



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

received
4/3/2018

NVY 18-007

March 30, 2018

Mr. Corey Daniels
Director, Nuclear Decommissioning
Entergy Nuclear Operations, Inc.
Vermont Yankee Nuclear Power Station
320 Governor Hunt Rd
Vernon, VT 05354

SUBJECT: 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)

Dear Mr. Daniels:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 267 to Facility Operating License No. DPR-28 for the Vermont Yankee Nuclear Power Station (VY). The amendment consists of changes to the Facility Operating Licenses in response to your application dated May 15, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17139D261), as supplemented by letter dated November 16, 2017 (ADAMS Accession Nos. ML17325B019 and ML17325B020).

The amendment replaces 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. The changes will reflect the new status of the facility, as well as the reduced scope of potential radiological accidents, once all spent fuel has been moved to dry cask storage within the onsite ISFSI, an activity which is scheduled for completion by the end of 2018. The ISFSI Emergency Plan will be used at VY during the period when all spent fuel will be stored in the VY ISFSI. This change reflects the complete removal of all fuel from the spent fuel pool 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).

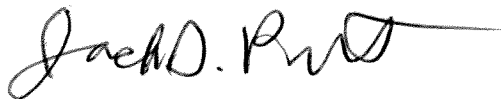
The NRC staff determined that the proposed VY ISFSI Emergency Plan and associated EAL changes would continue to meet the standards in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.47, "Emergency plans," and the requirements in Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," of 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," as exempted. As such, the VY ISFSI Emergency Plan and associated EAL changes would provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the VY facility.

The supplement to the application, dated November 16, 2017, provided additional information that clarified the application, but did not expand the scope of the application as originally noticed and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* (FR) on July 18, 2017 (82 FR 32879).

The NRC staff has determined that its documented safety evaluation does not contain Sensitive Unclassified Non-Safeguards Information pursuant to 10 CFR 2.390, "Public inspections, exemptions, requests for withholding." In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of ADAMS. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

A copy of the related Safety Evaluation is provided in Enclosure 2. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in black ink, appearing to read "Jack D. Parrott", with a long horizontal flourish extending to the right.

Jack D. Parrott, Senior Project Manager
Reactor Decommissioning Branch
Division of Decommissioning, Uranium Recovery
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

Docket Nos. 50-271

Enclosures:

1. Amendment No. 267 to DPR-28
2. Safety Evaluation

cc w/encls: Distribution via Listserv



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

ENTERGY NUCLEAR OPERATIONS, INC.

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 267
License No. DPR-28

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Entergy Nuclear Operations, Inc. (ENO or the licensee), dated May 15, 2017, as supplemented by letter dated November 16, 2017, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) Chapter I;
 - B. The facility will operate in conformity with the application, as supplemented, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," of the Commission's regulations and all applicable requirements have been satisfied.

Enclosure 1

2. Accordingly, Facility Operating License No. DPR-28 is amended by changing Section 3.B to read as follows:

The Technical Specifications contained in Appendix A, as revised through Amendment No. 267, are hereby incorporated in the license. Entergy Nuclear Operations, Inc. shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date the licensee notifies the NRC in writing that all spent nuclear fuel assemblies have been transferred out of the spent fuel pool and have been placed in dry storage within the independent spent fuel storage installation, and shall be implemented within 60 days of the effective date.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read "Bruce A. Watson", with a long horizontal flourish extending to the right.

Bruce A. Watson, CHP, Chief
Reactor Decommissioning Branch
Division of Decommissioning, Uranium Recovery
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

Attachment:
Change to Facility
Operating License No. DPR-28

Date of Issuance:

ATTACHMENT TO LICENSE AMENDMENT NO. 267

TO FACILITY OPERATING LICENSE NO. DPR-28

DOCKET NO. 50-271

Replace the following pages of the Facility Operating License No. DPR-28 with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the area of change.

