



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

December 10, 2015

Site Vice President  
Entergy Nuclear Operations, Inc.  
Vermont Yankee Nuclear Power Station  
P.O. Box 250  
Governor Hunt Road  
Vernon, VT 05354

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION – EXEMPTIONS FROM  
CERTAIN EMERGENCY PLANNING REQUIREMENTS AND RELATED  
SAFETY EVALUATION (CAC NO. MF3614)

Dear Sir or Madam:

The U.S. Nuclear Regulatory Commission (NRC) has approved the enclosed exemptions from specific requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.47, "Emergency plans," and Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50 to be effective as of April 15, 2016. This action is in response to your application for exemptions dated March 14, 2014, as supplemented by letters dated August 29, 2014, and October 21, 2014.

The exemptions are provided in Enclosure 1 and the NRC staff's related safety evaluation is provided in Enclosure 2. The exemptions will be forwarded to the Office of the Federal Register for publication.

Sincerely,

A handwritten signature in cursive script, reading "James Kim", is positioned above the typed name and title.

James Kim, Project Manager  
Plant Licensing IV-2 and Decommissioning  
Transition Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures:

1. Exemptions
2. Safety Evaluation

cc w/encs: Distribution via Listserv

**ENCLOSURE 1**

EXEMPTIONS

ENTERGY NUCLEAR OPERATIONS, INC.

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

**NUCLEAR REGULATORY COMMISSION**

**[Docket No. 50-271; NRC-2015-0111]**

**Entergy Nuclear Operations, Inc.;**

**Vermont Yankee Nuclear Power Station**

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Exemption; issuance.

**SUMMARY:** The U.S. Nuclear Regulatory Commission (NRC) is granting exemptions in response to a request from Entergy Nuclear Operations, Inc. (ENO or the licensee) regarding certain emergency planning (EP) requirements. The exemptions will eliminate the requirements to maintain formal offsite radiological emergency plans and reduce the scope of the onsite EP activities at the Vermont Yankee Nuclear Power Station (VY), based on the reduced risks of accidents that could result in an offsite radiological release at the decommissioning nuclear power reactor. Provisions would still exist for offsite agencies to take protective actions, using a comprehensive emergency management plan (CEMP) to protect public health and safety, if protective actions were needed in the event of a very unlikely accident that could challenge the safe storage of spent fuel.

**ADDRESSES:** Please refer to Docket ID **NRC-2015-0111** when contacting the NRC about the availability of information regarding this document. You may obtain publicly-available information related to this document using any of the following methods:

- **Federal Rulemaking Web Site:** Go to <http://www.regulations.gov> and search for Docket ID **NRC-2015-0111**. Address questions about NRC dockets to Carol Gallagher; telephone: 301-415-3463; e-mail: [Carol.Gallagher@nrc.gov](mailto:Carol.Gallagher@nrc.gov). For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **NRC's Agencywide Documents Access and Management System (ADAMS):**  
You may obtain publicly available documents online in the ADAMS Public Documents collection at <http://www.nrc.gov/reading-rm/adams.html>. To begin the search, select "[ADAMS Public Documents](#)" and then select "[Begin Web-based ADAMS Search](#)." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov). The ADAMS accession number for each document referenced (if that document is available in ADAMS) is provided the first time that a document is referenced.

- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

**FOR FURTHER INFORMATION CONTACT:** James Kim, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington DC 20555-0001; telephone: 301-415-4125; e-mail: [James.Kim@nrc.gov](mailto:James.Kim@nrc.gov).

**SUPPLEMENTARY INFORMATION:**

## I. Background.

The VY facility is a decommissioning power reactor located in the town of Vernon, Windham County, Vermont. The licensee, ENO, is the holder of Renewed Facility Operating License No. DPR-28 for VY. The license provides, among other things, that the facility is subject to all rules, regulations, and orders of the NRC now or hereafter in effect.

By letter dated January 12, 2015 (ADAMS Accession No. ML15013A426), ENO submitted, to the NRC, a certification in accordance with sections 50.82(a)(1)(i) and 50.82(a)(1)(ii) of Title 10 of the *Code of Federal Regulations* (10 CFR), indicating that it had permanently ceased power operations at VY and had permanently defueled the VY reactor vessel, respectively. The licensee has not operated the VY plant since December 29, 2014. As a permanently shutdown and defueled facility, and pursuant to 10 CFR 50.82(a)(2), ENO is no longer authorized to operate the VY reactor or emplace fuel into the VY reactor vessel, but is still authorized to possess and store irradiated nuclear fuel at the site. Irradiated fuel is currently stored onsite at VY in a spent fuel pool (SFP) and in an independent spent fuel storage installation.

During normal power reactor operations, the forced flow of water through the reactor coolant system (RCS) removes heat generated by the reactor by generating steam. The steam system, operating at high temperatures and pressures, transfers this heat to the main turbine generator to produce electricity. Many of the accident scenarios postulated in the updated safety analysis reports for operating power reactors involve failures or malfunctions of systems, which could affect the fuel in the reactor core, which in the most severe postulated accidents, would involve the release of large quantities of fission products. With the permanent cessation of reactor operations at VY and the permanent removal of the fuel from the reactor vessel, such accidents are no longer possible. The reactor, RCS, steam system, turbine generator, and

supporting systems are no longer in operation and have no function related to the storage of the spent fuel. Therefore, EP provisions for postulated accidents involving failure or malfunction of the reactor, RCS, steam system, turbine generator, or supporting systems are no longer applicable.

Since VY is permanently shutdown and defueled, the only design basis accident that could potentially result in an offsite radiological release at VY is the fuel handling accident (FHA). Analysis performed by ENO showed that 17 days after shutdown, the radiological consequence of the FHA would not exceed the limits established by the U.S. Environmental Protection Agency's (EPA's) Protective Action Guidelines (PAGs) at the exclusion area boundary. Based on the time that VY has been permanently shutdown (approximately 11 months), there is no longer any possibility of an offsite radiological release from a design basis accident that could exceed the EPA PAGs.

The EP requirements of 10 CFR 50.47, "Emergency plans," and appendix E to 10 CFR part 50, "Emergency Planning and Preparedness for Production and Utilization Facilities," continue to apply to nuclear power reactors that have permanently ceased operation and have removed all fuel from the reactor vessel. There are no explicit regulatory provisions distinguishing EP requirements for a power reactor that is permanently shut down and defueled from those for a reactor that is authorized to operate. To reduce or eliminate EP requirements that are no longer necessary due to the decommissioning status of the facility, ENO must obtain exemptions from those EP regulations. Only then can ENO modify the VY emergency plan to reflect the reduced risk associated with the permanently shutdown and defueled condition of VY.

## **II. Request/Action.**

By letter dated March 14, 2014 (ADAMS Accession No. ML14080A141), "Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR 50, appendix E," ENO requested exemptions from certain EP requirements of 10 CFR part 50 for VY. More specifically, ENO requested exemptions from certain planning standards in 10 CFR 50.47(b) regarding onsite and offsite radiological emergency plans for nuclear power reactors; from 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 from certain requirements in 10 CFR part 50, appendix E, section IV, which establish the elements that make up the content of emergency plans. In letters dated August 29, 2014 and October 21, 2014 (ADAMS Accession Nos. ML14246A176, and ML14297A159, respectively), ENO provided responses to the NRC staff's requests for additional information concerning the proposed exemptions.

The information provided by ENO included justifications for each exemption requested. The exemptions requested by ENO would eliminate the requirements to maintain formal offsite radiological emergency plans, reviewed by the Federal Emergency Management Agency (FEMA) under the requirements of 44 CFR part 350, and reduce the scope of onsite EP activities. The licensee stated that the application of all of the standards and requirements in 10 CFR 50.47(b), 10 CFR 50.47(c), and 10 CFR part 50, appendix E is not needed for adequate emergency response capability, based on the substantially lower onsite and offsite radiological consequences of accidents still possible at the permanently shutdown and defueled facility, as compared to an operating facility. If offsite protective actions were needed for a very unlikely accident that could challenge the safe storage of spent fuel at VY, provisions exist for offsite agencies to take protective actions using a CEMP under the National Preparedness System to protect the health and safety of the public. A CEMP in this context, also referred to as an

emergency operations plan (EOP), is addressed in FEMA's Comprehensive Preparedness Guide 101, "Developing and Maintaining Emergency Operations Plans." Comprehensive Preparedness Guide 101 is the foundation for State, territorial, Tribal, and local EP in the United States. It promotes a common understanding of the fundamentals of risk-informed planning and decision-making and helps planners at all levels of government in their efforts to develop and maintain viable, all-hazards, all-threats emergency plans. An EOP is flexible enough for use in all emergencies. It describes how people and property will be protected; details who is responsible for carrying out specific actions; identifies the personnel, equipment, facilities, supplies and other resources available; and outlines how all actions will be coordinated. A CEMP is often referred to as a synonym for "all-hazards planning."

### **III. Discussion.**

In accordance with 10 CFR 50.12, "Specific exemptions," the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR part 50 when: 1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and 2) any of the special circumstances listed in 10 CFR 50.12(a)(2) are present. These special circumstances include, among other things, that the application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.

As noted previously, the current EP regulations contained in 10 CFR 50.47(b) and appendix E to 10 CFR part 50 apply to both operating and shutdown power reactors. The NRC has consistently acknowledged that the risk of an offsite radiological release at a power reactor that has permanently ceased operations and removed fuel from the reactor vessel is



significantly lower, and the types of possible accidents are significantly fewer, than at an operating power reactor. However, current EP regulations do not recognize that once a power reactor permanently ceases operation, the risk of a large radiological release from a credible emergency accident scenario is reduced. The reduced risk is largely the result of the low frequency of credible events that could challenge the SFP structure, and the reduced decay heat and reduced short-lived radionuclide inventory due to decay. The NRC's NUREG/CR-6451, "A Safety and Regulatory Assessment of Generic BWR [Boiling Water Reactor] and PWR [Pressurized Water Reactor] Permanently Shutdown Nuclear Power Plants," dated August 31, 1997 (ADAMS Accession No. ML082260098) and NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," dated February 28, 2001 (ADAMS Accession No. ML010430066), confirmed that for permanently shutdown and defueled power reactors that are bounded by the assumptions and conditions in the reports, the risk of offsite radiological release is significantly less than that for an operating power reactor.

In the past, EP exemptions similar to those requested by ENO, have been granted to licensees of permanently shutdown and defueled power reactors. However, the exemptions did not relieve the licensees of all EP requirements. Rather, the exemptions allowed the licensees to modify their emergency plans commensurate with the credible site-specific risks that were consistent with a permanently shutdown and defueled status. Specifically, for previous permanently shutdown and defueled power reactors, the basis for the NRC staff's approval of the exemptions from certain EP requirements was based on the licensee's demonstration that: 1) the radiological consequences of design-basis accidents would not exceed the limits of the U.S. Environmental Protection Agency's (EPA) PAGs at the exclusion area boundary, and 2) in the unlikely event of a beyond-design-basis accident resulting in a loss of all modes of heat transfer from the fuel stored in the SFP, there is sufficient time to initiate appropriate mitigating

actions, and if needed, for offsite authorities to implement offsite protective actions using a CEMP approach to protect the health and safety of the public.

