



Entergy Nuclear Operations, Inc.
Vermont Yankee
320 Governor Hunt Rd
Vernon, VT 05354
Tel 802 257 7711

John W. Boyle
Director, Nuclear Decommissioning

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

BVY 17-009

May 15, 2017

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

SUBJECT: License Amendment Request – Independent Spent Fuel Storage Installation (ISFSI)
Emergency Plan and Emergency Action Level Scheme
Vermont Yankee Nuclear Power Station
Docket No. 50-271
License No. DPR-28

72-059

- REFERENCES:
1. Letter, Entergy Nuclear Operations, Inc. to USNRC, "Post-Shutdown Decommissioning Activities Report," BVY 14-078, dated December 19, 2014 (ADAMS Accession No. ML14357A110)
 2. Letter, Entergy Nuclear Operations, Inc. to USNRC, "Notification of Schedule Change for Dry Fuel Loading Campaign," BVY 17-013, dated April 12, 2017 (ADAMS Accession No. ML17104A050)
 3. Letter, USNRC to Entergy Nuclear Operations, Inc., "Vermont Yankee Nuclear Power Station – Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation (CAC No. MF3614)," dated December 10, 2015 (ADAMS Accession No. ML15180A054)

Dear Sir or Madam:

Pursuant to 10 CFR 50.54(q), 10 CFR 50.47(b), 10 CFR 50, Appendix E, and 10 CFR 50.90, Entergy Nuclear Operations, Inc. (ENO) requests an amendment to Renewed Facility Operating License Number DPR-28 for Vermont Yankee Nuclear Power Station (VY). The proposed amendment would replace the Permanently Defueled Emergency Plan (PDEP) and its associated Permanently Defueled Emergency Action Level (EAL) Technical Bases Document with the Independent Spent Fuel Storage Installation (ISFSI) Emergency Plan and its associated ISFSI EAL Technical Bases Document. This ISFSI Emergency Plan will be used at VY during the period when all spent fuel will be stored in the VY ISFSI. The proposed changes are being submitted to the

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NRC for approval prior to implementation, as required under 10 CFR 50.54(q)(4) and 10 CFR Part 50, Appendix E, Section IV.B.2, and 10 CFR 72.44(f).

This change reflects the complete removal of all fuel from the spent fuel pool (SFP) and 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). As described in the Post Shutdown Decommissioning Activities Report (PSDAR) (Reference 1), spent fuel will remain in the SFP until it meets the criteria for transfer, the existing ISFSI is expanded, and the spent fuel can be transferred in an efficient manner to the expanded ISFSI. The ISFSI expansion is estimated to be completed in September 2017, spent fuel transfer to the ISFSI is expected to commence in May 2017, and, provided the criteria for transfer are met, anticipated to be completed in late 2018 (Reference 2). To comport to the reduced scope of potential radiological accidents with the spent fuel in dry cask storage within the ISFSI, ENO determined that replacement of the PDEP and Permanently Defueled EAL Technical Bases Document with the ISFSI Emergency Plan and the ISFSI EAL Technical Bases Document were warranted.

The proposed emergency plan continues to rely on previously granted exemptions from certain emergency planning requirements (Reference 3), as the bases for these exemptions have not changed and remain in effect. These proposed ISFSI Emergency Plan changes have been determined to represent changes in both the EAL scheme and the staffing level previously approved by the NRC to implement the PDEP in accordance with the requirements of 10 CFR 50.54(q), and therefore require NRC approval prior to implementation.

Attachment 1 to this letter contains a description, technical analysis, significant hazards determination, and environmental considerations evaluation for the proposed amendment. Attachment 2 contains a comparison matrix of the Nuclear Energy Institute 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6 to the Proposed VY Emergency Classification System and ISFSI EALs. Attachment 3 contains the supporting evaluation and calculation.

Enclosures 1 and 2 to this letter provide the proposed ISFSI Emergency Plan and ISFSI EAL Technical Bases Document, respectively.

This letter contains no new regulatory commitments.

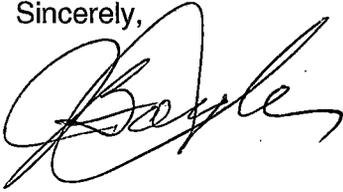
In accordance with 10 CFR 50.91(b)(1), a copy of this application, with attachments and enclosures, is being provided to the designated state of Vermont official.

ENO is requesting NRC approval of this proposed license amendment by June 30, 2018, based on the anticipated completion of the planned dry fuel storage campaigns, subject to certain regulatory approvals. Once approved, implementation of the ISFSI Emergency Plan will commence only after notification to the NRC of the completion of the transfer of all spent fuel to the ISFSI.

If you have any questions on this transmittal, please contact Mr. Coley Chappell at 802-451-3374.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 15, 2017.

Sincerely,

A handwritten signature in black ink, appearing to read 'JWB', written in a cursive style.

JWB/ccc

- Attachments:
1. Description of Proposed Changes, Technical Analysis, Regulatory Evaluation, Significant Hazards Determination, and Environmental Considerations
 2. Comparison Matrix of Nuclear Energy Institute 99-01, "Development of Emergency Action Levels for Non-Passive Reactors, Revision 6," to the Proposed VY Emergency Classification System and ISFSI EALs
 3. Supporting Evaluation and Calculation

- Enclosures:
1. ISFSI Emergency Plan
 2. ISFSI EAL Technical Bases Document

cc: Mr. Daniel H. Dorman
Region 1 Administrator
U.S. Nuclear Regulatory Commission
2100 Renaissance Blvd, Suite 100
King of Prussia, PA 19406-2713

Mr. Jack D. Parrott, Project Manager
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Mail Stop T-8F5
Washington, DC 20555

Ms. June Tierney, Commissioner
VT Department of Public Service
112 State Street, Drawer 20
Montpelier, VT 05620-2601

Attachment 1

Vermont Yankee Nuclear Power Station

Description of Proposed Changes, Technical Analysis, Regulatory Evaluation,
Significant Hazards Determination, and Environmental Considerations

1.0 INTRODUCTION

This evaluation supports a request to amend Renewed Facility Operating License (OL) DPR-28 for Vermont Yankee Nuclear Power Station (VY).

By letter dated January 12, 2015, Entergy Nuclear Operations, Inc. (ENO) submitted certifications of permanent cessation of power operations and permanent removal of fuel from the reactor vessel (Reference 1). Consequently, as specified in 10 CFR 50.82(a)(2), the 10 CFR Part 50 license no longer authorizes operation of the reactor or emplacement or retention of fuel in the reactor vessel.

The U.S. Nuclear Regulatory Commission (NRC) issued License Amendment No. 264 to Renewed Facility Operating License No. DPR-28 for VY by letter dated December 11, 2015 (Reference 2) approving the VY Permanently Defueled Emergency Plan (PDEP) and associated Permanently Defueled Emergency Action Levels (EALs). The PDEP and EALs rely upon exemptions from certain emergency planning requirements as approved by NRC letter dated December 10, 2015 (Reference 3). Additional changes to the VY emergency plan and EAL Technical Bases Document are warranted to reflect the future storage of all fuel in the Independent Spent Fuel Storage Installation (ISFSI) facility.