Facility Operating License No. DPR-28

REMOVE

3

INSERT

3

- A. Entergy Nuclear Operations, Inc., pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source, or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components.
- B. Entergy Nuclear Operations, Inc., pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not to separate, such byproduct and special nuclear material as may be produced by operation of the facility.
- 1. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Section 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

G. This paragraph deleted by Amendment No. 263.

H. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 267, are hereby incorporated in the license. Entergy Nuclear Operations, Inc. shall operate the facility in accordance with the Technical Specifications.

I. Reports

Entergy Nuclear Operations, Inc. shall make reports in accordance with the requirements of the Technical Specifications.

J. This paragraph deleted by Amendment No. 226.

K. Environmental Conditions

Pursuant to the Initial Decision of the presiding Atomic Safety and Licensing Board issued February 27, 1973, the following conditions for the protection of the environment are incorporated herein:

- 1. This paragraph deleted by Amendment No. 206, October 22, 2001.
- 2. This paragraph deleted by Amendment 131, 10/07/91.

SAFETY EVALUATION BY THE OFFICE OF
NUCLEAR SECURITY AND INCIDENT RESPONSE
RELATED TO AMENDMENT NO. 267 TO
RENEWED FACILITY OPERATING LICENSE NO. DPR-28
ENTERGY NUCLEAR OPERATIONS, INC.
VERMONT YANKEE NUCLEAR POWER STATION
DOCKET NO. 50-271

1.0 INTRODUCTION

The Vermont Yankee Nuclear Power Station (VY) is a decommissioning power reactor located on the west bank of the Connecticut River immediately upstream of the Vernon Hydrostation in the town of Vernon, Vermont (5 miles south of Brattleboro, Vermont). The station is located on about 125 acres in Windham County. The licensee, Entergy Nuclear Operations, Inc. (ENO), is the holder of Renewed Facility Operating License No. DPR-28, issued pursuant to the Atomic Energy Act of 1954, as amended, and Part 50, "Domestic Licensing of Production and Utilization Facilities," of Title 10 of the *Code of Federal Regulations* (10 CFR).

By letter dated September 23, 2013 (Reference 1), ENO notified the U.S. Nuclear Regulatory Commission (NRC) of its decision to permanently cease power operations at VY in the fourth quarter of 2014, pursuant to 10 CFR 50.82(a)(1)(i). By letter dated January 12, 2015 (Reference 2), ENO submitted a certification to the NRC of permanent cessation of power operations on December 29, 2014 and certified that fuel had been permanently removed from the reactor pursuant to 10 CFR 50.82(a)(1)(i) and 10 CFR 50.82(a)(1)(ii), respectively. Upon docketing of these certifications, and pursuant to 10 CFR 50.82(a)(2), the VY facility operating license no longer authorized operation of the reactor or emplacement or retention of fuel into the reactor vessel.

By application dated May 15, 2017 (Reference 3), as supplemented by letter dated November 16, 2017 (Reference 4), the licensee requested changes to the VY Permanently Defueled Emergency Plan (PDEP) pursuant to 10 CFR 50.54(q). The proposed changes replace the VY PDEP and associated Emergency Action Level (EAL) Technical Bases Document (hereafter referred to as the EAL scheme) with an Independent Spent Fuel Storage Installation (ISFSI) Emergency Plan and associated EAL scheme.

The proposed changes would reflect the decommissioning status of the facility, as well as the reduced scope of potential radiological accidents, once all spent fuel has been moved to dry cask storage within the onsite ISFSI, which is currently scheduled for completion in 2018. The supplement to the application, dated November 16, 2017, provided additional information that clarified the application, but did not expand the scope of the application as originally noticed and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* (FR) on July 18, 2017 (82 FR 32879).

2.0 REGULATORY EVALUATION

This safety evaluation addresses the acceptability of the proposed VY ISFSI Emergency Plan and associated EAL scheme. This plan would replace the current VY PDEP and associated EAL scheme after all spent fuel has been transferred from the VY spent fuel pool (SFP) to the expanded onsite ISFSI.