With respect to design-basis accidents at VY, the licensee provided analysis demonstrating that 17 days following permanent shutdown, the radiological consequences of the only remaining design-basis accident with potential for offsite radiological release (the FHA) will not exceed the limits of the EPA PAGs at the exclusion area boundary. Therefore, because VY has been permanently shutdown for approximately 11 months, there is no longer any design-basis accident that would warrant an offsite radiological emergency plan meeting the requirements of 10 CFR Part 50.

With respect to beyond design-basis accidents at VY, the licensee analyzed a drain down of the spent fuel pool water that would effectively impede any decay heat removal. The analysis demonstrates that at 15.4 months after shutdown, there would be at least 10 hours after the assemblies have been uncovered until the limiting fuel assembly (for decay heat and adiabatic heatup analysis) reaches 900 degrees Celsius, the temperature used to assess the potential onset of fission product release. The analysis conservatively assumed the heat up time starts when the spent fuel pool has been completely drained, although it is likely that site personnel will start to respond to an incident when drain down starts. The analysis also does not consider the period of time from the initiating event causing loss of SFP water inventory until cooling is lost.

Based on precedent exemptions, the site-specific analysis should show that there is sufficient time following a loss of SFP coolant inventory until the onset of fuel damage to implement onsite mitigation of the loss of SFP coolant inventory and if necessary, to implement offsite protective actions. To meet this criterion, the staff accepted, in precedent exemptions, that the time should exceed 10 hours from the loss of coolant until the fuel temperature reaches 900 degrees Celsius (°C), assuming no air cooling.

The NRC staff reviewed the licensee's justification for the requested exemptions against the criteria in 10 CFR 50.12(a) and determined, as described below, that the criteria in 10 CFR 50.12(a) are met, and that the exemptions should be granted. An assessment of the ENO EP exemptions is described in SECY-14-0125, "Request by Entergy Nuclear Operations, Inc. for Exemptions from Certain Emergency Planning Requirements," dated November 14, 2014 (ADAMS Accession No. ML14227A711). The Commission approved the NRC staff's recommendation to grant the exemptions in the staff requirements memorandum to SECY-14-0125, dated March 2, 2015 (ADAMS Accession No. ML15061A516). Descriptions of the specific exemptions requested by ENO and the NRC staff's basis for granting each exemption are provided in SECY-14-0125 and summarized in a table at the end of this document. The staff's detailed review and technical basis for the approval of the specific EP exemptions, requested by ENO, are provided in the NRC staff's safety evaluation, which is enclosed in an NRC letter dated December 2, 2015 (ADAMS Accession No. ML15180A054).

**A. Authorized by Law**

The licensee has proposed exemptions from certain EP requirements in 10 CFR 50.47(b), 10 CFR 50.47(c)(2), and 10 CFR part 50, appendix E, section IV, which would allow ENO to revise the VY Emergency Plan to reflect the permanently shutdown and defueled condition of the station. As stated above, in accordance with 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR part 50. The NRC staff has determined that granting of the licensee's proposed exemptions will not result in a violation of the Atomic Energy Act of 1954, as amended, or the NRC's regulations. Therefore, the exemptions are authorized by law.

**B. No Undue Risk to Public Health and Safety**

ENO provided analyses that show the radiological consequences of design-basis accidents will not exceed the limits of the EPA PAGs at the exclusion area boundary. Therefore, formal offsite radiological emergency plans required under 10 CFR part 50 are no longer needed for protection of the public beyond the exclusion area boundary, based on the radiological consequences of design-basis accidents that are still possible at VY.

Although very unlikely, there is one postulated beyond-design-basis accident that might result in significant offsite radiological releases. However, NUREG-1738 confirms that the risk of beyond-design-basis accidents is greatly reduced at permanently shutdown and defueled reactors. The NRC staff's analyses in NUREG-1738 conclude that the event sequences important to risk, at permanently shutdown and defueled power reactors, are limited to large earthquakes and cask drop events. For EP assessments, this is an important difference relative to operating power reactors, where typically a large number of different sequences make significant contributions to risk. Per NUREG-1738, relaxation of offsite EP requirements, under 10 CFR part 50, a few months after shutdown resulted in only a small change in risk. The report further concludes that the change in risk, due to relaxation of offsite EP requirements, is small because the overall risk is low, and because even under current EP requirements for operating power reactors, EP was judged to have marginal impact on evacuation effectiveness in the severe earthquakes that dominate SFP risk. All other sequences including cask drops (for which offsite radiological emergency plans are expected to be more effective) are too low in likelihood to have a significant impact on risk.

Therefore, granting exemptions to eliminate the requirements of 10 CFR part 50 to maintain offsite radiological emergency plans and to reduce the scope of onsite EP activities will not present an undue risk to the public health and safety.

**C. Consistent with the Common Defense and Security**

The requested exemptions by ENO only involve EP requirements under 10 CFR part 50 and will allow ENO to revise the VY Emergency Plan to reflect the permanently shutdown and defueled condition of the facility. Physical security measures at VY are not affected by the requested EP exemptions. The discontinuation of formal offsite radiological emergency plans and the reduction in scope of the onsite EP activities at VY will not adversely affect ENO's ability to physically secure the site or protect special nuclear material. Therefore, the proposed exemptions are consistent with the common defense and security.

**D. Special Circumstances**

Special circumstances, in accordance with 10 CFR 50.12(a)(2)(ii), are present whenever application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule. The underlying purposes of 10 CFR 50.47(b), 10 CFR 50.47(c)(2), and 10 CFR part 50, appendix E, section IV, are to provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency, to establish plume exposure and ingestion pathway emergency planning zones for nuclear power plants, and to ensure that licensees maintain effective offsite and onsite radiological emergency plans. The standards and requirements in these regulations were developed by considering the risks associated with the operation of a power reactor at its licensed full-power level. These risks include the potential for a reactor accident with offsite radiological dose consequences.

As discussed previously in Section III of this document, because VY is permanently shutdown and defueled, there is no longer a risk of offsite radiological release from a design-basis accident; and the risk of a significant offsite radiological release from a beyond-design-basis accident is greatly reduced, when compared to the risk at an operating power reactor. The NRC staff has confirmed the reduced risks at VY, by comparing the generic risk

assumptions in the analyses in NUREG-1738 to site-specific conditions at VY; and has determined that the risk values in NUREG-1738 bound the risks presented by VY. As indicated by the results of the research conducted for NUREG-1738 and more recently, for NUREG-2161, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor" (ADAMS Accession No. ML14255A365), while other consequences can be extensive, accidents from SFPs with significant decay time have little potential to cause offsite early fatalities, even if the formal offsite radiological EP requirements were relaxed. The licensee's analysis of a beyond-design-basis accident involving a complete loss of SFP water inventory, based on an adiabatic heatup analysis of the limiting fuel assembly for decay heat, shows that within 15.4 months after shutdown, the time for the limiting fuel assembly to reach 900 degrees Celsius is 10 hours after the assemblies have been uncovered.

The only analyzed beyond-design-basis accident scenario that progresses to a condition where a significant offsite release might occur, involves the very unlikely event where the SFP drains in such a way that all modes of cooling or heat transfer are assumed to be unavailable, which is postulated to result in an adiabatic heatup of the spent fuel. The licensee's analysis of this beyond-design-basis accident shows that within 15.4 months after shutdown, more than 10 hours would be available between the time the fuel is initially uncovered (at which time adiabatic heatup is conservatively assumed to begin), until the fuel cladding reaches a temperature of 1652 degrees Fahrenheit (900 degrees C), which is the temperature associated with rapid cladding oxidation and the potential for a significant radiological release. This analysis conservatively does not include the period of time from the initiating event causing a loss of SFP water inventory until all cooling means are lost.

The NRC staff has verified ENO's analyses and its calculations. The analyses provide reasonable assurance that in granting the requested exemptions to ENO, there is no design-basis accident that will result in an offsite radiological release exceeding the EPA PAGs at the

exclusion area boundary. In the unlikely event of a beyond-design-basis accident affecting the SFP that results in a complete loss of heat removal via all modes of heat transfer, there will be well over 10 hours available before an offsite release might occur and, therefore, at least 10 hours to initiate appropriate mitigating actions to restore a means of heat removal to the spent fuel. If a radiological release were projected to occur under this unlikely scenario, a minimum of 10 hours is considered sufficient time for offsite authorities to implement protective actions using a CEMP approach to protect the health and safety of the public.

Exemptions from the offsite EP requirements in 10 CFR part 50 have previously been approved by the NRC when the site-specific analyses show that at least 10 hours are available following a loss of SFP coolant inventory accident with no air cooling (or other methods of removing decay heat) until cladding of the hottest fuel assembly reaches the zirconium rapid oxidation temperature. The NRC staff concluded in its previously granted exemptions, as it does with the ENO-requested EP exemptions, that if a minimum of 10 hours are available to initiate mitigative actions consistent with plant conditions, or if needed, for offsite authorities to implement protective actions using a CEMP approach, then formal offsite radiological emergency plans, required under 10 CFR part 50, are not necessary at permanently shutdown and defueled power reactors.

Additionally, in its letter to the NRC dated March 14, 2014, ENO described the SFP makeup strategies that could be used in the event of a catastrophic loss of SFP inventory. The multiple strategies for providing makeup water to the SFP include: using existing plant systems for inventory makeup; an internal strategy that relies on installed fire water pumps (one motor-driven and one diesel-driven) and service water; or an external strategy that uses an engine-driven emergency makeup pump to provide makeup to the SFP from the Cooling Tower No. 2 deep basin. ENO further provides that designated on-shift staff is trained to implement such strategies and they have plans in place to mitigate the consequences of an event involving a

catastrophic loss-of-water inventory concurrently from the VY SFP. ENO will maintain its License Condition 3.N, "Mitigation Strategy License Condition," for VY. This license condition requires VY to maintain its SFP inventory makeup strategies as discussed above. Considering the very low probability of beyond-design-basis accidents affecting the SFP, these diverse strategies provide defense-in-depth and time to provide additional makeup or spray water to the SFP before the onset of any postulated offsite radiological release.

For all the reasons stated above, the NRC staff concludes that application of certain requirements in 10 CFR 50.47(b), 10 CFR 50.47(c)(2), and 10 CFR part 50, appendix E, as summarized in the table at the end of this document, is not necessary to achieve the underlying purpose of these regulations and, therefore, satisfies the special circumstances in 10 CFR 50.12(a)(2)(ii). The staff further concludes that the exemptions granted by this action will maintain an acceptable level of emergency preparedness at VY and provide reasonable assurance that adequate offsite protective measures, if needed, can and will be taken by State and local government agencies using a CEMP approach, in the unlikely event of a radiological emergency at the VY facility. Since the underlying purposes of the rules, as exempted, would continue to be achieved, even with the elimination of the requirements under 10 CFR part 50 to maintain formal offsite radiological emergency plans and the reduction in the scope of the onsite EP activities at VY, the special circumstances required by 10 CFR 50.12(a)(2)(ii) exist.