As described in the Post Shutdown Decommissioning Activities Report (PSDAR) (Reference 4), spent fuel will remain in the SFP until it meets the criteria for transfer, the existing ISFSI is expanded, and the spent fuel can be transferred in an efficient manner to the expanded ISFSI. The ISFSI expansion is estimated to be completed in September 2017, spent fuel transfer to the ISFSI is expected to commence in May 2017, and, provided the criteria for transfer are met, anticipated to be completed in late 2018 (refer to Reference 2 in the cover letter). To comport to the reduced scope of potential radiological accidents with spent fuel in dry cask storage within the ISFSI, ENO determined that replacement of the PDEP and Permanently Defueled EAL Technical Bases Document with the ISFSI Emergency Plan and the ISFSI EAL Technical Bases Document were warranted.

The proposed emergency plan would address the operation of the ISFSI and would be implemented after all spent fuel has been removed from the spent fuel pool (SFP) and placed in dry storage within the ISFSI. The proposed emergency plan continues to rely on previously granted exemptions from certain emergency planning requirements (Reference 3) as the bases for the previously granted exemptions have not changed and remain in effect.

Implementation of the proposed emergency plan would involve the establishment of administrative controls related to the accumulation of radiological source material.

2.0 DESCRIPTION

The proposed amendment would modify the VY license by replacing the PDEP and the associated Permanently Defueled EAL scheme with the ISFSI Emergency Plan and the ISFSI EAL scheme to reflect the storage of all spent fuel in the ISFSI facility. The proposed changes reduce the scope of onsite emergency planning to reflect the reduced scope of potential radiological accidents with all spent fuel in dry cask storage within the ISFSI. After all spent fuel is in dry cask storage within the ISFSI, the number and severity of potential radiological accidents possible at VY are substantially lower. There continues to be no need for offsite emergency response plans at VY because no postulated design basis accident (DBA) or reasonably conceivable beyond design basis event can result in a radiological release that exceeds Environmental Protection Agency (EPA) Protective Action Guides (PAGs) beyond the Exclusion Area Boundary (EAB or "Site Boundary"), as described in EPA's "Protective Action Guides and Planning Guidance for Radiological Incidents, dated January 2017 (EPA PAG Manual) (Reference 5).

The robust nature and high integrity of the spent 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). Because of the high integrity dry shielded canister's design and the substantial protection afforded by the canisters, leakage of fission products from a canister is not considered to be a credible event, as discussed in Section 4.1, below.

The source term for an accidental release at the defueled reactor site is reduced significantly by the transfer of spent fuel from the SFP to the ISFSI and by the removal or decay of radioactive materials remaining in the plant. VY has developed a methodology in the absence of any controls to determine potential doses at the Site Boundary if a radiological release were to occur during decontamination and dismantlement of radioactive structures, systems, and components (SSCs). In planning and preparation for decontamination and dismantlement activities, application of this methodology will consider administrative and engineering controls that will be in place to limit radiological source term accumulation as well as methods to limit the dispersal of radioactive materials. These controls will ensure that if a radiological release were to occur, doses at the Site Boundary would not exceed two times the Offsite Dose Calculation Manual (ODCM) limits (2 times 1500 millirem/year) for 60 minutes; and therefore not result in doses to the public above EPA PAGs beyond the controlled area boundary. By ensuring that dose rates that could occur during decontamination and dismantlement activities cannot exceed twice the ODCM limit, the current radiological effluent EALs are no longer necessary and can be eliminated. Methods necessary to ensure a radiological release would not exceed two times the ODCM limits would be in addition to the requirements already specified in the ODCM for control of effluent releases and the requirement to maintain radiation doses received by personnel As Low As Reasonably Achievable.

The current EAL scheme was approved for use at VY on December 11, 2015 (Reference 2) and is based on Nuclear Energy Institute (NEI) 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6 (Reference 6). The proposed EAL scheme continues to be based on NEI 99-01, Revision 6, as appropriate, after the transfer of the spent fuel from the SFP to the ISFSI (Reference 6). The proposed revisions constitute a change in the emergency planning function commensurate with the ongoing and anticipated reduction in radiological source term at VY.

3.0 PROPOSED CHANGES

Replacement of the PDEP and Permanently Defueled EAL Technical Bases Document with the ISFSI Emergency Plan and the ISFSI EAL Technical Bases Document involve the following major changes to the VY Emergency Plan: 1) removal of the various emergency actions related to the SFP; 2) removal of non-ISFSI-related emergency event types; 3) revision of the Emergency Response Organization (ERO); and 4) replacement of the "Shift Manager" with the "ISFSI Shift Supervisor" (ISS) title as the position that assumes the Emergency Director responsibilities.

The proposed revisions to the VY Emergency Plan and EAL scheme are commensurate with the reduction in radiological hazards associated with the transfer of the spent fuel from the SFP to the ISFSI and will allow the facility to transition to an emergency plan and EAL scheme appropriate for the storage of the spent fuel in the ISFSI. The proposed changes are necessary to properly reflect the conditions of the facility and to maintain the effectiveness of the emergency plan.

3.1 Elimination of SFP Initiating Conditions and EALs

The Initiating Conditions (ICs) and EALs associated with emergency classification in the current PDEP are based on NEI 99-01, Revision 6 (Reference 6). 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 power operations.

After all spent fuel has been transferred from the SFP to dry cask storage within the ISFSI, the NEI 99-01, Appendix C ICs and EALs that are specifically associated with the SFP are no longer required to be part of the emergency plan. Additionally, certain ICs and EALs whose primary function is not associated with the storage of spent fuel in the SFP are also no longer required to be part of the emergency plan when administrative controls are established to limit source term accumulation and the offsite consequences of uncontrolled effluent releases. Therefore, the ICs proposed for elimination in Table 1, below, are not included in the ISFSI Emergency Plan and EAL scheme.

The ICs listed in Table 1 are being deleted, either partially or in their entirety, or modified, as indicated using strikethrough and underline format, to show the proposed changes from the current VY Permanently Defueled EAL Scheme. The ICs being deleted are either associated only with the storage of spent fuel in the SFP or are ICs for which controls to limit possible effluent releases will be established.

Table 1 – Emergency Plan Initiating Conditions Being Deleted

ALERT	UNUSUAL EVENT
PD-AA1 Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE of 50 mrem thyroid CDE.	PD-AU1 Release of gaseous or liquid radioactivity greater than 2 times the ODCM limits for 60 minutes or longer.
PD-AA2 UNPLANNED rise in plant radiation levels that impedes plant access required to maintain spent fuel integrity.	PD-AU2 UNPLANNED rise in plant radiation levels.
	PD-SU1 UNPLANNED spent fuel pool temperature rise.
<p>PD-HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes. is occurring or has occurred.</p> <p>PD-HA1.1 A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervisor.</p> <p>PD-HA1.2 A validated notification from NRC of an aircraft attack threat within 30 minutes of the site.</p>	<p>PD-HU1 Confirmed SECURITY CONDITION or threat.</p> <p>PD-HU1.1 A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the Security Shift Supervisor.</p> <p>PD-HU1.2 Notification of a CREDIBLE SECURITY THREAT directed at the site.</p> <p>PD-HU1.3 A validated notification from the NRC providing information of an aircraft threat.</p>
	PD-HU2 Hazardous event affecting equipment necessary for spent fuel cooling.⁽¹⁾

⁽¹⁾ For a facility in which all spent fuel is stored in the ISFSI, the condition addressed by PD-HU2 remains fully addressed by IC E-HU1.