The proposed changes for the VY ISFSI Emergency Plan and associated EAL scheme are required to meet the following regulations, as exempted, in part, by letter dated December 10, 2015 (Reference 5):

- 10 CFR 50.47(b)(1), states, in part: "... each principal response organization has staff to respond and to augment its initial response on a continuous basis";
- 10 CFR 50.47(b)(2) states, in part: "... adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available ...";
- 10 CFR 50.47(b)(4), as exempted, states, in part: "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...";
- 10 CFR Part 50, Appendix E, Section IV.A, as exempted, 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...";

The associated guidance documents on which the NRC based its acceptance and evaluation of the proposed VY ISFSI Emergency Plan and associated EAL scheme are as follows:

- Revision 1 to NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (Reference 6), which provides a common reference and guidance source for nuclear facility operators to develop radiological emergency response plans.
- Office of Nuclear Security and Incident Response / Division of Preparedness and Response (NSIR/DPR) Interim Staff Guidance (ISG) – 2, "Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants" (Reference 7), which provides guidance for the review of permanently defueled emergency plans for power reactor sites undergoing decommissioning.
- Spent Fuel Storage and Transportation (SFST) SFST-ISG – 16, "Emergency Planning" (Reference 8), which provides emergency plan review guidance applicable to facilities licensed pursuant to the regulatory requirements found in 10 CFR Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste."

- Nuclear Energy Institute (NEI) document NEI 99-01, Revision 6, “Development of Emergency Action Levels for Non-Passive Reactors” (Reference 9), which was endorsed by the NRC in a letter dated March 28, 2013 (Reference 10), as generic (non-plant-specific) EAL scheme development guidance.

3.0 TECHNICAL EVALUATION

The NRC staff has reviewed the licensee’s regulatory and technical analyses in support of its proposed emergency plan changes, as described in the application dated May 15, 2017, as supplemented by letter dated November 16, 2017. The technical evaluation is detailed below.

3.1 Background

VY has been permanently shut down since December 29, 2014, and the final removal of fuel from its reactor vessel was completed on January 12, 2015. VY is authorized to possess and store irradiated nuclear fuel at the permanently shutdown and defueled VY facility. The spent fuel from VY will be stored at the existing expanded ISFSI. After the VY reactor permanently ceased operation, all fuel assemblies were removed from the reactor vessel and placed in the VY SFP.

By letter dated March 14, 2014 (Reference 11), as supplemented by letters dated August 29, 2014 (Reference 12) and October 21, 2014 (Reference 13), ENO requested exemptions for VY from (1) certain planning standards in 10 CFR 50.47(b) regarding onsite and offsite radiological emergency plans for nuclear power reactors; (2) certain requirements in 10 CFR 50.47(c)(2) that require establishment of plume exposure and ingestion pathway emergency planning zones for nuclear power reactors, and (3) certain requirements in 10 CFR Part 50, Appendix E, Section IV, regarding the content of emergency plans. The NRC approved the requested exemptions in a letter dated December 10, 2015.

By letter dated December 11, 2015 (Reference 14), the NRC issued Amendment No. 264 to Renewed Facility Operating License No. DPR-28 for the VY PDEP Emergency Plan and for changes to the EAL scheme. The PDEP and EAL scheme were fully implemented on April 15, 2016, in accordance with the above-referenced license amendments.

3.2 Proposed Changes

In its application dated May 15, 2017, as supplemented by letter dated November 16, 2017, ENO requested that the NRC review and approve a proposed VY ISFSI Emergency Plan, including a proposed ISFSI EAL scheme that is based on NEI 99-01, Revision 6. The proposed amendment would replace the existing VY PDEP and associated EAL scheme, which currently reflect spent fuel from VY being stored in the SFP and onsite ISFSI. The major changes that ENO is requesting are: (1) removal of the various emergency actions related to the SFP; (2) removal of non-ISFSI related emergency event types; (3) replacing the “Shift Manager” title with the “ISFSI Shift Supervisor (ISS)” title as the position that assumes the Emergency Director’s responsibilities, and (4) a revision to the VY Emergency Response Organization (ERO).