#### **E. Environmental Considerations**

In accordance with 10 CFR 51.31(a), the Commission has determined that the granting of this exemption will not have a significant effect on the quality of the human environment, as discussed in the NRC staff's Environmental Assessment and Finding of No Significant Impact, which was published on August 10, 2015 (80 FR 47960).

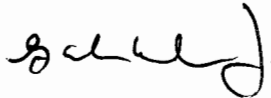


#### **IV. Conclusions.**

Accordingly, the Commission has determined, pursuant to 10 CFR 50.12(a), that ENO's request for exemptions from certain EP requirements in 10 CFR 50.47(b), 10 CFR 50.47(c)(2), and 10 CFR part 50, appendix E, section IV, and as summarized in the table at the end of this document, are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security. Also, special circumstances are present. Therefore, the Commission hereby grants ENO exemptions from certain EP requirements of 10 CFR 50.47(b), 10 CFR 50.47(c)(2), and 10 CFR part 50, appendix E, section IV, as discussed and evaluated, in detail, in the staff's safety evaluation dated December 10, 2015. The exemptions are effective as of April 15, 2016.

Dated at Rockville, Maryland, this 10<sup>th</sup> day of December, 2015.

For the Nuclear Regulatory Commission.

A handwritten signature in black ink, appearing to read "G. A. Wilson", written over a horizontal line.

George A. Wilson, Deputy Director,  
Division of Operating Reactor Licensing,  
Office of Nuclear Reactor Regulation.

**Table of Exemptions Granted to Entergy Nuclear Operations, Inc.**

10 CFR 50.47	NRC Staff Basis for Exemption
<p>10 CFR 50.47(b).</p> <p>The U.S. Nuclear Regulatory Commission (NRC) is granting exemption from portions of the rule language that would otherwise require offsite emergency response plans.</p>	<p>In the Statement of Considerations (SOC) for the final rule for emergency planning (EP) requirements for independent spent fuel storage installations (ISFSIs) and for monitor retrievable storage (MRS) facilities (60 FR 32430; June 22, 1995), the Commission responded to comments concerning offsite EP for ISFSIs or an MRS and concluded that, "the offsite consequences of potential accidents at an ISFSI or an MRS would not warrant establishing Emergency Planning Zones."</p> <p>In a nuclear power reactor's permanently defueled state, the accident risks are more similar to an ISFSI or an MRS than an operating nuclear power plant. The EP program would be similar to that required for an ISFSI under section 72.32(a) of Title 10 of the <i>Code of Federal Regulations</i> (10 CFR) when fuel stored in the spent fuel pool (SFP) has more than 5 years of decay time and would not change substantially when all the fuel is transferred from the SFP to an onsite ISFSI. Exemptions from offsite EP requirements have previously been approved when the site-specific analyses show that at least 10 hours are available from a partial drain-down event where cooling of the spent fuel is not effective until the hottest fuel assembly reaches the zirconium ignition temperature of 900 degrees Celsius (°C). The technical basis that underlies the approval of the exemption request is based partly on the analysis of a time period in which spent fuel stored in the SFP is unlikely to reach the zirconium ignition temperature in less than 10 hours. This time period is based on a heatup calculation, which uses several simplifying assumptions. Some of these assumptions are conservative (adiabatic conditions), while others are non-conservative (no oxidation below 900 °C). Weighing the conservatisms and non-conservatisms, the NRC staff judges that this calculation reasonably represents conditions that may occur in the event of an SFP accident.</p>

10 CFR 50.47	NRC Staff Basis for Exemption
	<p>The NRC staff concluded that if 10 hours were available to initiate mitigative actions, or if needed, offsite protective actions using a comprehensive emergency management plan (CEMP), formal offsite radiological emergency plans are not necessary for these permanently defueled nuclear power reactor licensees.</p> <p>As supported by the licensee's SFP analysis, the NRC staff believes an exemption from the requirements for formal offsite radiological emergency plans is justified for a zirconium fire scenario, considering the low likelihood of this event together with time available to take mitigative or protective actions between the initiating event and before the onset of a postulated fire.</p> <p>The Entergy Nuclear Operations, Inc. (ENO or the licensee) analysis has demonstrated that 17 days after shutdown the radiological consequences of design-basis-accidents (DBAs) will not exceed the limits of the U.S. Environmental Protection Agency's (EPA's) Protective Action Guides (PAGs) at the exclusion area boundary. This analysis also shows that 15.4 months after shutdown for an unlikely event of a beyond-DBA where the hottest fuel assembly adiabatic heatup occurs, 10 hours are available to take mitigative or, if needed, offsite protective actions, using a CEMP from the time the fuel is uncovered until it reaches the auto-ignition temperature of 900 °C.</p> <p>ENO furnished information concerning its SFP inventory makeup strategies. Several sources of makeup to the pool are available, such as the service water (SW) system, which has redundant pumping capability and power supplies to ensure alternative fuel pool makeup function. The SW system runs continuously, thus allowing for constant monitoring. Additionally, there are electric-driven and diesel-driven fire pumps that can supply makeup water to the SFP via the SW system or the fire water system. All sources discussed above take suction from the</p>

10 CFR 50.47	NRC Staff Basis for Exemption
	<p>Connecticut River. The Vermont Yankee Nuclear Power Station (VY) also has an engine-driven emergency makeup pump capable of taking suction from the Cooling Tower No. 2 deep basin to provide an alternate source of makeup water to the SFP.</p> <p>ENO further provides that designated on-shift staff is trained to implement such strategies and they have plans in place to mitigate the consequences of an event involving a catastrophic loss-of-water inventory concurrently from the VY SFP. ENO will maintain its License Condition 3.N, "Mitigation Strategy License Condition," for VY. This license condition requires VY to maintain its SFP inventory makeup strategies as discussed above.</p>
<p>10 CFR 50.47(b)(1).</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the need for Emergency Planning Zones (EPZs).</p>	<p>Refer to basis for 10 CFR 50.47(b).</p>
<p>10 CFR 50.47(b)(3).</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the need for an emergency operations facility (EOF).</p>	<p>Decommissioning power reactors present a low likelihood of any credible accident resulting in a radiological release together with the time available to take mitigative or, if needed, offsite protective actions using a CEMP between the initiating event and before the onset of a postulated fire. As such, an EOF would not be required. The "nuclear island," control room, or other onsite location can provide for the communication and coordination with offsite organizations for the level of support required.</p> <p>Also refer to basis for 10 CFR 50.47(b).</p>

10 CFR 50.47	NRC Staff Basis for Exemption
<p>10 CFR 50.47(b)(4).</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require reference to formal offsite radiological emergency response plans.</p>	<p>Decommissioning power reactors present a low likelihood of any credible accident resulting in a radiological release together with the time available to take mitigative or, if needed, offsite protective actions using a CEMP between the initiating event and before the onset of a postulated fire. As such, formal offsite radiological emergency response plans are not required.</p> <p>The Nuclear Energy Institute (NEI) document NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors" (Revision 6), was found to be an acceptable method for development of emergency action levels (EALs) and was endorsed by the NRC in a letter dated March 28, 2013 (ADAMS Accession No. ML12346A463). NEI 99-01 provides EALs for non-passive operating nuclear power reactors, permanently defueled reactors and ISFSIs.</p> <p>The ENO requested a license amendment to revise its EAL scheme to NEI 99-01, Revision 6 in a letter dated June 12, 2014, "Vermont Yankee Permanently Defueled Emergency Plan and Emergency Action Level Scheme" (ADAMS Accession No. ML14168A302).</p> <p>Also refer to basis for 10 CFR 50.47(b).</p>
<p>10 CFR 50.47(b)(5).</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require early notification of the public and a means to provide instructions to the public within the plume exposure pathway EPZ.</p>	<p>Refer to basis for 10 CFR 50.47(b).</p>
<p>10 CFR 50.47(b)(6).</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require prompt communications with the public.</p>	<p>Refer to basis for 10 CFR 50.47(b).</p>

10 CFR 50.47	NRC Staff Basis for Exemption
<p>10 CFR 50.47(b)(7).</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require information to be made available to the public on a periodic basis about how they will be notified and what their initial protective actions should be.</p>	<p>Refer to basis for 10 CFR 50.47(b).</p>
<p>10 CFR 50.47(b)(9).</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the capability for monitoring offsite consequences.</p>	<p>Refer to basis for 10 CFR 50.47(b).</p>
<p>10 CFR 50.47(b)(10)</p> <p>The NRC is granting exemption from portions of the rule language that would reduce the range of protective actions developed for emergency workers and the public. Consideration of evacuation, sheltering, or the use of potassium iodide will no longer be necessary. Evacuation time estimates (ETEs) will no longer need to be developed or updated. Protective actions for the ingestion exposure pathway EPZ will not need to be developed.</p>	<p>In the unlikely event of a SFP accident, the iodine isotopes, which contribute to an offsite dose from an operating reactor accident, are not present, so potassium iodide distribution would no longer serve as an effective or necessary supplemental protective action.</p> <p>In the SOC for the final rule for EP requirements for ISFSIs and for MRS facilities (60 FR 32430), the Commission responded to comments concerning site-specific EP that includes evacuation of surrounding population for an ISFSI not at a reactor site, and concluded, "The Commission does not agree that as a general matter emergency plans for an ISFSI must include evacuation planning."</p> <p>The Commission also concluded that, "the offsite consequences of potential accidents at an ISFSI or an MRS would not warrant establishing Emergency Planning Zones." (60 FR 32435)</p> <p>Also refer to basis for 10 CFR 50.47(b).</p>
<p>10 CFR 50.47(c)(2).</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the establishment of a 10-mile radius plume exposure pathway EPZ and a 50-mile radius ingestion pathway EPZ.</p>	<p>Refer to basis for 10 CFR 50.47(b)(10).</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p>10 CFR part 50, appendix E, section IV.1.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require onsite protective actions during hostile action.</p>	<p>The EP rule published in the <i>Federal Register</i> (76 FR 72560; November 23, 2011) amended certain requirements in 10 CFR part 50. Among the changes, the definition of "hostile action" was added as an act directed toward a nuclear power plant or its personnel. This definition is based on the definition of "hostile action" provided in NRC Bulletin 2005-02, "Emergency Preparedness and Response Actions for Security-Based Events," dated July 18, 2005 (ADAMS Accession No. ML051740058). NRC Bulletin 2005-02 is not applicable to nuclear power reactors that have permanently ceased operations and have certified that fuel has been removed from the reactor vessel. ENO certified that it had permanently ceased operations at VY and that all fuel had been removed from the reactor vessel. Therefore, the enhancements for hostile actions required by the 2011 EP Final Rule are not necessary for VY in its permanently shutdown and defueled status.</p> <p>Additionally, the NRC excluded non-power reactors from the definition of "hostile action" at the time of the 2011 rulemaking because, as defined in 10 CFR 50.2, a non-power reactor is not considered a nuclear power reactor and a regulatory basis had not been developed to support the inclusion of non-power reactors in the definition of "hostile action." Similarly, a decommissioning power reactor or ISFSI is not a "nuclear reactor," as defined in the NRC's regulations. Like a non-power reactor, a decommissioning power reactor also has a lower likelihood of a credible accident resulting in radiological releases requiring offsite protective measures, than does an operating reactor.</p> <p>Although this analysis provides a justification for exempting VY from "hostile action" related requirements, some EP requirements for security-based events are maintained. The classification of security-based events, notification of offsite authorities and coordination with offsite agencies under a CEMP concept are still required.</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p>10 CFR part 50, appendix E, section IV.2.</p> <p>The NRC is granting exemption from portions of the rule language concerning the evacuation time analyses within the plume exposure pathway EPZ for the licensee's initial application.</p>	<p>Refer to basis for 10 CFR 50.47(b)(10).</p>
<p>10 CFR part 50, appendix E, section IV.3.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require use of NRC-approved ETEs and updates to State and local governments when developing protective action strategies.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.2.</p>
<p>10 CFR part 50, appendix E, section IV.4.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require licensees to update ETEs based on the most recent census data and submit the ETE analysis to the NRC prior to providing it to State and local governments for developing protective action strategies.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.2.</p>
<p>10 CFR part 50, appendix E, section IV.5.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require licensees to estimate the EPZ permanent resident population changes once a year between decennial censuses.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.2.</p>
<p>10 CFR part 50, appendix E, section IV.6.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to submit an updated ETE analysis to the NRC based on changes in the resident population that result in exceeding specific evacuation time increase criteria.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.2.</p>
<p>10 CFR part 50, appendix E, section IV.A.1.</p> <p>The NRC is granting exemption from the word "operating" in the requirement to describe the normal plant organization.</p>	<p>Based on the permanently shutdown and defueled status of the VY reactor, a decommissioning reactor is not authorized to operate under 10 CFR 50.82(a). Because the licensee cannot operate the reactor, the licensee does not have a "plant operating organization."</p>



