	3.16E+04	6.80E-04	0.00E+00
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Te-125m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
I-129	0.00E+00	0.00E+00	0.00E+00	7.92E+07	6.80E-04	0.00E+00
I-131	0.00E+00	0.00E+00	0.00E+00	1.62E+07	6.80E-04	0.00E+00
Sn-113	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Cs-134	2.09E-03	2.73E-02	2.73E-04	1.01E+06	6.80E-04	1.87E-01
Cs-136	0.00E+00	0.00E+00	0.00E+00	1.94E+05	6.80E-04	0.00E+00
Cs-137	1.48E-02	1.93E-01	1.93E-03	8.48E+05	6.80E-04	1.11E+00
Ba-137m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Ba/La-140	0.00E+00	0.00E+00	0.00E+00	2.03E+06	6.80E-04	0.00E+00

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NUCLIDE	Average activity	Normalized activity	Q_i (1% act)	R_i	D_i	$[Q_iR_iD_i]$
Ce-141	0.00E+00	0.00E+00	0.00E+00	6.14E+05	6.80E-04	0.00E+00
Ce/Pr-144	0.00E+00	0.00E+00	0.00E+00	1.34E+07	6.80E-04	0.00E+00
Np-237/Pu-242	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.80E-04	0.00E+00
Pu-238	0.00E+00	0.00E+00	0.00E+00	2.18E+10	6.80E-04	0.00E+00
Pu-239/240	2.20E-06	2.87E-05	2.87E-07	2.47E+10	6.80E-04	4.82E+00
Pu-241	1.91E-04	2.49E-03	2.49E-05	4.89E+08	6.80E-04	8.29E+00
Am-241	3.80E-06	4.96E-05	4.96E-07	8.03E+09	6.80E-04	2.71E+00
Cm-242	0.00E+00	0.00E+00	0.00E+00	5.23E+08	6.80E-04	0.00E+00
Cm-243/244	0.00E+00	0.00E+00	0.00E+00	6.35E+09	6.80E-04	0.00E+00
U-233/234	0.00E+00	0.00E+00	0.00E+00	7.28E+08	6.80E-04	0.00E+00
U-235	0.00E+00	0.00E+00	0.00E+00	8.09E+07	6.80E-04	0.00E+00
U-238	0.00E+00	0.00E+00	0.00E+00	3.71E+08	6.80E-04	0.00E+00
total	7.66E-02	1	1.00E-02			4.28E+01
1.36 E-06 mrem per second at site boundary						
4.89 E-03 mrem dose after one hour at the site boundary						

ATTACHMENT 4 Spent Fuel Pool Release

Pre-Release Dose Calculation

Maximum Organ Dose		Total Body Dose	
Receptor:	Max Receptor	Receptor:	Max Receptor
Age Group:	Teen	Age Group:	Adult
Organ:	Liver	Organ:	Total Body
Dose (mrem):	3.329E-01	Dose (mrem):	2.263E-01

Maximum Total Body Dose	2.263E-01
Maximum Organ Dose	3.329E-01

Max Receptor for All Isotopes (mrem)

	Bone	Liver	T Body	Thyroid	Kidney	Lung	GI-LLI	Skin
Adult	2.063E-01	3.221E-01	**2.263E-01**	5.083E-05	1.079E-01	3.588E-02	6.758E-03	0.000E+00
Teen	2.191E-01	**3.329E-01**	1.270E-01	3.884E-05	1.111E-01	4.301E-02	5.053E-03	0.000E+00
Child	2.737E-01	2.954E-01	4.877E-02	3.516E-05	9.499E-02	3.418E-02	1.970E-03	0.000E+00
Infant	2.324E-05	3.554E-05	7.977E-06	5.324E-06	7.977E-06	8.570E-06	5.703E-06	0.000E+00

Attachment 5
Page 1 of 3

WMG Suite 9.1.3
From Distribution List

Nuclide Distribution Report

Report Date: 3/18/2019 Revision Date: 3/18/2019

Distribution:	2019 DAW	Distribution Date:	2/11/2019
Chemical Form:	metal oxide mixture	Physical Form:	Solid
Derivation:	Single	Activity Units:	uCi/sample
Sample ID:	L81230-1 2019 DAW	Sample Date:	2/11/2019

Nuclide Distribution

Nuclide Name	Activity	Abundance	Nuclide Type	Base Nuclide	Scaling Factor
C-14	7.05E-05	<LLD>	AP	Co-60	2.93E-03
Ce-144	1.15E-04	<LLD>	FP	N/A	N/A
Co-58	1.78E-04	0.286 %	AP	Co-60	7.39E-03
Co-60	2.41E-02	38.665 %	AP	N/A	N/A
Cs-134	8.74E-04	1.402 %	FP	Cs-137	2.00E-01
Cs-137	4.36E-03	6.995 %	FP	N/A	N/A
Fe-55	3.91E-03	6.273 %	AP	Co-60	1.62E-01
H-3	3.85E-03	6.177 %	FP	Cs-137	8.83E-01
I-129	1.39E-05	<LLD>	FP	Cs-137	3.19E-03
Mn-54	2.17E-04	0.348 %	AP	Co-60	9.00E-03
Ni-63	2.45E-02	39.307 %	AP	Co-60	1.02E+00
Sr-90	3.41E-04	0.547 %	FP	Cs-137	7.82E-02
Tc-99	2.94E-04	<LLD>	FP	Cs-137	6.74E-02