The proposed changes modify the scope of onsite emergency preparedness requirements to reflect the reduced potential radiological accidents with all spent fuel in dry cask storage within the VY onsite ISFSI. The off-normal events and accidents addressed in the VY ISFSI

Emergency Plan are related to the dry storage of spent nuclear fuel at the ISFSI and include only off-normal, accident, natural phenomena, and hypothetical events and consequences affecting the VY ISFSI.

Under the previous facility condition with spent fuel stored within the SFP, the most severe postulated beyond-design-basis accident involved a highly unlikely sequence of events that causes a heat-up of the spent fuel, postulated to occur without heat transfer, such that the zirconium alloy fuel cladding reaches ignition temperature. While highly improbable, the resultant zirconium alloy fire could lead to the release of large quantities of fission products into the atmosphere. However, after removal of the spent fuel from the VY SFP, the accident scenarios and analyses contained in Chapter 6 of the VY Defueled Safety Analysis Report (DSAR) demonstrate that the age and configuration of spent fuel stored in dry cask storage precludes the possibility of such a zirconium alloy fire scenario. As such, after all the spent fuel is transferred to dry cask storage within the VY ISFSI, the number and severity of potential radiological accidents is significantly less than when spent fuel was stored in the SFP. For these reasons, the potential radiological consequences of accidents possible at VY after all spent fuel is transferred to the ISFSI are further reduced.

There continues to be no need for formal offsite radiological emergency preparedness (REP) plans under 44 CFR Part 350, "Review and Approval of State and Local Radiological Emergency Plans and Preparedness," at VY because no design-basis accident or reasonably credible beyond-design-basis accident can result in radioactive releases that exceed the U.S. Environmental Protection Agency (EPA) Early Phase Protective Action Guides (PAGs) (Reference 15) beyond the exclusion area boundary.

3.3 Evaluation

The NRC staff reviewed the changes from the current VY PDEP to the proposed ISFSI Emergency Plan and EAL scheme, including the licensee's evaluation of the changes, to verify that the proposed ISFSI Emergency Plan and EAL scheme continue to meet the standards contained in 10 CFR 50.47(b) and the requirements of Appendix E to 10 CFR Part 50, as exempted, for the long-term defueled conditions at VY. The NRC staff also performed a review to ensure the proposed ISFSI Emergency Plan would be consistent with the requirements of 10 CFR 72.32(a), for an ISFSI not located on the site of an operating nuclear power reactor. Although the requirements of 10 CFR 72.32(a) do not apply to a 10 CFR Part 50 licensee, such as VY, the NRC examined these regulations to promote consistency in the emergency planning requirements between specifically licensed and generally licensed ISFSIs. These requirements, and their applicability to facilities licensed under 10 CFR Part 72, are further described in SFST-ISG -16.

3.3.1 *ISFSI EALs and Removal of SFP Initiating Conditions and EALs*

The initiating conditions (ICs) and EALs associated with the emergency classification levels in the current PDEP are based on Appendix C to NEI 99-01, Revision 6, which addresses a nuclear power reactor that has permanently ceased operations and transferred spent fuel from the reactor vessel to the SFP (permanently defueled). After all spent fuel has been removed from the SFP and placed in dry cask storage within the ISFSI, the ICs and EALs in Appendix C to NEI 99-01, which are associated with the SFP at a decommissioning facility, are no longer necessary. Additionally, certain ICs and EALs, whose primary function is not associated with

the SFP, are no longer needed when administrative controls are established to limit source term accumulation and the offsite consequences of uncontrolled effluent releases.

ENO states that 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. ENO provided examples of the types of administrative controls for radiological source term accumulation limits and methods to control the accidental dispersal of the radiological sources in Attachment 1 to its application.

Other ICs proposed for deletion include those associated with the mitigative strategies contained in certain ENO license conditions, as well as response procedures for potential or actual aircraft attacks. These will be eliminated after spent fuel is removed from the SFP and is stored in the onsite VY ISFSI.