The ICs being deleted include all ICs associated with the categories of abnormal radioactive release and system malfunction associated with the SFP as well as security conditions associated with aircraft. These categories apply to the storage of spent fuel in the SFP and are not necessary or appropriate for a facility in which all spent fuel is stored in the ISFSI.

The ICs listed in Table 2, below, are being retained. The ICs being retained in the ISFSI Emergency Plan and associated EAL scheme are appropriate to address the condition of a facility in which all spent fuel is stored in the ISFSI.

Table 2 – ISFSI Emergency Plan Initiating Conditions

ALERT	UNUSUAL EVENT
Independent Spent Fuel Storage Installation	
	E-HU1: Damage to a loaded cask CONFINEMENT BOUNDARY.
Hazards and Other Conditions	
PD-HA1 HOSTILE ACTION is occurring or has occurred.	PD-HU1 Confirmed SECURITY CONDITION or threat.
PD-HA3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT.	PD-HU3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT.

3.2 Emergency Response Organization Revision

The current VY PDEP provides for two (2) ERO augmented positions: a Technical Coordinator and a Radiation Protection Coordinator. The PDEP requires the ERO to be activated at an Alert classification (can be activated in part or in whole at the discretion of the ED for an Unusual Event) with the goal of the ERO to augment the on-shift staff within 2 hours of an Alert classification. The proposed VY ISFSI Emergency Plan proposes replacing these positions with a Resource Manager and an individual trained in radiological monitoring and assessment.

The 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 Emergency Director within two (2) hours of declaration of an Unusual Event or an Alert. Entry into the ISFSI Emergency Plan would result from an extreme natural phenomenon (beyond design basis) or a security condition, either of which would negatively impact or restrict the ability of responding personnel to access to the site.

The Resource Manager augments the Emergency Director by assisting in assessing the emergency condition and coordinating the required resources, including serving as the public information interface. Services provided to the Emergency Director 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 (as compared to the ERO response required by the PDEP as described above) 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, VY proposes that a minimum of one person trained in radiological monitoring and assessment will report to the ISFSI within four hours of an emergency declaration for an event involving radiological consequences.

The proposed VY ISFSI Emergency Plan also provides that additional personnel resources may be directed to report to the ISFSI to provide 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 VY staff and can be requested from various contractors.

3.3 Replacement of the “Shift Manager” with the “ISFSI Shift Supervisor”

The current VY PDEP assigns the authority and responsibility for command and control of emergencies to the Shift Manager. If an emergency condition develops, the Shift Manager assumes the role of Emergency Director. The proposed VY ISFSI Emergency Plan proposes replacing the Shift Manager position with an ISFSI Shift Supervisor (ISS).

The ISS is an on-shift position at the VY site on a continuous, 24 hour per day basis, and is the senior management position during off-hours. This position is responsible for monitoring ISFSI conditions and managing the activities at the VY ISFSI. This position assumes overall command and control of the response as the Emergency Director and is responsible for monitoring conditions and approving all onsite activities. The ISFSI Emergency Plan clearly identifies non-delegable responsibilities, along with other designated tasks assigned to the ISS.

3.4 ISFSI Emergency Plan

The ISFSI Emergency Plan describes VY’s plan for responding to emergencies while all spent fuel is in dry cask storage within the ISFSI. The ISFSI Emergency Plan is provided in Enclosure 1 to this submittal for NRC review and approval. This proposed emergency plan is associated with EALs for events related to the ISFSI. The ISFSI Emergency Plan addresses the applicable regulations stipulated in 10 CFR 50.47, “Emergency Plans” and 10 CFR 50, Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities” (as previously exempted), and is consistent with regulations in 10 CFR 72.32 and 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 Plants” (Reference 7).

The VY ISFSI Emergency Plan conservatively provides that the emergency planning zone for the ISFSI is the area within the Site Boundary. The Site Boundary establishes the perimeter of the Owner Controlled Area. The Site Boundary completely encompasses the ISFSI controlled area. The ISFSI controlled area, as defined in 10 CFR 72.3, “Definitions,” means the area immediately surrounding an ISFSI for which VY exercises authority over its use and within which ISFSI operations are performed.

The ISFSI controlled area is established to limit dose to the public during normal operations, anticipated occurrences, and DBAs 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.” VY’s analysis of the radiological impact of potential accidents at the ISFSI concluded that any releases beyond the ISFSI controlled area are expected to be less than the EPA PAGs. The ISFSI 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 with all spent fuel in dry storage within the ISFSI, the current offsite Comprehensive Emergency Management Plan (CEMP) approach will continue to be an effective method to protect the health and safety of the public. Additionally, the scope of the onsite emergency response organization and corresponding requirements in the emergency plan may be reduced without an undue risk to the public health and safety. The current VY PDEP describes interfaces with the States of Vermont and New Hampshire and the Commonwealth of Massachusetts, including notifications of emergency declarations and annual reviews of VY's emergency classification system with appropriate State and Commonwealth representatives. The proposed VY ISFSI Emergency Plan proposes to maintain these interfaces.

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 detailed in Reference 5. Exposure levels, which warrant pre-planned response measures, are limited to onsite areas. For this reason, radiological emergency planning remains focused onsite.

3.5 ISFSI Emergency Action Levels

Enclosure 2 to this submittal provides the VY ISFSI EAL Technical Bases Document, which contains the proposed VY ISFSI EAL Scheme for NRC review and approval. The current VY EAL Scheme was approved by the NRC on December 11, 2015 (Reference 2). The proposed ISFSI EAL scheme would be implemented with the VY ISFSI Emergency Plan (provided in Enclosure 1).

Deletions from the currently approved EAL Scheme are identified in Table 1, "Emergency Plan Initiating Conditions Being Deleted," in Section 3.1, "Elimination of SFP Initiating Conditions and EALs," above.

Related Documents

Supporting evaluations and calculations for establishing appropriate source term accumulation limit administrative control limits are provided in Attachment 3.

Operating Modes and Applicability

The proposed ISFSI EAL Scheme is only applicable after all spent nuclear fuel has been transferred out of the SFP and placed in dry storage within the ISFSI.

State and Local Government Review of Proposed Changes

State and local emergency management officials are advised of EAL changes that are implemented. Prior to implementation of this License Amendment Request (LAR), VY 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.