Attachment 5
Page 2 of 3

Package ID:	***Carport material model***	**Container Type:**	20' CVAN
Waste Class:	N/A	**DOT Package Class:**	A LSA-II
Description:	2015 DAW	**Chelating Agent:**	N P
Chemical Form:	Metal Oxides Mixture	**Weight % Chelating:**	N P
Physical Form	Solid	**Package Volume (ft³):**	1,280.00
Material Volume (ft³):	1,024.00	**Package Weight (lbs):**	11,040.00
Material Weight (lbs):	5,000.00	**3 Meter Dose (mR/hr):**	N/A
Dose / Curie Factor:	16.10	**Material Height (in):**	76.800
Contact Rad Level (mR/hr):	2.0	1 Meter Rad Level (mR/hr): 2.0	Survey Date: 8/25/2015

Package Activity By Nuclide

Nuclide	(mCi)	Nuclide	(mCi)	Nuclide	(mCi)
Am-241	1.40E-03	C-14	1.95E-01	Ce-144	2.76E-01
Co-58	2.63E+00	Co-60	1.08E+01	Cr-51	1.30E+00
Cs-134	6.68E-01	Cs-137	4.13E+00	Fe-55	2.80E+00
H-3	1.19E-01	I-129	1.01E-01	Mn-54	4.10E-01
Nb-95	2.58E-01	Ni-63	7.71E+00	Pu-239	8.12E-04
Pu-241	6.68E-02	Sr-90	3.56E-02	Tc-99	6.75E-01
Zr-95					
* - Indicates Entered Value	# - Indicates Override			**TOTAL:**	3.22E+01

Part 61 Information

Sample ID:	L63313-1
Sample Date:	5/14/2015
Activity Units:	uCi/sample
Analysis Vendor:	Teledyne Brown

Entered Dose Rates in mR/hr

2.0
Characterization Distance (in): 39.37 **AVERAGE: 2.00**

Attachment 5
Page 3 of 3

Package Name:	***Primary Filter Liner***	NRC Waste Class:	C
Liner SN	007082-10	DOT Class:	>A LSA-II
Total Filter Volume (ft^3)	5.431	Material Height (in):	44.000
Total Filter Weight (lbs):	175.450	Nuclides > 5 Year Half Life:	1.71E+04

Filter Activity By Nuclide

Nuclide	(mCi)	Nuclide	(mCi)	Nuclide	(mCi)
Ag-110m	1.35E+01	C-14	7.94E-01	Ce-144	7.14E+00
Cm-242	7.32E-04	Co-57	2.01E+00	Co-58	8.54E-01
Co-60	1.21E+04	Cr-51	1.63E-07	Cs-137	4.58E+01
Fe-55	6.57E+02	Fe-59	1.70E-07	H-3	1.54E+02
Hf-181	1.20E-08	I-129	1.94E+00	Mn-54	2.38E+02
Nb-95	7.30E-05	Ni-59	2.59E-01	Ni-63	7.48E+02
Pu-239	1.62E-01	Pu-241	1.47E+00	Sb-124	1.49E-03
Tc-99	8.94E+01	Zn-65	6.29E+00	Zr-95	3.92E-02
				TOTAL:	2.13E+04

ATTACHMENT 6

THREE MILE ISLAND NUCLEAR STATION

ACKNOWLEDGEMENTS FROM THE COMMONWEALTH OF PENNSYLVANIA REGARDING THE ACCEPTABILITY OF THE PERMANENTLY DEFUELED EMERGENCY PLAN

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

February 19, 2021

Mr. Craig Smith
Three Mile Island Nuclear Station
P.O. Box 480
Route 441, South
Middletown, PA 17057

RE: TMI's revised Emergency Plan

Dear Mr. Smith:

Exelon Nuclear recently sent The Bureau of Radiation Protection, Nuclear Safety Division (BRP) information concerning Three Mile Island Generating Station (TMI) draft License Amendment Request (LAR) for Independent Spent Fuel Storage Installation (ISFSI) Only Emergency Plan (IOEP), Emergency Action Level (EAL) update, and Technical Bases to support IOEP condjtions.

BRP has reviewed these materials and have no additional comments at this time but reserves the right to further comment during the formal LAR review and approval process.

Should you have any questions or concerns, please contact me at 717-787-2480 or via email at steacker@pa.gov.

Sincerely,

Stephen Acker
Chief, Nuclear Safety Division

cc: David J. Allard, CHP
Sandra Silva (PEMA)

pennsylvania
EMERGENCY MANAGEMENT AGENCY

January 28, 2021

Mr. Craig Smith
Three Mile Island Nuclear Station
P.O. Box 480 Route 441 South
Middletown, Pennsylvania 17057
Dear Mr. Smith:

Exelon Nuclear presented the Pennsylvania Emergency Management Agency (PEMA), Nuclear Power Plants Division with information concerning Three Mile Island Generating Station (TMI) draft License Amendment Request (LAR) for Independent Spent Fuel Storage Installation (ISFSI) Only Emergency Plan (IOEP) and Emergency Action Level (EAL) and Technical Bases to support ISFSI-Only conditions. TMI Unit 1's nuclear spent fuel is expected to be stored in dry cask storage on the TMI-1 ISFSI in late 2022/early 2023. Exelon Corporation shared their plans with PEMA and the Department of Environmental Protection, Bureau of Radiation Protection (BRP) via email on Thursday, January 21, 2021. PEMA has no additional comments or concerns at this time but reserves the right to further comment during the formal LAR review and approval process.

Should you have any questions or concerns, please contact me at 717-651-2235 or via email at sansilva@pa.gov.

Sincerely,

Sandra B. Silva
Division Chief
Nuclear Power Plants Division