The ICs listed in Table 1, below, are being deleted, either partially or in their entirety as indicated, from the PDEP and EAL scheme for VY. 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 1: Initiating Conditions to be Deleted or Modified

ALERT	UNUSUAL EVENT
<p><u>PD-AA1 (all EALs)</u></p> <p>Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 millirems (mrem) total effective dose equivalent (TEDE) or 50 mrem committed dose equivalent (CDE).</p>	<p><u>PD-AU1 (all EALs)</u></p> <p>Release of gaseous or liquid radioactivity greater than 2 times the Offsite Dose Calculation Manual (ODCM) limit for 60 minutes or longer.</p>
<p><u>PD-AA2 (all EALs)</u></p> <p>UNPLANNED rise in plant radiation levels that impedes plant access required to maintain spent fuel integrity.</p>	<p><u>PD-AU2 (all EALs)</u></p> <p>UNPLANNED rise in plant radiation levels.</p>
<p><u>PD-HA1*</u></p> <p>HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes is occurring or has occurred.</p>	<p><u>PD-SU1 (all EALs)</u></p> <p>UNPLANNED spent fuel pool temperature rise.</p>

<u>PD-HA1.1*</u> A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervisor.	<u>PD-HU1.3</u> A validated notification from the NRC providing information of an aircraft attack threat
<u>PD-HA1.2</u> A validated notification from NRC of an aircraft attack threat within 30 minutes of the site.	<u>PD-HU2**</u> Hazardous event affecting SAFETY SYSTEM equipment necessary for spent fuel cooling.

*Only the strike-through portion is being deleted.

**For an ISFSI-only facility, the condition addressed by PD-HU2 remains fully addressed by IC E-HU1 (which is being retained in the emergency plan).

The existing VY ICs and EALs not listed in Table 1 above are being retained. The ICs and EALs being deleted include all ICs associated with the categories of abnormal radioactivity release and system malfunction. These two categories apply only to spent fuel pool operation. The ICs and EALs being retained in the VY ISFSI Emergency Plan and EAL scheme are appropriate to address the condition of an ISFSI only facility (i.e., no fuel stored in the spent fuel pool).

The ICs listed in Table 2 below are being retained because they are appropriate to address the condition of the ISFSI-Only storage of the spent fuel.

Table 2, “Initiating Conditions to be Maintained”

ALERT	UNUSUAL EVENT
Independent Spent Fuel Storage Installation (ISFSI)	
	E-HU1 Damage to a loaded cask CONFINEMENT BOUNDARY. 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. Two times the ISFSI Technical Specification allowable levels equate to: <ul style="list-style-type: none"> • 40 mR/hr on the top of the overpack or • 220 mR/hr on the side of the overpack, excluding inlet and outlet ducts

ALERT	UNUSUAL EVENT
Hazards and Other Conditions	
<p>PD-HA1 HOSTILE ACTION is occurring or has occurred</p> <p>PD-HA1.1 A HOSTILE ACTION is occurring or has occurred as reported by the Security Shift Supervisor.</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-HA3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT.</p> <p>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>	<p>PD-HU3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an UNUSUAL EVENT.</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>

The most severe beyond-design-basis accident postulated for VY with spent fuel stored within the SFP involved a highly unlikely sequence of events that causes heat up of the spent fuel, postulated to occur without heat transfer, such that the zirconium alloy fuel cladding reaches ignition temperature. Because this limiting, beyond-design-basis scenario is no longer possible due to the transfer of spent fuel from the SFP to dry cask storage in the onsite ISFSI, ENO's assessment focused on the following design-basis accidents associated with the performance of decommissioning activities with all irradiated fuel stored in the VY ISFSI: (1) cask drop accident (fuel related accident); (2) radioactive material handling accident (non-fuel related); (3) radioactive waste handling accident (high integrity container drop), and (4) accidents initiated by external events.