10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p>10 CFR part 50, appendix E, section IV.A.3.</p> <p>The NRC is granting exemption from the requirement to describe the licensee's headquarters personnel sent to the site to augment the onsite emergency response organization.</p>	<p>The number of staff at decommissioning sites is generally small but is commensurate with the need to safely store spent fuel at the facility, in a manner that is protective of public health and safety. Decommissioning sites typically have a level of emergency response that does not require response by the licensee's headquarters personnel.</p>
<p>10 CFR part 50, appendix E, section IV.A.4.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to identify a position and function within its organization, which will carry the responsibility for making offsite dose projections.</p>	<p>Although the likelihood of events that would result in doses in excess of the EPA PAGs to the public beyond the exclusion area boundary is extremely low based on the permanently shutdown and defueled status of the reactor, the licensee is still required to determine if a radiological release is occurring. If a release is occurring, then the licensee staff should promptly communicate that information to offsite authorities for their consideration. The offsite organizations are responsible for deciding what, if any, protective actions should be taken based on a CEMP.</p> <p>Also refer to basis for 10 CFR 50.47(b).</p>
<p>10 CFR part 50, appendix E, section IV.A.5.</p> <p>The NRC is granting exemption from the requirement for the licensee to identify individuals with special qualifications, both licensee employees and non-employees, for coping with emergencies.</p>	<p>VY has performed an on-shift staffing analysis, addressing SFP mitigating strategies, including review of collateral duties. The specific event scenario utilized for the staffing analysis involves a catastrophic loss-of-water inventory in the SFP.</p> <p>Also refer to basis for 10 CFR 50.47(b).</p>
<p>10 CFR part 50, appendix E, section IV.A.7.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require a description of the assistance expected from State, local, and Federal agencies for coping with a hostile action.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.1.</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p>10 CFR part 50, appendix E, section IV.A.8.</p> <p>The NRC is granting exemption from the requirement to identify the State and local officials for ordering protective actions and evacuations.</p>	<p>Offsite emergency measures are limited to support provided by local police, fire departments, and ambulance and hospital services, as appropriate. Due to the low probability of DBAs or other credible events to exceed the EPA PAGs, protective actions such as evacuation should not be required, but could be implemented at the discretion of offsite authorities using a CEMP.</p> <p>Also refer to basis for 10 CFR 50.47(b)(10).</p>
<p>10 CFR part 50, appendix E, section IV.A.9.</p> <p>The NRC is granting exemption from the requirement for the licensee to provide an analysis demonstrating that on-shift personnel are not assigned responsibilities that would prevent performance of their assigned emergency plan functions.</p>	<p>The duties of the on-shift personnel at a decommissioning reactor facility are not as complicated and diverse as those for an operating power reactor. Responsibilities should be well defined in the emergency plan and procedures, regularly tested through drills and exercises audited and inspected by the licensee and the NRC.</p> <p>The NRC staff considered the similarity between the staffing levels at a permanently shutdown and defueled reactor and staffing levels at an operating power reactor site. The minimal systems and equipment needed to maintain the spent nuclear fuel in the SFP or in a dry cask storage system in a safe condition require minimal personnel and is governed by Technical Specifications. In the EP final rule published in the <i>Federal Register</i> (76 FR 72560; November 23, 2011), the NRC concluded that the staffing analysis requirement was not necessary for non-power reactor licensees due to the small staffing levels required to operate the facility.</p> <p>The NRC staff also examined the actions required to mitigate the very low probability of beyond-design-basis events for the SFP. In a letter dated April 24, 2014, "Technical Specification Proposed Changes No. 309, Defueled Technical Specifications and Revised License Conditions for Permanently Defueled Condition – Supplement 1" (ADAMS Accession No. ML14119A101), ENO withdrew the proposed changes to the Mitigating Strategies License Condition 3.N. This license</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
	<p>condition requires VY to maintain its SFP inventory makeup strategies as discussed above.</p> <p>VY has performed an on-shift staffing analysis, addressing SFP mitigating strategies, including review of collateral duties. The specific event scenario utilized for the staffing analysis involves a catastrophic loss-of-water inventory in the SFP.</p> <p>Also refer to basis for 10 CFR part 50, appendix E, section IV.1.</p>
<p>10 CFR part 50, appendix E, section IV.B.1.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require offsite EALs and offsite protective measures and associate offsite monitoring for the emergency conditions.</p> <p>In addition, the NRC is granting exemption from portions of the rule language that would otherwise require EALs based on hostile action.</p>	<p>NEI 99-01 was found to be an acceptable method for the development of EALs. No offsite protective actions are anticipated to be necessary, so classification above the alert level is no longer required, which is consistent with ISFSI facilities.</p> <p>As discussed previously, ENO requested a license amendment to revise its EAL scheme to NEI 99-01, Revision 6, in a letter dated June 12, 2014, "Vermont Yankee Permanently Defueled Emergency Plan and Emergency Action Level Scheme" (ADAMS Accession No. ML14168A302). Before ENO can amend its EAL scheme to reflect the risk commensurate with power reactor that has been permanently shut down and defueled, ENO needs an exemption from the requirement for the site area emergency and general emergency classifications.</p> <p>Also refer to basis for 10 CFR part 50, appendix E, section IV.1.</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p data-bbox="203 247 781 279">10 CFR part 50, appendix E, section IV.C.1.</p> <p data-bbox="203 310 806 510">The NRC is granting exemption from portions of the rule language that would otherwise require EALs based on operating reactor concerns, such as offsite radiation monitoring, pressure in containment, and the response of the emergency core cooling system.</p> <p data-bbox="203 541 797 646">In addition, the NRC is striking language that would otherwise require offsite EALs of a site area emergency and a general emergency.</p>	<p data-bbox="837 247 1417 478">Containment parameters do not provide an indication of the conditions at a defueled facility and emergency core cooling systems are no longer required. Other indications, such as SFP level or temperature, can be used at site where there is spent fuel in the SFP.</p> <p data-bbox="837 510 1442 804">In the SOC for the final rule for EP requirements for ISFSIs and for MRS facilities (60 FR 32430), the Commission responded to comments concerning a general emergency at an ISFSI and MRS, and concluded that, "...an essential element of a General Emergency is that a release can be reasonably expected to exceed EPA PAGs exposure levels off site for more than the immediate site area."</p> <p data-bbox="837 846 1442 1140">The probability of a condition at a defueled facility reaching the level above an emergency classification of alert is very low. In the event of an accident at a defueled facility that meets the conditions for exemption from formal EP requirements, there will be available time for event mitigation and, if necessary, implementation of offsite protective actions using a CEMP.</p> <p data-bbox="837 1171 1417 1337">NEI 99-01 was found to be an acceptable method for development of EALs. No offsite protective actions are anticipated to be necessary, so classification above the alert level is no longer required.</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p>10 CFR part 50, appendix E, section IV.C.2.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to assess, classify, and declare an emergency condition within 15 minutes.</p>	<p>In the EP rule published in the November 23, 2011, <i>Federal Register</i> (76 FR 72560), nuclear power reactor licensees were required to assess, classify and declare an emergency condition within 15 minutes. Non-power reactors do not have the same potential impact on public health and safety as do power reactors, and as such, non-power reactor licensees do not require complex offsite emergency response activities and are not required to assess, classify and declare an emergency condition within 15 minutes. An SFP and an ISFSI are also not nuclear power reactors, as defined in the NRC's regulations and do not have the same potential impact on public health and safety, as do power reactors. A decommissioning power reactor has a low likelihood of a credible accident resulting in radiological releases requiring offsite protective measures. For these reasons, the NRC staff concludes that a decommissioning power reactor should not be required to assess, classify and declare an emergency condition within 15 minutes.</p>
<p>10 CFR part 50, appendix E, section IV.D.1.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to reach agreement with local, State, and Federal officials and agencies for prompt notification of protective measures or evacuations.</p> <p>In addition, the NRC is granting exemption from identifying the associated titles of officials to be notified for each agency within the EPZs.</p>	<p>Refer to basis for 10 CFR 50.47(b) and 10 CFR 50.47(b)(10).</p>
<p>10 CFR part 50, appendix E, section IV.D.2.</p> <p>The NRC is granting exemption from the requirement for the licensee to annually disseminate general information on EP and evacuations within the plume exposure pathway EPZ.</p> <p>In addition, the NRC is granting exemption for the need for signage or other measures to</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.D.1.</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
address transient populations in the event of an accident.	
<p>10 CFR part 50, appendix E, section IV.D.3.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to have the capability to make notifications to State and local government agencies within 15 minutes of declaring an emergency.</p>	<p>While the capability needs to exist for the notification of offsite government agencies within a specified time period, previous exemptions have allowed for extending the State and local government agencies' notification time up to 60 minutes, based on the site-specific justification provided.</p> <p>ENO's license amendment request to approve its Permanently Defueled Emergency Plan (PDEP) dated June 12, 2014, (ADAMS Accession No. ML14168A302), provides that VY will make notifications to the State of Vermont within 60 minutes of declaration of an event. Considering the very low probability of beyond-design-basis events affecting the SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP (all-hazards) approach between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire, formal offsite radiological response plans are not needed. Therefore, decommissioning reactors are not required to notify State and local governmental agencies within 15 minutes. For similar reasons, the requirement for alerting and providing prompt instructions to the public within the plume exposure pathway EPZ using an alert and notification system is not required.</p> <p>Also refer to basis for 10 CFR 50.47(b) and 10 CFR 50.47(b)(10).</p>
<p>10 CFR part 50, appendix E, section IV.D.4.</p> <p>The NRC is granting exemption from the requirement for the licensee to obtain U.S. Federal Emergency Management Agency (FEMA) approval of its backup alert and notification capability.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.D.3 regarding the alert and notification system requirements.</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p>10 CFR part 50, appendix E, section IV.E.8.a.(i).</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to have an onsite technical support center (TSC) and EOF.</p>	<p>Due to the low probability of DBAs or other credible events to exceed the EPA PAGs at the site boundary, the available time for event mitigation at a decommissioning power reactor and, if needed, to implement offsite protective actions using a CEMP, an EOF would not be required to support offsite agency response. In addition, an onsite TSC with part 50, appendix E requirements would not be needed. ENO proposes in its PDEP that onsite actions would be directed from the control room.</p>
<p>10 CFR part 50, appendix E, section IV.E.8.a.(ii).</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to have an onsite operational support center (OSC).</p>	<p>NUREG-0696, "Functional Criteria for Emergency Response Facilities," provides that the OSC is an onsite area separate from the control room and the TSC, where licensee operations support personnel will assemble in an emergency. For a decommissioning power reactor, an OSC is no longer required to meet its original purpose of an assembly area for plant logistical support during an emergency. The OSC function can be incorporated into the control room, as proposed by ENO.</p>
<p>10 CFR part 50, appendix E, section IV.E.8.b. and subpart sections IV.E.8.b.(1) - E.8.b.(5).</p> <p>The NRC is granting exemption from the requirements related to an offsite EOF location, space and size, communications capability, access to plant data and radiological information, and access to copying and office supplies.</p>	<p>Refer to basis for 10 CFR 50.47(b)(3).</p>
<p>10 CFR part 50, appendix E, section IV E.8.c. and sections IV E.8.c.(1) - E.8.c.(3).</p> <p>The NRC is granting exemption from the requirements to have an EOF with the capabilities to obtain and display plant data and radiological information; the capability to analyze technical information and provide briefings; and the capability to support events occurring at more than one site (if the emergency operations center supports more than one site).</p>	<p>Refer to basis for 10 CFR 50.47(b)(3).</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p>10 CFR part 50, appendix E, section IV E.8.d.</p> <p>The NRC is granting exemption from the requirements to have an alternate facility that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.1 regarding hostile action.</p>
<p>10 CFR part 50, appendix E, section IV.E.8.e.</p> <p>The NRC is granting exemption from the requirement regarding the need for the licensee to comply with paragraph 8.b of this section.</p>	<p>Refer to basis for 10 CFR 50.47(b)(3).</p>
<p>10 CFR part 50, appendix E, section IV.E.9.a.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to have communications with contiguous State and local governments that are within the plume exposure pathway EPZ (which is no longer required by the exemption granted to 10 CFR 50.47(b)(10)).</p>	<p>Refer to basis for 10 CFR 50.47(b) and 10 CFR 50.47(b)(10).</p> <p>The State and the local governments in which the nuclear facility is located need to be informed of events and emergencies, therefore, lines of communication are required to be maintained.</p>
<p>10 CFR part 50, appendix E, section IV.E.9.c.</p> <p>The NRC is granting exemption from the requirements for communication and testing provisions between the control room, the onsite TSC, State/local emergency operations centers, and field assessment teams.</p>	<p>Because of the low probability of DBAs or other credible events that would be expected to exceed the EPA PAGs and the available time for event mitigation and, if needed, implementation of offsite protective actions using a CEMP, there is no need for the TSC, EOF, or offsite field assessment teams.</p> <p>Also refer to justification for 10 CFR 50.47(b)(3). Communication with State and local emergency operations centers is maintained to coordinate assistance on site if required.</p>