4.0 TECHNICAL EVALUATION

4.1 Radiological Consequences of Design Basis Events

VY is located in the town of Vernon, Vermont in Windham County on the west shore of the Connecticut River immediately upstream of the Vernon Hydrostation. The facility is located on approximately 125 acres owned by Entergy Nuclear Vermont Yankee, LLC, with the exception of a

narrow strip of land between the Connecticut River and the VY property for which Entergy Nuclear Vermont Yankee, LLC has perpetual rights and easements from the owner. The site is bounded by the Connecticut River (Vernon Pond) on the east, by farm and pasture land mixed with wooded areas on the north and south, and by the town of Vernon on the west. Warwick and Northfield State Forests (approximately 8 miles southwest of the site), Green Mountain National Forest (approximately 18 miles southwest of the site) and the Pisgah Mountain Range (northeast of the site) limit the population density and land use within a 50-mile radius of the site. The majority of the land surrounding the site is undeveloped. The developed land is used for agricultural, dairying, and for residential areas within small villages. The primary agricultural crop is silage corn, which is stored for year-round feed for milk cows.

Chapter 6 of the VY Defueled Safety Analysis Report (DSAR) describes the DBA scenario that is applicable to VY with fuel stored in the SFP. This chapter discusses a postulated fuel handling accident (FHA) as the DBA associated with fuel movement until the fuel has been transferred to the ISFSI. This chapter also discusses a site event consisting of the postulated drop of a high integrity container (HIC) containing radioactive resins. However, after transfer of all irradiated fuel from the SFP to dry storage within the ISFSI, the accident scenario postulated in the DSAR is no longer possible.

The off-normal events and accidents addressed in the VY ISFSI Emergency Plan are related to the dry storage of spent nuclear fuel within the ISFSI and include only the off-normal, accident, natural phenomena, and hypothetical events and consequences presented in the Holtec International (Holtec) Final Safety Analysis Report (FSAR) for the HI-STORM 100 Cask System, Revision 4, for Certificate of Compliance (CoC) No. 1014 (Amendment 2) (Reference 8), and Holtec FSAR for the HI-STORM 100 Cask System, Revision 14 for CoC No. 1014 (Amendment 10) (Reference 9). After all fuel is removed from the VY SFP, there will no longer be any potential for the accidents previously described in the VY DSAR that would increase risk to the health and safety of the public. These accidents included events specifically related to the storage of the spent fuel in the SFP. After the transfer of the spent fuel from the SFP to the ISFSI, the spent fuel storage and handling systems will be removed from operation consistent with the PSDAR (Reference 4).

The Holtec HI-STORM 100 FSAR describes the DBAs applicable to the VY ISFSI along with the radiological dose calculation results. As provided in the Holtec FSAR, the analyses of the potential radiological impacts of postulated off-normal, natural phenomena, and accident events involving the ISFSI indicate 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 limited to the ISFSI and immediate vicinity, and for this reason radiological emergency planning is focused on this area.

The ISFSI is a passive storage system that does not rely on electric power for heat transfer. After removal of the spent fuel from the SFP, there are no credible fuel-related accidents for which actions are required to prevent occurrence or to mitigate the consequences. There is no credible accident resulting in radioactive releases requiring offsite protective measures, as discussed in Section 3.4 above.

VY began moving spent fuel to dry storage in 2008 in accordance with Amendment 2 to the Holtec CoC and Revision 4 to the HI-STORM 100 Cask System FSAR (Reference 8). The remaining spent fuel in the SFP is planned to be moved to dry storage in accordance with Amendment 10 to the Holtec CoC and Revision 14 to the HI-STORM 100 Cask System FSAR (Reference 9), or using a later amendment or other NRC approved licensing actions. These actions may result in the criteria for transfer being met to allow the transfer of spent fuel to the ISFSI to be completed in late 2018 (refer to Reference 2 in the cover letter). However, this Amendment is not dependent on the approval of licensing actions related to the dry fuel storage loading campaign.

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 Holtec FSAR (Reference 8 and Reference 9). 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.

After all spent fuel has been removed from the SFP, the estimated radiological inventory (non-fuel) that remains at the reactor facility is primarily attributable to activated reactor components and structural materials. 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 spent nuclear fuel in dry storage within the ISFSI, the radiological status of the facility required for implementing the proposed ISFSI Emergency Plan is summarized as follows:

- The remaining radiological source term at VY will not create an unplanned/unanticipated increase in radiation or in liquid or airborne radioactivity levels 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 structures, systems, and components (SSCs) are 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 ISFSI Emergency Plan describes VY's plan for responding to emergencies while all spent fuel is in dry storage within an ISFSI, and is not intended to apply to the decontamination and dismantlement of radioactive SSCs.

NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," (NUREG-0586) (Reference 10) supports this conclusion in the following statement (Section 4.3.9.3):

"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 detectable. 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 includes the following statement (Section 4.3.9.4):

"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 detectable 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, controls designed to minimize the likelihood and consequence of off-normal or accident events would be implemented when decontamination or dismantling activities involving radioactive SSCs are being performed. Examples of potential controls for radiological source term accumulation limits include:

- limits on radioactive materials collected on filter media and resins (dose rate limit),
- limits on contaminated materials collected in shipping containers (dose rate limit),
- limits on surface or fixed contamination on work areas that may create airborne radioactive material (activity limits), and
- limits on contaminated materials collected in radioactive liquid storage tanks (activity concentration limits).

Examples of potential methods to control accidental dispersal of the radiological source term include limitations on dispersal mechanisms that may cause a fire (*e.g.*, limits on combustible material loading, and use of fire watch to preclude fire), placement of a berm around a radioactive liquid storage tank, and packaging radioactive materials within confined boundaries with ventilation controls established.

4.2 Radiological Consequences of Postulated Events

As addressed in the request for the previously approved exemptions from certain emergency planning requirements contained in 10 CFR 50.47 and 10 CFR 50, Appendix E (Reference 3), an analysis of the potential radiological impact of a DBA at VY in a permanently defueled condition indicates that any releases beyond the Site Boundary are below EPA PAG exposure levels detailed in Reference 5. The bases for these exemptions have not changed and remain in effect for the proposed ISFSI Emergency Plan.

Although the limited scope of DBAs that remain applicable to the VY facility justifies a reduction in the necessary scope of emergency response capabilities, VY also assessed beyond design basis events using industry precedent, including information contained in Appendix I, “Radiological Accidents,” of NUREG-0586 (Reference 10).

Under the current facility configuration with spent fuel stored within the SFP, the most severe postulated beyond design basis event involves a highly unlikely sequence of events that causes heatup of the spent 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 spent fuel from the SFP, the configuration of the spent fuel stored in dry storage precludes the possibility of such a scenario.

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

1. Cask Drop Event (Fuel-Related Event)

VY is the holder of a general license for the storage of spent 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 VY is used for interim, onsite, dry storage of spent nuclear fuel assemblies in the Holtec HI-STORM 100 System CoC No. 1014(10 CFR 72.214).

As documented in the Holtec FSAR (Reference 8 and Reference 9), analysis of the normal events, including drop events, determined that canister drops can be sustained without breaching the confinement boundary, preventing removal of spent fuel assemblies, or creating a criticality accident. 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. Neither normal conditions of operation or off-normal events preclude retrieval of the fuel for transport and ultimate disposal.

The dry spent fuel storage casks used at VY are approved for storage of spent fuel per 10 CFR 72.214; and, as such, are in compliance with the requirements of 10 CFR 72.24 and 10 CFR 72.122 for off-normal and accident events to ensure that they will provide safe storage of spent fuel during all analyzed off-normal and accident events. Therefore, no radiological release would be expected to occur.