As discussed in the December 10, 2015, exemption from certain emergency planning requirements for VY (Reference 5), an analysis of the potential radiological impact of a design-basis accident at VY in a permanently defueled condition indicated that any releases beyond the exclusion area boundary were below the EPA Early Phase PAGs. The basis for these exemptions has not changed and remains in effect for the proposed emergency plan changes. For design-basis accident scenarios (1) and (2) cited in the paragraph above, the results of the assessment indicate that the projected radiological doses at the exclusion area boundary are less than the EPA Early Phase PAGs. The effects of external events, such as fires, flood, wind

(including tornadoes), earthquakes, lightning, and physical security breaches on the VY ISFSI that could affect the confinement boundary of the ISFSI, remain unchanged from the effects that were considered under the existing PDEP. The NRC staff examined the assumptions used in the licensee's analyses and verified that inputs were more conservative than those used in the approved PDEP, and therefore, determined that the associated accident analyses are sufficient to conclude that any releases beyond the exclusion area boundary will be below EPA Early Phase PAGs.

Because of the very low risk of consequences to public health and safety resulting from the postulated accidents related to the VY ISFSI, no potential emergencies are classified as higher than an Alert, in accordance with the requirements of Section IV.C.1 to Appendix E of 10 CFR Part 50, as exempted. Classification of emergencies at no higher than an Alert also maintains consistency with the regulations in 10 CFR 72.32(a)(3), "Classification of accidents."

Based on the NRC staff's review of the VY ISFSI Emergency Plan and associated EAL scheme, as described above, the NRC staff concludes that the planning standard of 10 CFR 50.47(b)(4), as exempted, pertaining to a standard emergency classification and action level scheme, is addressed in acceptable manner in the VY ISFSI Emergency Plan, considering the permanently shutdown and defueled status of the facility and the proposed transfer of all remaining spent fuel from the SFP to the ISFSI by late 2018.

3.3.2 VY Emergency Response Organization Revision

The existing VY PDEP provides for two (2) ERO augmented positions – a Technical Coordinator and a Radiation Protection Coordinator. The proposed VY ISFSI Emergency Plan would replace these positions with a Resource Manager. The Resource Manager will assist in assessing the event and coordinating required resources, including public information interface. The Resource Manager will be in contact with the Emergency Director within two hours of classification of an Unusual Event or an Alert. The Resource Manager does not need to physically report to VY to perform their responsibilities. In addition, ENO proposes that, for a declared emergency involving radiological consequences (IC E-HU1), a minimum of one person trained in radiological monitoring and assessment will report to the VY ISFSI within four hours of the emergency declaration. Supplemental personnel shall report at the discretion of the Emergency Director and/or Resource Manager.

In its evaluation of the proposed changes to the VY ERO, the NRC staff considered the accident analysis referenced in Section 3.3.1 above, related to the deletion of EALs, either partially or in their entirety, as indicated, as they relate to SFP operation. Specifically, the NRC staff considered the postulated accidents that could occur with all the spent fuel moved into the VY ISFSI, which pose a very low risk to public health and safety. The NRC staff notes that ENO also continues to commit to maintain the appropriate level of augmented response to an emergency, to include an event involving radiological consequences.

In the Statement of Considerations for the Final Rule for Emergency Planning Licensing Requirements for Independent Spent Fuel Storage Facilities and Monitored Retrievable Storage Facilities (MRS) (60 *Federal Register* (FR) 32430; June 22, 1995), the Commission stated, in part:

For there to be a significant environmental impact resulting from an accident involving the dry storage of spent nuclear fuel, a significant amount of the radioactive material contained within a cask must escape its packaging and enter

the biosphere. There are two primary factors that protect the public health and safety from this event. The first is the design requirements for the cask that are imposed by regulation.

These general design criteria place an upper bound on the energy a cask can absorb before the fuel is damaged. No credible dynamic events have been identified that could impart such significant amounts of energy to a storage cask after that cask is placed at the ISFSI.

Additionally, there is a second factor which does not rely upon the cask itself but considers the age of the spent fuel and the lack of dispersal mechanisms. There exists no significant dispersal mechanism for the radioactive material contained within a storage cask.

...