10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p>10 CFR part 50, appendix E, section IV.E.9.d.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require provisions for communications from the control room, onsite TSC, and EOF with NRC Headquarters and appropriate Regional Operations Center.</p>	<p>The functions of the control room, EOF, TSC, and OSC may be combined into one or more locations at a permanently shutdown and defueled facility due to its smaller facility staff and the greatly reduced required interaction with State and local emergency response facilities, as compared to an operating reactor.</p> <p>Also refer to basis for 10 CFR 50.47(b).</p>
<p>10 CFR part 50, appendix E, section IV.F.1. and section IV F.1.viii.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to provide training and drills for the licensee's headquarters personnel, Civil Defense personnel, or local news media.</p>	<p>Decommissioning power reactor sites typically have a level of emergency response that does not require additional response by the licensee's headquarters personnel. Therefore, the NRC staff considers exempting licensee's headquarters personnel from training requirements to be reasonable.</p> <p>Due to the low probability of DBAs or other credible events to exceed the EPA PAGs, offsite emergency measures are limited to support provided by local police, fire departments, and ambulance and hospital services, as appropriate. Local news media personnel no longer need radiological orientation training since they will not be called upon to support the formal Joint Information Center. The term "Civil Defense" is no longer commonly used; references to this term in the examples provided in the regulation are, therefore, not needed.</p>
<p>10 CFR part 50, appendix E, section IV.F.2.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require testing of a public alert and notification system.</p>	<p>Because of the low probability of DBAs or other credible events that would be expected to exceed the limits of EPA PAGs and the available time for event mitigation and, if necessary, offsite protective actions from a CEMP, the public alert and notification system will not be used and, therefore, requires no testing.</p> <p>Also refer to basis for 10 CFR 50.47(b).</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p>10 CFR part 50, appendix E, section IV.F.2.a. and sections IV.F.2.a.(i) through IV.F.2.a.(iii).</p> <p>The NRC is granting exemption from the requirements for full participation exercises and the submittal of the associated exercise scenarios to the NRC.</p>	<p>Due to the low probability of DBAs or other credible events that would be expected to exceed the limits of EPA PAGs, the available time for event mitigation and, if necessary, implementation of offsite protective actions using a CEMP, no formal offsite radiological response plans are required. Therefore, the need for the licensee to exercise onsite and offsite plans with full participation by each offsite authority having a role under the radiological response plan is not required.</p> <p>The intent of submitting exercise scenarios at an operating power reactor site is to check that licensees utilize different scenarios in order to prevent the preconditioning of responders at power reactors. For decommissioning power reactor sites, there are limited events that could occur and, as such, the previously routine progression to general emergency in an operating power reactor site scenario is not applicable.</p> <p>The licensee would be exempt from 10 CFR part 50, appendix E, section IV.F.2.a.(i)-(iii) because the licensee would be exempt from the umbrella provision of 10 CFR part 50, appendix E, section IV.F.2.a.</p>
<p>10 CFR part 50, appendix E, section IV.F.2.b.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to submit scenarios for its biennial exercises of its onsite emergency plan. In addition, the NRC is granting exemption from portions of the rule language that requires assessment of offsite releases, protective action decision making, and references to the TSC, OSC, and EOF.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.F.2.a.</p> <p>The low probability of DBAs or other credible events that would exceed the EPA PAGs, the available time for event mitigation and, if necessary, implementation of offsite protective actions using a CEMP, render a TSC, OSC, and EOF unnecessary. The principal functions required by regulation can be performed at an onsite location that does not meet the requirements of the TSC, OSC or EOF.</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p>10 CFR part 50, appendix E, section IV.F.2.c. and sections IV F.2.c.(1) through F.2.c.(5).</p> <p>The NRC is granting exemption from the requirements regarding the need for the licensee to exercise offsite plans biennially with full participation by each offsite authority having a role under the radiological response plan. The NRC is also granting exemptions from the conditions for conducting these exercises (including hostile action exercises) if two different licensees have facilities on the same site or on adjacent, contiguous sites, or share most of the elements defining co-located licensees.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.F.2.a.</p>
<p>10 CFR part 50, appendix E, section IV.F.2.d.</p> <p>The NRC is granting exemption from the requirements to obtain State participation in an ingestion pathway exercise and a hostile action exercise, with each State that has responsibilities, at least once per exercise cycle.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.2.</p>
<p>10 CFR part 50, appendix E, section IV.F.2.e.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to allow participation exercise in licensee drills by any State and local government in the plume exposure pathway EPZ when requested.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.2.</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
<p>10 CFR part 50, appendix E, section IV.F.2.f.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require FEMA to consult with the NRC on remedial exercises. The NRC is granting exemption from portions of the rule language that discuss the extent of State and local participation in remedial exercises.</p>	<p>FEMA is responsible for evaluating the adequacy of offsite response during an exercise. Because the NRC is granting exemptions from the requirements regarding the need for the licensee to exercise onsite and offsite plans with full participation by each offsite authority having a role under the radiological response plan, FEMA will no longer evaluate the adequacy of offsite response during remedial or other exercises.</p> <p>No action is expected from State or local government organizations in response to an event at a decommissioning power reactor site other than firefighting, law enforcement and ambulance/medical services support. A memorandum of understanding should be in place for those services. Offsite response organizations will continue to take actions on a comprehensive EP basis to protect the health and safety of the public as they would at any other industrial site.</p>
<p>10 CFR part 50, appendix E, section IV.F.2.i.</p> <p>The NRC is granting exemption from portions of the rule language that would otherwise require the licensee to drill and exercise scenarios that include a wide spectrum of radiological release events and hostile action.</p>	<p>Due to the low probability of DBAs or other credible events to exceed the EPA PAGs, the available time for event mitigation and, if needed, implementation of offsite protective actions using a CEMP, the previously routine progression to general emergency in power reactor site scenarios is not applicable to a decommissioning site. Therefore, the licensee is not expected to demonstrate response to a wide spectrum of events.</p> <p>Also refer to basis for 10 CFR part 50, appendix E, section IV.1 regarding hostile action.</p>
<p>10 CFR part 50, appendix E, section IV.F.2.j.</p> <p>The NRC is granting exemption from the requirements regarding the need for the licensee's emergency response organization to demonstrate proficiency in key skills in the principal functional areas of emergency response.</p> <p>In addition, the NRC is granting exemption during an eight calendar year exercise cycle,</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.F.2.</p>