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 I). The initiator to these events could be a fire, explosion, or a fuel handling event (cask drop). After all spent fuel has been moved to the ISFSI, there would 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 (2 times 1500 millirem/year). During decontamination and dismantlement activities, administrative controls would limit the total amount of activity that could accumulate in a concentrated source such that a release to the environment from concentrated sources of these radioactive materials would not exceed two times the ODCM limit at the Site Boundary. Calculation VYC-3200, provided in Attachment 3, details an activity accumulation limit methodology for decontamination and dismantlement of irradiated stainless steel (e.g., reactor vessel internals) and irradiated concrete (e.g., reactor coolant loop bio-shield walls) based on isotopic mixtures from NUREG/CR-3474, "Long-Lived Activation Products in Reactor Materials," (Reference 11) such that a release to the environment from concentrated sources of these radioactive materials would not exceed two times the ODCM at the Site Boundary.

It is expected that representative material samples will be taken and analyzed prior to actual decontamination/dismantlement work. Using the methodology consistent with the calculation in Attachment 3, 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.

3. Radioactive Waste Handling Accident (High Integrity Container Drop)

This analysis, provided in chapter 6 of the VY DSAR, evaluated the drop of a high integrity container (HIC). The event involved the drop of the largest liner containing the highest concentration of radioactive materials (dewatered reactor water cleanup resin containing 19,415 curies of 26 various radionuclides representing the highest activity waste at the facility). The calculation postulates that the container is dropped at a location 250 meters (820 feet) from the closest site boundary with subsequent container failure and 1% of the liner contents released with 0.5% of the release becoming aerosolized and carried in the

direction of the closest site boundary. The resulting two hour integrated dose at the Site Boundary is projected to be 16.1 millirem TEDE, which is below the EPA PAG limit of 1 rem TEDE.

4. Accidents Initiated by External Events

The effects of external events, such as aircraft impacts, fires, floods, wind (including tornadoes), earthquakes, lightning, and physical security breaches on the ISFSI remain unchanged from the effects that were considered under the existing PDEP. Externally initiated events are addressed by the proposed ISFSI EALs.

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.

5.0 SUMMARY

By letter dated January 12, 2015, ENO submitted certifications of permanent cessation of power operations and permanent removal of fuel from the reactor vessel (Reference 1). Consequently, as specified in 10 CFR 50.82(a)(2), the 10 CFR Part 50 license no longer authorizes operation of the reactor or emplacement or retention of fuel in the reactor vessel. The fuel campaigns to transfer the remaining spent fuel from the SFP to the ISFSI are expected to commence in May 2017, and with the completion of the ISFSI expansion scheduled to be completed in September 2017, is anticipated to be completed as early as mid-2018. Based on the reduced scope of potential radiological accidents with all spent fuel in dry cask storage within the ISFSI, VY proposes the implementation of a revised emergency plan and corresponding EAL scheme, to be implemented after completion of the transfer of all spent fuel to the ISFSI.

This proposed amendment would replace the PDEP and its associated Permanently Defueled EAL Scheme with the ISFSI Emergency Plan and its associated EAL Scheme, as appropriate for the condition wherein all spent nuclear fuel is in dry storage within the ISFSI. The ISFSI Emergency Plan and EAL Scheme are being submitted to the NRC for approval, as required under Section IV.B.2 of Appendix E to 10 CFR Part 50. Additionally, 10 CFR 50.54(q)(4) and 10 CFR 72.44(f) require that proposed changes receive prior approval by the NRC because they are considered to reduce the effectiveness of the emergency plan.

6.0 REGULATORY EVALUATION

The proposed emergency plan does not meet all of the standards of 10 CFR 50.47(b) and requirements of 10 CFR Part 50, Appendix E. However, VY was previously granted exemptions from portions of 10 CFR 50.47(b), 10 CFR 50.47(c)(2), and 10 CFR 50, Appendix E, Section IV, by letter dated December 10, 2015 (Reference 3). The bases for these exemptions have not changed and remain in effect for the emergency plan changes requested in this document. Considering the previously granted exemptions, the emergency plan, as proposed, 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 Applicable Regulatory Requirements/Criteria

The regulatory requirements, as exempted, are discussed below.

Title 10 of the Code of Federal Regulations (10 CFR), Section 50.47, "Emergency Plans," set 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."

Section 50.47(b) establishes the standards that 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 50.47(b) 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."
- 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 change reduces 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."

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.C.1 of Appendix E requires that each emergency plan define the emergency classification levels that determine the extent of participation of the emergency response organization.

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 emergency plan continues to rely on previously granted exemptions from certain emergency planning requirements (Reference 3) since the bases for these exemptions have not changed and remain in effect.

In November 2012, NEI published NEI 99-01, Revision 6 (Reference 6). The NRC endorsed NEI 99-01, Revision 6, by letter dated March 28, 2013 (Reference 12). The changes being requested

herein are based on Revision 6 to NEI 99-01. The proposed changes are conservatively being considered as 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.

6.2 Aircraft-Related Emergency Action Levels

Security-based ICs and EALs were provided to licensees in NRC Bulletin 2005-02, "Emergency Preparedness and Response Actions for Security Based Events," dated July 18, 2005 (Reference 13). Bulletin 2005-02 was addressed to all holders of operating licenses for nuclear power reactors, except those who had permanently ceased power operations and had certified that fuel had 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 (74 *Federal Register* (FR) 13926; March 27, 2009), 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 spent fuel stored in a SFP, in addition to maintaining the mitigative strategies license conditions required by NRC Order, EA-02-026, "Interim Compensatory Measures (ICM) Order," issued February 25, 2002 (67 FR 9792; March 4, 2002).

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.

Therefore, the ICs proposed for deletion also include those associated with the mitigative strategies and response procedures for potential or actual aircraft attack procedures as the spent fuel will have been removed from the SFP and stored in the ISFSI prior to the implementation of the changes requested herein.

6.3 No Significant Hazards Consideration Determination

Pursuant to 10 CFR 50.92, Entergy Nuclear Operations, Inc. (ENO) 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 Vermont Yankee Nuclear Power Station (VY) site emergency plan and emergency action level (EAL) scheme commensurate with the hazards associated with a permanently shut down and defueled facility that has transferred all spent fuel from the spent fuel pool (SFP) to dry cask storage within the independent spent fuel storage installation (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 amendment would modify the VY facility operating license by revising the emergency plan and EAL scheme. VY has permanently ceased power operations and is permanently defueled. The proposed amendment is conditioned on all spent nuclear fuel being removed from wet storage in the SFP and placed in dry storage within the ISFSI. Occurrence of postulated accidents associated with spent fuel stored in a SFP is no longer credible in a SFP devoid of such fuel. The proposed amendment has no effect on plant structures, systems, or components (SSC) and therefore can neither affect the capability of any plant SSC to perform its design function nor increase the likelihood of the malfunction of any plant SSC. The proposed amendment would have no effect on any of the previously evaluated accidents in the VY Defueled Safety Analysis Report (DSAR) or the Holtec HI-STORM 100 Final Safety Analysis Report (FSAR) (Reference 8 and Reference 9).