Based on the design limitations, the majority of spent fuel is cooled greater than 5 years. At this age, spent fuel has a heat generation rate that is too low to cause significant particulate dispersal in the unlikely event of a cask confinement boundary failure.

Although the VY spent fuel analysis has not been able to identify any design-basis accident that would result in a failure of the confinement barrier for the dry storage casks or the irradiated fuel itself, the VY ISFSI Emergency Plan nonetheless requires augmentation of one person trained in radiological monitoring and assessment, who will report to the station within four hours of the 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 plant 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 supplemental personnel are available from VY staff and ENO, and can also be requested from various contractors.

Based on the NRC staff's review of the VY ISFSI Emergency Plan, as described above, the NRC staff concludes that the planning standard of 10 CFR 50.47(b)(1) and (2), pertaining to timely augmentation of response capabilities, is addressed in an acceptable manner in the VY ISFSI Emergency Plan, considering the permanently shutdown and defueled status of the facility, and the proposed transfer of all remaining spent fuel from the SFP to the ISFSI by 2018.

3.3.3 *Replacement of the "Shift Manager" title with the "ISFSI Shift Supervisor" title*

ENO revised Section 6.1, "On-Shift Positions," in the VY ISFSI Emergency Plan to reassign the following Emergency Director responsibilities from the Shift Manager to the ISFSI Shift Supervisor:

- Notification of the emergency classification to the NRC and Vermont, New Hampshire, and Massachusetts;
- Management of available station resources;
- Initiation of mitigative actions;
- Initiation of mitigative, corrective, and onsite protective actions;

- Decision to call for LLEA (Local Law Enforcement Agency), fire, or ambulance assistance;
- Augmentation of the emergency staff, as deemed necessary;
- Coordination of security activities;
- Termination of the emergency condition when appropriate;
- Performance of initial radiological assessment;
- Maintaining a record of event activities, and
- Suspending security measures.

The NRC staff evaluation verified the retitled position of ISFSI Shift Supervisor is on-shift at the VY site 24-hours a day / 7 days a week, and also serves as the senior management position during off-hours. This position assumes overall command and control of the event response as the Emergency Director, and is responsible for monitoring conditions and approving all onsite activities. The VY ISFSI Emergency Plan clearly identifies non-delegable responsibilities, along with other designated tasks, for the ISFSI Shift Supervisor. The NRC staff considers this retitling activity to be an administrative change that will not impact the timing or performance of existing emergency response duties.

Based on the NRC staff's review of the VY ISFSI Emergency Plan, as described above, the NRC staff concludes that the requirements of Section IV.A to Appendix E of 10 CFR Part 50, as exempted, pertaining to responsibilities and duties of individuals assigned to the licensee's emergency organization, are addressed in a satisfactory manner, considering the current permanently shutdown and defueled status of the facility and the proposed transfer of all remaining spent fuel from the SFP to the ISFSI by 2018.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment includes changes to requirements with respect to installation or use of a facility component located within the protected area and changes to recordkeeping, reporting, or administrative procedures or requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding, which was published in the *Federal Register* on July 18, 2017 (82 FR 32879). Accordingly, the amendment meets the eligibility criteria for categorical exclusions set forth in 10 CFR 51.22(c)(9) and 10 CFR 51.22(c)(10)(ii). 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.

5.0 STATE CONSULTATION

On January 25, 2018 (Reference 16), the NRC staff notified the Vermont State Liaison Officer to the NRC, June Tierney, Commissioner, Vermont Department of Public Service, regarding the proposed change to approve the VY ISFSI Emergency Plan and associated EAL scheme to reflect the transfer of all spent fuel into dry cask storage at the onsite ISFSI and the NRC staff's determination that the amendment involves no significant hazards consideration. The Vermont State Liaison Officer did not respond.