10 CFR Part 50, Appendix E, Section IV	NRC Staff Basis for Exemption
from demonstrating proficiency in the key skills necessary to respond to such scenarios as hostile actions, unplanned minimal radiological release, and scenarios involving rapid escalation to a site area emergency or general emergency.	
<p>10 CFR part 50, appendix E, section IV.I</p> <p>The NRC is granting exemption from the requirements regarding the need for the licensee to develop a range of protective actions for onsite personnel during hostile actions.</p>	<p>Refer to basis for 10 CFR part 50, appendix E, section IV.E.8.d.</p>

**ENCLOSURE 2**

SAFETY EVALUATION RELATED TO  
ENTERGY NUCLEAR OPERATIONS, INC.  
VERMONT YANKEE NUCLEAR POWER STATION  
DOCKET NO. 50-271  
REQUEST FOR EXEMPTIONS FROM PORTIONS OF  
10 CFR 50.47 AND 10 CFR PART 50, APPENDIX E



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO REQUEST FOR EXEMPTIONS FROM PORTIONS OF  
10 CFR 50.47 AND 10 CFR PART 50, APPENDIX E  
ENTERGY NUCLEAR OPERATIONS, INC.  
VERMONT YANKEE NUCLEAR POWER STATION  
DOCKET NO. 50-271

1.0 INTRODUCTION

Vermont Yankee Nuclear Power Station (VY) is a decommissioning nuclear power reactor (boiling water reactor (BWR)) located on approximately 125 acres in the town of Vernon, Vermont in Windham County on the west shore of the Connecticut River, upstream of the Vernon Hydro Station. Entergy Nuclear Operations, Inc. (ENO, the licensee) is the holder of 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), authorizing the licensee to possess and store spent nuclear fuel and greater-than-Class C radioactive waste at the permanently shutdown and defueled VY facility.

By letter dated September 23, 2013 (Reference 1), ENO submitted a certification to the U.S. Nuclear Regulatory Commission (NRC), indicating its intention to permanently cease power operations at the VY facility, following the end of the current operating cycle, which was expected to occur in the fourth quarter of 2014.

By letter dated January 12, 2015 (Reference 2), ENO submitted a certification to the NRC of permanent cessation of power operations pursuant to 10 CFR 50.82(a)(1)(i) and the removal of fuel from the reactor vessel, pursuant to 10 CFR 50.82(a)(1)(ii). Upon docketing of the certification, 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). Spent fuel is currently stored on site in a spent fuel pool (SFP) and a dry cask storage facility (independent spent fuel storage installation (ISFSI)).

By letter dated March 14, 2014 (Reference 3), ENO requested exemptions from specific emergency preparedness (EP) requirements of 10 CFR Part 50 for VY. More specifically, ENO requested exemptions from certain planning standards in 10 CFR 50.47(b) regarding onsite and offsite radiological emergency preparedness (REP) plans for nuclear power reactors; from certain requirements in 10 CFR 50.47(c)(2) that require establishment of plume exposure and

ingestion pathway emergency planning zones (EPZs) for nuclear power reactors; and from certain requirements in 10 CFR Part 50, Appendix E, Section IV, "Content of Emergency Plans," which establishes the elements that make up the content of emergency plans. ENO requested exemptions to eliminate the requirements to maintain formal offsite radiological emergency plans in accordance with 44 CFR 350, "Review and Approval of State and Local Radiological Emergency Plans and Preparedness," and to reduce the scope of the onsite emergency planning activities at VY, based on the reduced risks of an offsite radiological release at VY, given its permanently shutdown and defueled status. The exemptions will maintain the requirements for an onsite radiological emergency plan and will continue to ensure the capability to communicate and coordinate with offsite response authorities. Examples of the reduced EP requirements include: setting the highest emergency plan classification as an "Alert"; extending the timing requirements for notification of offsite authorities consistent with the regulations in 10 CFR 72.32(a); requiring only onsite exercises with the opportunity for offsite response organization (ORO) participation; and maintaining arrangements only for the ORO (i.e., law enforcement, fire and medical services) that may respond to onsite emergencies.

The NRC staff initiated a request for additional information (RAI) in a letter dated August 19, 2014 (Reference 4). By letter dated August 29, 2014 (Reference 5), ENO provided responses to the RAI and amended its request. The amended request aligns with the specific wording for the exemptions approved in staff requirements memorandum (SRM) to SECY 14-0125, dated March 2, 2015 (Reference 6).

The NRC staff found the application complete, and the licensee's associated technical justification provides a basis for the Commission's consideration of the requested exemption.

In accordance with 10 CFR 50.12, "Specific exemptions," the licensee stated that this exemption request: (1) is authorized by law; (2) will not present an undue risk to the public health and safety; (3) is consistent with the common defense and security; and (4) meets the requirement for special circumstances in 10 CFR 50.12(a)(2).

## 1.1 Discussion

The regulations that require each nuclear power reactor licensee to establish and maintain emergency plans and preparedness are set forth in 10 CFR 50.47, "Emergency plans," and Appendix E to 10 CFR Part 50, "Emergency Planning and Preparedness for Production and Utilization Facilities." The regulations include standards for both onsite and offsite REP plans. However, as applied to a decommissioning nuclear power reactor, the regulations do not take into account the reduced risk of an offsite radiological release at a permanently shutdown and defueled reactor.

With the termination of reactor operations at VY and the permanent removal of the fuel from the reactor vessel, most of the accident scenarios postulated for operating reactors are no longer possible. The irradiated fuel is now stored in either the SFP or the VY ISFSI, and will remain onsite until it can be moved offsite for long-term storage or disposal. The reactor, reactor coolant system (RCS), steam system, turbine generator, and supporting systems are no longer in operation and have no function related to the storage of the irradiated fuel. Therefore, postulated accidents involving failure or malfunction of the reactor, RCS, steam system, turbine generator, and supporting systems are no longer applicable.



During reactor decommissioning, the principal public safety concerns involve the perceived radiological risks associated with the onsite storage of spent fuel. For a period of time after fuel has been irradiated in a power reactor, the spent fuel is being stored in an SFP (wet storage). A highly unlikely accident scenario has been postulated whereby a loss-of-water inventory from the SFP, due to a beyond-design-basis accident<sup>1</sup> (beyond-DBA), could result in a significant heatup of the spent fuel due to loss of all cooling, culminating in substantial zirconium cladding oxidation and fuel damage, also known as a zirconium fire.

In August 1997, the NRC published NUREG/CR-6451, "A Safety and Regulatory Assessment of Generic BWR [boiling water reactor] and PWR [pressurized water reactor] Permanently Shutdown Nuclear Power Plants" (Reference 7), which provided recommendations on operationally-based regulations that could be partially or totally removed for decommissioning power reactor licensees without impacting public health and safety. It recommended that licensees apply for exemptions from certain EP requirements, after the spent fuel is no longer susceptible to substantial zirconium oxidation and the fuel cladding will remain intact given the SFP is drained.

In the late 1990s, the NRC staff developed thermal-hydraulic criteria for determining when reductions in EP requirements at decommissioning power reactors could be permitted. The criteria were used on a case-by-case basis to grant exemptions from certain EP requirements. The underlying technical basis was a demonstration that: (1) the radiological consequences of applicable design-basis accidents (DBAs) would not exceed radiological release limits at the site exclusion area boundary<sup>2</sup> (EAB); and (2) for a highly unlikely beyond-DBA where the SFP is drained and no cooling (air or water) of the fuel is taking place, the spent fuel stored in the SFP would not reach the zirconium ignition temperature in fewer than 10 hours starting from the time at which a loss of both water and air cooling was assumed have occurred. The NRC staff concluded that if 10 hours were available to initiate mitigation actions consistent with plant conditions or, if needed, offsite protective actions using a comprehensive emergency management plan<sup>3</sup> (CEMP) or "all hazards" approach, then formal offsite REP plans would not be necessary for permanently defueled power reactor licensees.

The analysis and 10-hour criterion for mitigating the potential consequences of beyond DBAs at an SFP does not credit the natural air cooling and water cooling in the SFP after the event, as a

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<sup>1</sup> Beyond Design-Basis Accidents - This term refers to accident sequences that are possible but unlikely and are considered beyond the scope of design-basis accidents that a nuclear facility must be designed and built to withstand.

<sup>2</sup> The area surrounding the reactor, where the reactor licensee has the authority to determine all activities, including exclusion or removal of personnel or property.

<sup>3</sup> A comprehensive emergency management plan in this context, also referred to as an emergency operations plan (EOP), is addressed in the Federal Emergency Management Agency's (FEMA) Comprehensive Preparedness Guide (CPG) 101, "Developing and Maintaining Emergency Operations Plans". CPG 101 is the foundation for State, territorial, Tribal, and local emergency planning in the United States. It promotes a common understanding of the fundamentals of risk-informed planning and decision making and helps planners at all levels of government in their efforts to develop and maintain viable, all-hazards, all-threats emergency plans. An EOP is flexible enough for use in all emergencies. It describes how people and property will be protected; details who is responsible for carrying out specific actions; identifies the personnel, equipment, facilities, supplies and other resources available; and outlines how all actions will be coordinated. A comprehensive emergency management plan is often referred to as a synonym for "all hazards planning."

modeling simplification. It assumes that the fuel immediately begins to heat up without removing any of its energy (often referred to as an adiabatic heatup). These assumptions include the simplified treatment of the thermal-hydraulic response and the use of often bounding configurations that do not allow for thermal radiation between high powered bundles and low power bundles and from the spent fuel assemblies to the SFP wall liner. In a more realistic calculation, as provided in the recent NUREG-2161, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling-Water Reactor," dated September 2014 (Reference 8), thermal radiation heat transfer (in addition to air cooling) can play a significant role. For example, the NUREG-2161 study indicated that it could take more than 10 hours for the spent fuel in the SFP to heat up to the zirconium cladding ignition temperature of 900 degrees Celsius (C) after only one month of being moved from the reactor to the SFP, for the reference plant, if the assemblies most recently removed from the reactor are distributed among older, cooler fuel assemblies. It should be noted that this assessment applies to BWR fuel.

The 10-hour time frame is not intended to be the time in which it would take to repair all key safety systems or to repair a large SFP breach. Rather, considering the very low probability of beyond-DBAs affecting the SFP, in the NRC staff's judgment, 10 hours provides a reasonable time period to implement pre-planned mitigation measures to provide makeup or spray to the SFP before the onset of zirconium cladding ignition and, if necessary, for offsite authorities to implement protective actions using a CEMP (all-hazards) approach.