Because VY 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. Furthermore, previously generated source term materials have been removed from the site in accordance with applicable regulations and permitting requirements.

Therefore, the proposed amendment 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 VY.

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 amendment 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.

Because the 10 CFR Part 50 license for VY no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel, as specified in 10 CFR 50.82(a)(2), the postulated accidents associated with reactor operation are no longer credible. In addition, with all spent nuclear fuel transferred out of wet storage from the SFP and placed in dry storage within the ISFSI, a fuel handling accident is no longer credible. Therefore, there are no credible events that would result in radiological releases beyond the site boundary exceeding the EPA PAG exposure levels, as detailed in the EPA's "Protective Action Guide and Planning Guidance for Radiological Incidents," dated January 2017 (Reference 5).

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 structures, systems, and components perform their safety function or their design margins. Because there is no change to the physical design of the facility, 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, ENO concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

6.4 Precedent

Similar changes to emergency plans and associated EAL Schemes approved by the NRC for plants that have transferred all fuel from the SFP to dry cask storage in the ISFSI include: 1) the La Crosse Boiling Water Reactor facility on September 8, 2014 (Reference 14), 2) the Zion Facility on May 14, 2015 (Reference 15) and December 20, 2016 (Reference 16), 3) the Kewaunee Power Station on March 2, 2017 (Reference 17), and 4) the Crystal River Unit 3 Nuclear Generating Plant on March 22, 2017 (Reference 18).

6.5 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 as exempted, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

7.0 ENVIRONMENTAL CONSIDERATIONS

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

- (i) The amendment involves no significant hazards consideration.

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

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

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

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

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

Based on the above, ENO 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

1. Letter, Entergy Nuclear Operations, Inc. to USNRC, "Certifications of Permanent Cessation of Power Operations and Permanent Removal of Fuel from the Reactor Vessel," BVY 15-001, dated January 12, 2015 (ADAMS Accession No. ML15013A426)
2. Letter USNRC to VYNPS, "Vermont Yankee Nuclear Power Station – Issuance of Amendment Re: Changes to the Emergency Plan and Emergency Action Levels (TAC No. MF4279)", dated December 11, 2015 (ADAMS Accession No. ML15233A166)
3. Letter, USNRC to Entergy Nuclear Operations, Inc., "Vermont Yankee Nuclear Power Station – Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation (CAC No. MF3614)," dated December 10, 2015 (ADAMS Accession No. ML15180A054)
4. Letter, Entergy Nuclear Operations, Inc. to USNRC, "Post-Shutdown Decommissioning Activities Report," BVY 14-078, dated December 19, 2014 (ADAMS Accession No. ML14357A110)
5. U.S. Environmental Protection Agency, "Protective Action Guide and Planning Guidance for Radiological Incidents," dated January 2017 (EPA-400/R-17/001)
6. Nuclear Energy Institute (NEI) 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors," dated November 2012 (ADAMS Accession No. ML12326A805)
7. 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, dated November 1980

8. Holtec International Final Safety Analysis Report for the HI-STORM 100 Cask System Revision 3, dated April 10, 2006, for Certificate Number 1014, Docket No. 72-1014, Amendment 2, Effective Date June 7, 2005 (ADAMS Accession No. ML063240599)
9. Holtec International Final Safety Analysis Report for the HI-STORM 100 Cask System Revision 14, dated January 5, 2015, for Certificate Number 1014, Docket No. 72-1014, Amendment 10, Effective Date May 31, 2016 (ADAMS Accession No. ML15007A435)
10. NUREG-0586, "Generic Environmental Impact Statement of Decommissioning of Nuclear Facilities," Supplement 1, Volume 1, November 2002
11. NUREG/CR-3474, "Long-Lived Activation Products in Reactor Materials," dated August 1984
12. Letter, Mark Thaggard (USNRC) to Susan Perkins-Grew (NEI), "U.S. Nuclear Regulatory Commission Review and Endorsement of NEI 99-01, Revision 6, Dated November, 2012 (TAC No. D92368)," dated March 28, 2013 (ML12346A463)
13. NRC Bulletin 2005-02, "Emergency Preparedness and Response Actions for Security Based Events," dated July 18, 2005 (ADAMS Accession No. ML051740058)
14. Letter from U.S. Nuclear Regulatory Commission to Dairyland Power Cooperative (La Crosse Boiling Water Reactor), "Issuance of Amendment Relating to the Dairyland Power Cooperative La Crosse Boiling Water Reactor Request for Changes to the Emergency Planning Requirements," dated September 8, 2014 (ADAMS Accession No. ML14155A112)
15. Letter from U.S. Nuclear Regulatory Commission to ZionSolutions LLC (Zion Nuclear Power Station), "Issuance of Amendments Relating to the Emergency Planning Requirements for Zion Nuclear Power Station, Units 1 and 2, dated May 14, 2015 (ADAMS Accession No. ML15092A423)
16. Letter from U.S. Nuclear Regulatory Commission to ZionSolutions LLC (Zion Nuclear Power Station), "Issuance of Amendments Related to Changes to a Proposed Revision to the Zion Nuclear Power Station Defueled Station Emergency Plan (TAC NOs. L53114 and L53115), dated December 20, 2016 (ADAMS Accession No. ML16211A081)
17. Letter from U.S. Nuclear Regulatory Commission to Dominion Nuclear, "Safety Evaluation for the Proposed Revision to the Kewaunee Power Station Defueled Station Emergency Plan (TAC No. L53082), dated March 2, 2017 (ADAMS Accession No. ML16195A323)
18. Letter from U.S. Nuclear Regulatory Commission to 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. ML 17048A474)

Attachment 2

Vermont Yankee Nuclear Power Station

Comparison Matrix of Nuclear Energy Institute 99-01, "Development of Emergency Action Levels for Non-Passive Reactors, Revision 6," to the Proposed VY Emergency Classification System and ISFSI EALs