6.0 CONCLUSION

Based on review of the proposed VY ISFSI Emergency Plan and associated EAL scheme, the NRC staff finds that the proposed changes would continue to meet the standards in 10 CFR 50.47(b) and the requirements in Appendix E of Part 50, as exempted. The NRC staff finds continued reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the VY facility. In addition, the NRC staff concludes that the VY ISFSI Emergency Plan will be consistent with the emergency planning requirements in 10 CFR Part 72 for an ISFSI not located on the site of an operating reactor. Therefore, the NRC staff concludes that the licensee's proposed changes to the VY ISFSI Emergency Plan and associated EAL scheme in its letter dated May 15, 2017, as supplemented by letter dated November 16, 2017, are acceptable.

The NRC staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there continues to be reasonable assurance that 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 REFERENCES

1. Letter from Entergy Nuclear Operations, Inc. to U.S. Nuclear Regulatory Commission, Docket No. 50-271, "Notification of Permanent Cessation of Power Operations," dated September 23, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13273A204).
2. Letter from Entergy Nuclear Operations, Inc. to U.S. Nuclear Regulatory Commission, "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).
3. Letter from Entergy Nuclear Operations, Inc. to U.S. Nuclear Regulatory Commission, Docket No. 50-271, "License Amendment Request- Independent Spent Fuel Storage Installation (ISFSI) Emergency Plan and Emergency Action Level Scheme," dated May 15, 2017 (ADAMS Accession No. ML17139D261).
4. Letter from Entergy Nuclear Operations, Inc. to U.S. Nuclear Regulatory Commission, Docket No. 50-271, "Response to Request for Additional Information Regarding the License Amendment Request to Change the Emergency Plan and Emergency Action Level Scheme to Reflect an ISFSI-Only Configuration," dated November 16, 2017 (ADAMS Accession No. ML17325A947).
5. Letter from U.S. Nuclear Regulatory Commission 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).

6. U.S. Nuclear Regulatory Commission and Federal Emergency Management Agency, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," NUREG-0654/FEMA-REP-1, Rev.1, dated November 1980 (ADAMS Accession No. ML040420012).
7. NSIR/DRP-ISG-2, "Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants," dated May 11, 2015 (ADAMS Accession No. ML14106A057).
8. SFST-ISG-16, "Emergency Planning," dated June 14, 2000 (ADAMS Accession No. ML003724570).
9. NEI 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors," dated November 2012 (ADAMS Accession No. ML12326A805).
10. Letter from U.S. Nuclear Regulatory Commission to NEI "Technical Evaluation for the Endorsement of NEI 99-01, Revision 6," dated March 28, 2013 (ADAMS Accession No. ML12346A463).
11. Letter from Entergy Nuclear Operations, Inc. to U.S. Nuclear Regulatory Commission, "Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR 50, Appendix E, Vermont Yankee Nuclear Power Station, Docket No. 50-271 License No. DPR-28," dated March 14, 2014 (ADAMS Accession No. ML14080A141).
12. Letter from Entergy Nuclear Operations, Inc., letter to U.S. Nuclear Regulatory Commission, "Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR 50, Appendix E - Supplement 1 (TAC No. MF3614), Vermont Yankee Nuclear Power Station Docket No. 50-271 License No. DPR-28," dated August 29, 2014 (ADAMS Accession No. ML 14246A176).
13. Letter from Entergy Nuclear Operations, Inc., to U.S. Nuclear Regulatory Commission, "Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR 50, Appendix E - Supplement 2 (TAC No. MF3614) Vermont Yankee Nuclear Power Station, Docket No. 50-271 License No. DPR-28," dated October 21, 2014 (ADAMS Accession No. ML14297A159).
14. Letter from U.S. Nuclear Regulatory Commission to Entergy Nuclear Operations, Inc., "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).
15. U.S. Environmental Protection Agency PAG Manual, "Protective Action Guides and Planning Guidance for Radiological Incidents," dated January 2017, (ADAMS Accession No. ML17044A073).
16. E-mail from U.S. Nuclear Regulatory Commission to Vermont Department of Public Service, "Email Request for Review of the Draft Safety Evaluation for Implementation of a Revised Emergency Plan at Vermont Yankee to Reflect an ISFSI-only Configuration", dated January 25, 2018 (ADAMS Accession No. ML18045A086).

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