In February 2001, the NRC prepared NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants" (Reference 9), to provide a technical basis for a proposed rulemaking outlined in SECY-00-0145, "Integrated Rulemaking for Nuclear Power Plant Decommissioning" (Reference 10), and subsequently updated in SECY-01-0100, "Policy Issues Related to Safeguards, Insurance, and Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in Spent Fuel Pools" (Reference 11). Although the rulemaking was later deferred in light of higher priority work after the terrorist attacks of September 11, 2001, NUREG-1738 provides insights that the NRC staff continues to find helpful for the evaluation of exemption requests concerning EP requirements. Among these insights, NUREG-1738 identified beyond design-basis seismic events as the dominant contributor to events that could result in a loss of SFP coolant that uncovers fuel for plants in the Central and Eastern United States. These events would also likely be the dominant contributor to loss of SFP coolant inventory events that uncover fuel.

NUREG-1738 identified a zirconium fire resulting from a substantial loss-of-water inventory from the SFP as the only postulated scenario at a decommissioning plant that could result in a significant offsite radiological release. The scenarios that lead to this condition have very low frequencies of occurrence (i.e., on the order of one to ten times in a million years) and are considered beyond-DBAs because the SFP and attached systems are designed to prevent a substantial loss-of-coolant inventory under accident conditions. However, the consequences of such accidents could potentially lead to an offsite radiological dose in excess of the U.S. Environmental Protection Agency's (EPA) Protective Action Guides (PAGs) (Reference 12) at the EAB.

However, the risk associated with zirconium cladding fire events decreases as the spent fuel ages, decay time increases, decay heat decreases, and short-lived radionuclides decay away.

As the decay time increases, the overall risk of a zirconium cladding fire continues to decrease due to two factors: (1) the amount of time available for preventative actions increases, which reduces the probability that the actions would not be successful; and (2) the increased likelihood that the fuel is air coolable, which decreases the reliance on actions to prevent a zirconium fire. The NRC staff also notes that the results of research conducted for NUREG-1738 and NUREG-2161 suggest that, while other radiological consequences can be extensive, a postulated accident scenario leading to an SFP zirconium fire, where the fuel has significant decay time, will have little potential to cause offsite early fatalities regardless of the type of offsite EP response (i.e., formal offsite REP plan or CEMP).

Although the risk of sabotage is not considered in any standard reactor risk analyses, the NRC staff cannot rule out radiological sabotage (which is not quantifiable) as an insignificant risk contributor relative to other zirconium cladding fire initiators. Therefore, permanently shutdown and defueled reactors must continue to provide a high assurance of adequate protection from the design-basis threat of radiological sabotage under the plant's Physical Security Plan. Physical security for special nuclear material at fixed sites, including decommissioning power reactors, is required by 10 CFR Part 73, "Physical Protection of Plants and Materials." Decommissioning power reactor licensees are required by 10 CFR 73.55(f) to develop target sets for use in the development and implementation of security strategies that protect against spent fuel sabotage. However, the number of target sets at a decommissioning reactor is significantly less than that for an operating power reactor. Implementation of the protective strategy at a decommissioning reactor takes into account this reduction in target sets.

In Attachment 1 of the March 14, 2014, letter (Reference 3), ENO provided a summary of the defueled accident analyses, which included: (1) a fuel handling accident (FHA) in the reactor building; (2) an adiabatic heatup of the hottest fuel assembly stored in the SFP; (3) loss of normal spent fuel cooling; and (4) a radioactive waste handling accident. The analyses demonstrate that, in all cases, with the exception of the adiabatic heatup of the hottest fuel assembly, radiation exposure levels at the site's EAB would be less than the EPA PAGs.

The summary of the FHA states that, as of 17 days after the final reactor shutdown, the radiological consequences of the FHA will not exceed the limits of the EPA PAGs at the EAB. The adiabatic heatup analysis shows that, as of 15.4 months after the final reactor shutdown, the time for the hottest fuel assembly to reach 900 degrees C is 10 hours after the loss of all cooling. Due to the length of time it would take the adiabatic heatup to occur, there is sufficient time to initiate mitigative actions consistent with plant conditions and, if necessary, for offsite authorities to employ their CEMP to take protective actions. The loss of normal spent fuel cooling accident analysis assumes that there is no active cooling of the SFP and there is no method to maintain SFP water inventory using normal plant systems. The summary states that as of 15.4 months after the final reactor shutdown, it will take the SFP temperature 74 hours to reach 212 degrees Fahrenheit (F) and the total time for the SFP level to boil off to 3 feet above the top of the fuel assemblies is 16 days. Three feet of water provides sufficient shielding from radiation to allow personnel to respond to the event. The radioactive waste handling accident involves dropping a high integrity container containing the highest concentration of radioactive materials 820 feet from the closest site boundary; 1 percent of the contents is assumed to be released and 0.5 percent of the release is carried in the direction of the site boundary in the form of an aerosol. The resulting 2-hour integrated dose at the site boundary is calculated to be 16.1 millirem total effective dose equivalent.

Also in Attachment 1 to the March 14, 2014, letter, ENO furnished information concerning its SFP inventory makeup strategies. Several sources of makeup to the pool are available, such as the service water system, which has redundant pumping capability and power supplies to ensure alternative fuel pool makeup function. Additionally, there are electric-driven and diesel-driven fire pumps that can supply makeup water to the SFP via the service water system or the fire water system. All sources discussed above take suction from the Connecticut River. VY also has an engine-driven emergency makeup pump capable of taking suction from the Cooling Tower No. 2 deep basin to provide an alternate source of makeup water to the SFP. There are multiple ways to add makeup water to the SFP with or without entry to the refuel floor. In a letter dated April 24, 2014 (Reference 13), ENO withdrew its request to remove License Condition 3.N, Mitigation Strategy License Condition from the VY Renewed Facility Operating License. This license condition requires VY to maintain its SFP inventory makeup strategies, as discussed above.

In attachment 1 to the March 14, 2014, letter, ENO provided tables showing how VY meets or compares with the industry decommissioning commitments (IDCs) and the NRC staff decommissioning assumptions (SDAs) contained in NUREG-1738.

By letter dated December 19, 2014, VY submitted a Post-Shutdown Decommissioning Activities Report (PSDAR) (Reference 14), which identified that VY will decommission using a SAFSTOR<sup>4</sup> method, in which most fluid systems are drained and the plant is left in a stable condition until final decontamination and dismantlement activities begin. In its letter dated January 12, 2015 (Reference 2), ENO stated that the VY reactor was permanently shut down on December 29, 2014. All fuel assemblies were removed from the reactor vessel and placed in the SFP as of January 12, 2015. The irradiated fuel will be stored in the SFP until it is placed in dry casks and later shipped offsite in accordance with the schedules described in the PSDAR and the updated Irradiated Fuel Management Plan. The SFP and its supporting systems are being modified and dedicated only to spent fuel storage. With the reactor defueled, the reactor vessel, RCS and secondary systems are no longer in operation and have no function related to the safe storage and management of irradiated fuel.

In the unlikely situation that a radiological release is expected, elements of the revised onsite emergency plan would facilitate the ability of offsite authorities to take protective actions under a CEMP (all-hazards) approach. The licensee must still maintain an ability to determine if a radiological release is occurring and, if a release is occurring or expected to occur, promptly communicate that information to offsite authorities. The licensee uses the InForm Notification System, with the Nuclear Alert System as a backup, to notify the State of Vermont, State of New Hampshire and the Commonwealth of Massachusetts, who notify local agencies of a declared emergency at the VY facility, consistent with current agreed-upon practices.

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<sup>4</sup> SAFSTOR is a method of decommissioning in which a nuclear facility is placed and maintained in a condition that allows the facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use.

The NRC staff proposed an evaluation of the ENO's exemption request to the Commission in SECY-14-0125, "Request by Entergy Nuclear Operations, Inc. for Exemptions from Certain Emergency Planning Requirements," dated November 14, 2014 (Reference 15), which was approved by the Commission in the SRM to SECY-14-0125, dated March 2, 2015 (Reference 6).

## 2.0 REGULATORY EVALUATION

The regulations in 10 CFR 50.12(a)(2)(ii) provide that the NRC may, on application by a licensee or on its own initiative, grant exemptions from the requirements of the regulations in circumstances in which application of the regulation would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule<sup>5</sup>.

The underlying purposes of the planning standards in 10 CFR 50.47(b), the requirements in 10 CFR 50.47(c)(2), and certain requirements of 10 CFR Part 50, Appendix E, Section IV, are to ensure that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency; to establish plume exposure and ingestion pathway EPZs for nuclear power plants; and to ensure that licensees maintain effective offsite and onsite radiological emergency response plans.

The NRC staff relied on past precedent to assess whether the VY request for EP exemptions satisfied the underlying purposes of the EP regulations. The last exemptions that eliminated requirements for formal offsite REP planning were approved in June 2015 for the San Onofre Nuclear Generating Station (SONGS), Units 2 and 3 (Reference 16), in March 2015, for the Crystal River Unit 3 Nuclear Generating Plant (CR3) (Reference 17), and in October 2014 for the Kewaunee Power Station (KPS) (Reference 18). The exemptions requested for VY, as described in this safety evaluation (SE), are consistent with those approved by the NRC for SONGS, CR3 and KPS. Prior to these sites, the last approved exemption that eliminated the requirements for formal offsite REP planning were for the Zion Nuclear Power Station in 1999 (Reference 19). The NRC staff recognizes that the planning standards in 10 CFR 50.47(b), the requirements in 10 CFR 50.47(c)(2), and certain requirements in 10 CFR 50, Appendix E, Section IV, were developed taking into consideration the risks associated with accidents that have the potential for significant offsite radiological dose consequences during operation of a nuclear power reactor at its licensed full-power level. As provided in Section 1.1 of this SE, the NRC staff has concluded that after a reactor has permanently shut down and defueled, the risks associated with accidents that have a potential for offsite radiological release, are significantly reduced for those licensees that are reasonably aligned with the analyses presented in NUREG-1738 (Reference 9). This position has been further informed by recent SFP studies provided in NUREG-2161 (Reference 8).

Based on the low risk of postulated beyond-DBAs that will result in significant offsite radiological consequences, the NRC staff considers that the special circumstances condition of 10 CFR 50.12(a)(2)(ii) can be met by demonstrating that VY satisfies the two criteria provided below. Specifically, the planning standards in 10 CFR 50.47(b), the requirements in

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<sup>5</sup> Notwithstanding the special circumstances of the exemption request, 10 CFR 50.12(a)(1) requires that the exemption must be authorized by law, not present an undue risk to the public health and safety, and be consistent with the common defense and security.

10 CFR 50.47(c)(2), and certain requirements in 10 CFR 50, Appendix E, Section IV, from which ENO has requested exemptions, would not serve or be necessary to achieve the underlying purpose of the EP regulations if the VY site-specific analyses demonstrate that:

1. An offsite radiological release will not exceed the EPA PAGs at the EAB for a DBA; and
2. In the unlikely event of a beyond-DBA, resulting in a loss of all modes of cooling for the spent fuel stored in the SFP, there is a minimum of 10 hours for the hottest fuel assembly to reach 900 degrees C, which is the critical temperature threshold for self-sustained oxidation of cladding in air. This will ensure that sufficient time exists to initiate appropriate mitigating actions and, if needed, sufficient time is available for offsite agencies to take protective actions using a CEMP (all-hazards) approach to protect the health and safety of the public.