NEI 99-01, Rev 6, Appendix C/Section 8 ICs/EALs	Proposed EAL Matrix for VY	Comparison
<p>E-HU1</p> <p>ECL: Notification of Unusual Event</p> <p>Initiating Condition: Damage to a loaded cask CONFINEMENT BOUNDARY</p> <p>Operating Mode Applicability: Not Applicable</p>	<p>E-HU1</p> <p>ECL: Unusual Event</p> <p>Initiating Condition: Damage to a loaded cask CONFINEMENT BOUNDARY</p>	<ul style="list-style-type: none"> • Use of "Unusual Event" instead of "Notification of Unusual Event" Use agrees in meaning and intent with NEI 99-01, Rev. 6 • Removed Operating Mode Applicability as it does not apply in a permanently defueled condition
<p>Example Emergency Action Levels:</p> <p>(1) Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading greater than (2 times the site-specific cask specific technical specification allowable radiation level) on the surface of the spent fuel cask.</p>	<p>Emergency Action Levels: E-HU.1</p> <p>E-HU1.1 Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by a radiation reading greater than two times the ISFSI Technical Specification allowable levels.</p> <p>Two times the ISFSI Technical Specification allowable levels equate to:</p> <ul style="list-style-type: none"> • 14.80 mR/hr on the top of the overpack <p>or</p> <ul style="list-style-type: none"> • 16.62 mR/hr on the side of the overpack, excluding inlet and outlet ducts 	<ul style="list-style-type: none"> • Removed "Example" from Emergency Action Levels • Provided VY-specific radiation levels that conform to the recommended "2 times" the VY-specific technical specification allowable levels. • Removed reference to "on-contact." 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. The radiation levels listed in the EAL represent the site-specific Technical Specification radiation levels and comply with this recommendation.
<p>Basis:</p> <p>This IC addresses an event that results in damage to the CONFINEMENT BOUNDARY of a storage cask containing spent fuel. It applies to irradiated fuel that is licensed for dry storage beginning at the point that the loaded storage cask is sealed. The issues of concern are the creation of a potential or actual release path to the environment, degradation of one or more fuel assemblies due to environmental factors, and configuration changes which could cause challenges in removing the cask or fuel from storage.</p> <p>The existence of "damage" is determined by radiological</p>	<p>Basis:</p> <p>This IC addresses an event that results in damage to the CONFINEMENT BOUNDARY of a storage cask containing spent fuel. It applies to irradiated fuel that is licensed for dry storage beginning at the point that the loaded storage cask is sealed. The issues of concern are the creation of a potential or actual release path to the environment, degradation of one or more fuel assemblies due to environmental factors, and configuration changes which could cause challenges in removing the cask or fuel from storage.</p> <p>The existence of "damage" is determined by radiological survey. The Technical Specification multiple of two times is used here to distinguish between non-emergency and emergency conditions. The emphasis for this classification is the degradation in</p>	<ul style="list-style-type: none"> • Removed reference to "on-contact." 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. The radiation levels listed in the EAL represent the site-specific Technical Specification radiation levels and comply with this recommendation. • Removed reference to Recognition category AU1 as this EAL is not included in the proposed VY EAL Scheme.

NEI 99-01, Rev 6, Appendix C/Section 8 ICs/EALs	Proposed EAL Matrix for VY	Comparison
<p>survey. The technical specification multiple of "2 times", which is also used in Recognition Category A IC AU1, is used here to distinguish between non-emergency and emergency conditions. The emphasis for this classification is the degradation in the level of safety of the spent fuel cask and not the magnitude of the associated dose or dose rate. It is recognized that in the case of extreme damage to a loaded cask, the fact that the "on-contact" dose rate limit is exceeded may be determined based on measurement of a dose rate at some distance from the cask.</p> <p>Security-related events for ISFSIs are covered under ICs HU1 and HA1.</p>	<p>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 dose rate limit is exceeded may be determined based on measurement of a dose rate at some distance from the cask.</p> <p>Security-related events for ISFSIs are covered under IC PD-HU1 and PD-HA1.</p>	
<p>PD-HU1 ECL: Notification of Unusual Event Initiating Condition: Confirmed SECURITY CONDITION or threat. Operating Mode Applicability: Not Applicable</p>	<p>PD-HU1 ECL: Unusual event Initiating Condition: Confirmed SECURITY CONDITION or threat.</p>	<ul style="list-style-type: none"> • Use of "Unusual Event" instead of "Notification of Unusual Event". Use agrees in meaning and intent with NEI 99-01, Rev. 6 • Removed Operating Mode Applicability as it does not apply in a permanently defueled condition.
<p>Example Emergency Action Levels: (1 or 2 or 3)</p> <p>(1) A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the (site-specific security shift supervision).</p> <p>(2) Notification of a credible security threat directed at the site.</p> <p>(3) A validated notification from the NRC providing information of an aircraft threat.</p>	<p>Emergency Action Levels: PD-HU1.1 or PD-HU1.2</p> <p>PD-HU1.1 A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the Security Shift Supervisor.</p> <p>PD-HU1.2 Notification of a CREDIBLE SECURITY THREAT directed at the site.</p>	<ul style="list-style-type: none"> • Removed "Example" from Emergency Action Levels • Renumbered Example EALs 1 and 2 to PD-HU1.1 and PD-HU1.2 consistent with VY's current EAL numbering scheme • Deleted Example EAL 3 related to aircraft threat
<p>Basis: This IC addresses events that</p>	<p>Basis: This IC addresses events that pose a threat</p>	<ul style="list-style-type: none"> • Deleted reference to communicating with the Control Room and referenced

NEI 99-01, Rev 6, Appendix C/Section 8 ICs/EALs	Proposed EAL Matrix for VY	Comparison
<p>pose a threat to plant personnel or the equipment necessary to maintain cooling of spent fuel, and thus represent a potential degradation in the level of plant safety. Security events which do not meet one of these EALs are adequately addressed by the requirements of 10 CFR § 73.71 or 10 CFR § 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under IC PD-HA1.</p> <p>Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event. Classification of these events will initiate appropriate threat-related notifications to plant personnel and OROs.</p> <p>Security plans and terminology are based on the guidance provided by NEI 03-12, <i>Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]</i>.</p> <p>EAL #1 references (site-specific security shift supervision) because these are the individuals trained to confirm that a security event is occurring or has occurred. Training on security event confirmation and classification is controlled due to the nature of Safeguards and 10 CFR § 2.39 information.</p> <p>EAL #2 addresses the receipt of a credible security threat. The credibility of the threat is assessed in accordance with (site-specific procedure).</p> <p>EAL #3 addresses the threat from the impact of an aircraft on the plant. The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may also be provided</p>	<p>to plant personnel or spent fuel, and thus represent a potential degradation in the level of plant safety. Security events which do not meet one of these EALs are adequately addressed by the requirements of 10 CFR 73.71 or 10 CFR 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under IC PD-HA1.</p> <p>Timely and accurate communications between Security Shift Supervision and the ISFSI Shift Supervisor/Emergency Director are essential for proper classification of a security-related event. Classification of these events will initiate appropriate threat-related notifications to plant personnel and Offsite Response Organizations (OROs).</p> <p>Security plans and terminology are based on the guidance provided by NEI 03-12, <i>Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]</i>.</p> <p>PD-HU1.1 references the Security Shift Supervisor because this is the individual 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 2.390 information.</p> <p>PD-HU1.2 addresses the receipt of a CREDIBLE SECURITY THREAT. The credibility of a threat is assessed in accordance with Security procedures.</p> <p>Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Security Plan.</p> <p>Escalation of the emergency classification level would be via Initiating Condition PD-HA1.</p>	<p>communicating with the ISFSI Shift Supervisor/Emergency Director</p> <ul style="list-style-type: none"> Deleted wording associated with aircraft threats

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<p>by NORAD through the NRC. Validation of the threat is performed in accordance with (site-specific procedure).</p> <p>Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Security Plan.</p> <p>Escalation of the emergency classification level would be via IC PD-HA1.</p>		
<p>PD-HA1</p> <p>ECL: Alert</p> <p>Initiating Condition: HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.</p> <p>Operating Mode Applicability: Not Applicable</p>	<p>PD-HA1</p> <p>ECL: Alert</p> <p>Initiating Condition: HOSTILE ACTION is occurring or has occurred.</p>	<ul style="list-style-type: none"> • Deleted reference to the Owner Controlled Area. At VY, the Site Boundary establishes the perimeter of the Owner Controlled Area. The Security Shift Supervisor is the individual trained on security event confirmation and classification. The occurrence of a Hostile Action will be determined by the Security Shift Supervisor in accordance with the Security Plan. Therefore, there is no need to include a defined boundary in the IC. • Deleted reference to airborne threat • Removed Operating Mode Applicability as it does not apply in a permanently defueled condition
<p>Example Emergency Action Levels:</p> <p>(1) A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the (site-specific security shift supervision).</p> <p>(2) A validated notification from NRC of an aircraft attack</p>	<p>Emergency Action Levels: PD-HA1.1</p> <p>PD-HA1.1 A HOSTILE ACTION is occurring or has occurred as reported by the Security Shift Supervisor.</p>	<ul style="list-style-type: none"> • Removed "Example" from Emergency Action Levels • Deleted reference to the Owner Controlled Area. At VY, the Site Boundary establishes the perimeter of the Owner Controlled Area. The Security Shift Supervisor is the individual trained on security event confirmation and classification. The occurrence of a Hostile Action will be determined

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<p>threat within 30 minutes of the site.</p>		<p>by the Security Shift Supervisor in accordance with the Security Plan. Therefore, there is no need to include a defined boundary in the IC.</p> <ul style="list-style-type: none"> • Renumbered Example EAL 1 to PD-HA1.1 consistent with VY's current EAL numbering scheme • Deleted Example EAL 2 related to aircraft threat
<p>Basis:</p> <p>This IC addresses the occurrence of a HOSTILE ACTION within the OWNER CONTROLLED AREA or notification of an aircraft attack threat. This event will require rapid response and assistance due to the possibility of the attack progressing to the PROTECTED AREA, or the need to prepare the plant and staff for a potential aircraft impact.</p> <p>Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event.</p> <p>Security plans and terminology are based on the guidance provided by NEI 03-12, <i>Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]</i>.</p> <p>As time and conditions allow, these events require a heightened state of readiness by the plant staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Alert declaration will also heighten the awareness of Offsite Response Organizations, allowing them to be better prepared should it be necessary to consider further actions.</p>	<p>Basis:</p> <p>This IC addresses the occurrence of a HOSTILE ACTION.</p> <p>Timely and accurate communications between Security Shift Supervision and the ISFSI Shift Supervisor/Emergency Director are essential for proper classification of a security-related event.</p> <p>Security plans and terminology are based on the guidance provided by NEI 03-12, <i>Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]</i>.</p> <p>As time and conditions allow, these events require a heightened state of readiness by the plant staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Alert declaration will also heighten the awareness of OROs, allowing them to be better prepared should it be necessary to consider further actions.</p> <p>This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR 73.71 or 10 CFR 50.72.</p> <p>This EAL is applicable for any HOSTILE ACTION directed against the ISFSI.</p> <p>In some cases, it may not be readily apparent if an aircraft impact within the Site Boundary was intentional (i.e., a Hostile Action). It is expected, although not certain, that notification by an appropriate Federal</p>	<ul style="list-style-type: none"> • Changed wording to reflect VY ISFSI EAL wording • Deleted wording associated with aircraft threats • Deleted reference to communicating with the Control Room and referenced communicating with the ISFSI Shift Supervisor/Emergency Director • Deleted example EALs

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<p>This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.</p> <p>EAL #1 is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes any action directed against an ISFSI that is located within the OWNER CONTROLLED AREA.</p> <p>EAL #2 addresses the threat from the impact of an aircraft on the plant, and the anticipated arrival time is within 30 minutes. The intent of this EAL is to ensure that threat-related notifications are made in a timely manner so that plant personnel and OROs are in a heightened state of readiness. This EAL is met when the threat-related information has been validated in accordance with (site-specific procedure).</p> <p>The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may be provided by NORAD through the NRC.</p> <p>In some cases, it may not be readily apparent if an aircraft impact within the OWNER CONTROLLED AREA was intentional (i.e., a HOSTILE ACTION). It is expected, although not certain, that notification by an appropriate Federal agency to the site would clarify this point. In this case, the appropriate federal agency is intended to be NORAD, FBI, FAA</p>	<p>agency to the site would clarify this point. In this case, the appropriate federal agency is intended to be NORAD, FBI, FAA, or NRC. The emergency declaration, including one based on other ICs/EALs, should not be unduly delayed while awaiting notification by a Federal agency.</p> <p>Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Security Plan.</p>	

<p>NEI 99-01, Rev 6, Appendix C/Section 8 ICs/EALs</p>	<p>Proposed EAL Matrix for VY</p>	<p>Comparison</p>
<p>or NRC. The emergency declaration, including one based on other ICs/EALs, should not be unduly delayed while awaiting notification by a Federal agency.</p> <p>Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Security Plan.</p>		
<p>PD-HU3</p> <p>ECL: Notification of Unusual Event</p> <p>Initiating Condition: Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE.</p> <p>Operating Mode Applicability: Not Applicable</p>	<p>PD-HU3</p> <p>ECL: Unusual Event</p> <p>Initiating Condition: Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.</p>	<ul style="list-style-type: none"> • Use of "Unusual Event" instead of "Notification of Unusual Event". Use agrees in meaning and intent with NEI 99-01, Rev. 6 • Removed Operating Mode. Applicability as it does not apply in a permanently defueled condition
<p>Example Emergency Action Levels:</p> <p>(1) Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.</p>	<p>Emergency Action Levels: PD-HU3.1</p> <p>PD-HU3.1 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 ISFSI or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.</p>	<ul style="list-style-type: none"> • Removed "Example" from Emergency Action Levels • Renumbered Example EAL 1 to PD-HU3.1 consistent with VY's current EAL numbering scheme • Reworded to make EAL specific to VY ISFSI facility
<p>Basis:</p> <p>This IC addresses unanticipated</p>	<p>Basis:</p> <p>This IC addresses unanticipated conditions</p>	<ul style="list-style-type: none"> • Use of "Unusual Event" instead of "Notification of Unusual Event".

<p>NEI 99-01, Rev 6, Appendix C/Section 8 ICs/EALs</p>	<p>Proposed EAL Matrix for VY</p>	<p>Comparison</p>
<p>conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for a NOUE.</p>	<p>not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for an Unusual Event.</p>	<p>Use agrees in meaning and intent with NEI 99-01, Rev. 6</p>
<p>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</p>	<p>PD-HA3 ECL: Alert Initiating Condition: Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT.</p>	<ul style="list-style-type: none"> Removed Operating Mode Applicability as it does not apply in a permanently defueled condition
<p>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.</p>	<p>Emergency Action Levels: PD-HA3.1 PD-HA3.1 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 ISFSI or a security event that involves probable life threatening risk to site personnel or damage to ISFSI equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.</p>	<ul style="list-style-type: none"> Removed "Example" from Emergency Action Levels Renumbered Example EAL 1 to PD-HA3.1 consistent with VY's current EAL numbering scheme Reworded to make EAL specific to VY ISFSI facility
<p>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.</p>	<p>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.</p>	<ul style="list-style-type: none"> No differences or deviations