Previously granted exemptions from EP regulations reduced EP requirements, consistent with the regulations for a licensee authorizing fuel loading and low power testing only, as specified in the standards of 10 CFR 50.47(d), and is consistent with the information requirements for an ISFSI emergency plan, as required by 10 CFR 72.32(a). Examples of the reduced EP requirements include: setting the highest emergency plan event classification as an "Alert"; extending the timing requirements for notification of offsite authorities; requiring only onsite exercises with the opportunity for ORO participation; and only maintaining arrangements for the OROs (i.e., law enforcement, fire and medical services) that may respond to onsite emergencies. No formal offsite REP plans in accordance with 44 CFR 350 were required after the exemptions were granted for these licensees.

As part of the review for ENO's exemption request, the NRC staff also considered the EP regulations in 10 CFR 72.32 and "Spent Fuel Project Office Interim Staff Guidance (ISG) – 16, Emergency Planning" (Reference 20), as references to ensure consistency between specific-licensed and general-licensed ISFSIs. Furthermore, the licensee should address the IDCs and SDAs that formed the basis of the analyses as presented in NUREG-1738.

## 2.1 Design-Basis Accidents

During normal power reactor operations, the forced flow of water through the RCS removes the heat generated by the reactor by generating steam. The steam system, operating at high temperatures and pressures, transfers this heat to the turbine generator. The most severe postulated accidents for nuclear power plants involve damage to the nuclear reactor core and the release of large quantities of fission products to the RCS and subsequent release of some fission products to the environment. Many of the accident scenarios postulated in the facility safety analysis report involve failures or malfunctions of systems that could affect the reactor core. With the termination of reactor operations and the permanent removal of the fuel from the reactor core, such accidents are no longer possible. Therefore, the postulated accidents involving failure or malfunction of the reactor, RCS, steam system, or turbine generator are no longer applicable. Postulated accidents that could potentially apply to a permanently shutdown and defueled facility include an FHA, a radioactive waste handling accident, and an SFP boiling event. The potential offsite consequences of these events are affected by the time available for decay of fission products in the fuel and, possibly, the availability of engineered safety features,

such as ventilation systems to filter fission products from the accident area atmosphere before they are released outside the facility.

The regulations in 10 CFR 50.67, "Accident source term" state, in part, that:

(i) An individual located at any point on the boundary of the exclusion area for any 2-hour period following the onset of the postulated fission product release, would not receive a radiation dose in excess of 0.25 Sv [Sievert] (25 rem) total effective dose equivalent (TEDE), (ii) An individual located at any point on the outer boundary of the low population zone, who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage), would not receive a radiation dose in excess of 0.25 Sv (25 rem) total effective dose equivalent (TEDE), and (iii) Adequate radiation protection is provided to permit access to and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 0.05 Sv (5 rem) total effective dose equivalent (TEDE) for the duration of the accident.

Appendix A to 10 CFR Part 50, "General Design Criteria (GDC)," Criterion 19 - Control room, states, in part:

A control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions, including loss-of-coolant accidents. Adequate radiation protection shall be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body, or its equivalent to any part of the body, for the duration of the accident. Equipment at appropriate locations outside the control room shall be provided (1) with a design capability for prompt hot shutdown of the reactor, including necessary instrumentation and controls to maintain the unit in a safe condition during hot shutdown, and (2) with a potential capability for subsequent cold shutdown of the reactor through the use of suitable procedures.

NUREG-0800, "Standard Review Plan [SRP] for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition" (SRP), Section 15.0.1, "Radiological Consequence Analyses Using Alternative Source Terms," Revision 0, July 2000 (Reference 21), provides review guidance to the NRC staff for the review of alternative source term amendment requests. SRP Section 15.0.1 states that the NRC reviewer should evaluate the proposed change against the guidance in Regulatory Guide (RG) 1.183, "Alternative Radiological Source Terms for Evaluation Design Basis Accidents at Nuclear Power Reactors" (Reference 22). As provided in RG 1.183, the dose acceptance criteria for a FHA are a TEDE of 6.3 rem at the EAB for the worst 2 hours, 6.3 rem at the outer boundary of the low population zone (LPZ), and 5 rem in the control room for the duration of the accident.

The NRC approved implementation of the Alternative Source Term (AST) methodology at VY, by License Amendment No. 223, dated March 29, 2005 (Reference 23). This license amendment represents full scope implementation of the AST as described in RG 1.183.

The EPA's "Protective Action Guide and Planning Guidance for Radiological Incidents," Draft for Interim Use and Public Comment, issued March 2013 (Reference 12), provides radiological protection criteria for application to all incidents that would require consideration of protective actions, with the exception of nuclear war. This manual provides recommended numerical PAGs for the principal protective actions available to public officials during a radiological incident. The EPA developed this manual to assist public officials in planning for emergency response to radiological incidents. To support a request for exemptions from requirements for offsite planning zones, a licensee needs to compare its calculated accident doses to the EPA PAGs, which suggest that protective actions, such as, sheltering-in-place or evacuation of the public, are justified when the projected dose to an individual is 1 rem projected over 4 days.

The Nuclear Energy Institute (NEI) document NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6, dated November 2012 (Reference 24), provides guidance for the development of emergency action levels (EALs) for reactors in a permanently defueled condition. NEI 99-01, Revision 6, was endorsed by the NRC in a letter dated March 28, 2013 (Reference 25). NEI 99-01 states that the accident analysis necessary to adopt the permanently defueled EAL scheme must confirm that the source terms and release motive forces are not sufficient to warrant classification of a site area emergency (SAE) or General Emergency (GE), resulting in the maximum classification level of an Alert during an accident. An SAE would be declared for any event where exposure levels beyond the EAB are expected to exceed 10 percent of the EPA PAGs, which are a projected dose of 1 to 5 rem TEDE in 4 days for sheltering or evacuation of the public, and a projected dose of 5 rem child thyroid dose from radioactive iodine for administration of prophylactic drugs (potassium iodide). Correspondingly, NEI 99-01 established the SAE classification threshold as 100 mrem TEDE or 500 mrem thyroid committed dose equivalent.

## 2.2 Beyond-Design-Basis Accidents

The NRC staff has long recognized that the frequency of a large radiological release at a decommissioning power reactor storing irradiated fuel in an SFP is lower than the frequency of a large offsite radiological release at an operating reactor. The NRC staff evaluated the potential for large releases caused by beyond-design basis events affecting SFP storage in the 1980s (NUREG-1353, "Regulatory Analysis for the Resolution of Generic Issue 82, 'Beyond Design Basis Accidents in Spent Fuel Pools,'" issued April 1989 (Reference 26)), and determined that the risk was acceptably low, largely as a result of the low frequency of events that could challenge the integrity of the SFP structure. After permanent cessation of operations at decommissioning reactors, the heat generated by the irradiated fuel in the SFP continually decreases. The decreased heat generation increases the time from an initiating event that damages the pool until fuel temperatures high enough to damage the fuel cladding could develop, after loss of adequate coolant inventory. The increasing time to heatup the fuel would eventually allow for sufficient time to perform ad hoc measures to mitigate the consequences of the radiological release that could follow fuel cladding damage and, if necessary, initiate protective measures. On this basis, the NRC granted exemptions from emergency planning requirements at many decommissioning reactors in the 1990s.



As stated previously in this SE, the NRC staff completed a detailed study of decommissioning risk, which is documented in NUREG-1738 (Reference 9). For spent fuel that has aged 1 year, the NRC staff estimated the frequency of fuel uncover to range from 5.8 to 24 per 10 million years for the plants studied. The frequency of fuel uncover was used as a simplifying and conservative surrogate for the overall frequency of severe fuel damage resulting from inadequate cooling following a loss-of-coolant inventory. Consistent with the NUREG-1353 (Reference 26) results, beyond-design-basis seismic initiating events dominate the fuel uncover frequency estimates. Fuel cask handling accidents were also significant contributors to the frequency estimate. The analysis relied on several assumptions to evaluate the likelihood of successful recovery, mitigation, and emergency response activities, which were classified as IDCs and SDAs. Because the configuration of the fuel, the storage racks, and the pool structure could be affected in unpredictable ways by a major seismic event or cask drop, the associated consequence evaluation could not rule out conditions where air cooling would be inadequate, even after many years of decay. To assess the available time for response measures, the analysis considered both situations where the heat of oxidation affected heatup rate in air-cooled configurations and adiabatic heatup in configurations where air cooling would be precluded.

In this SE, the NRC staff verifies the licensee's assumptions, calculations, and overall analyses of the beyond-DBAs supporting the licensee's justification for the EP exemption requests, in accordance with the criteria discussed in Section 2.0 of this SE.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Design-Basis Accidents

In Section IV of Attachment 1 to the EP exemption request dated March 14, 2014 (Reference 3), ENO provided a summary of event analyses relevant to VY in its defueled state. After the permanent cessation of reactor operations and permanent removal of fuel from the reactor vessel, most of the initial conditions of accident and transient analyses included in the VY safety analysis report are no longer possible. The licensee identified the FHA within the SFP as the only DBA scenario with the potential to result in a radiological release in the permanently shutdown and defueled state of VY. The licensee also identified a sustained loss of SFP forced cooling and a radioactive waste handling accident involving a drop of a high integrity container assumed to contain dewatered resin as potential events that would be evaluated for radiological consequences. The licensee determined that the design-basis FHA in the SFP and other analyzed events would be within relevant regulatory limits. These analyses assumed no dose consequence mitigation by engineered safety feature systems. The design-basis FHA was evaluated for fuel subcritical for more than 17 days, and the sustained loss of SFP cooling event was analyzed considering the decay heat present in the SFP 15.4 months following permanent shutdown of the reactor. The radioactive waste handling accident considered a fixed inventory of radioactive material in the dewatered resin, which was not specifically related to a time following permanent reactor shutdown.

##### 3.1.1 Fuel Handling Accident

A revision to the FHA analysis was performed by the licensee to support the license amendment request "Eliminate Certain ESF [engineered safeguard features] Requirements during

Movement of Irradiated Fuel,” dated November 14, 2013 (Reference 27), to address the permanently defueled condition. The analysis assumed a reasonable time post-cessation of operations for movement of fuel. The licensee had then determined that if an FHA occurs, the dose consequences would be within 10 CFR 50.67 and RG 1.183 dose limits. The licensee evaluated the days of decay time after the reactor had been shut down in which the dose consequences were acceptable without relying on safety-related structures, systems, and components remaining operable for accident mitigation during and following the event. The licensee evaluated the maximum 2-hour TEDE to an individual located at the EAB, the 30-day TEDE to an individual at the outer boundary of the LPZ, and the control room. The resulting doses were less than the RG 1.183 and SRP 15.0.1 dose acceptance criteria, as well as the 10 CFR 50.67 limits.

The revised FHA analysis involves the inadvertent dropping of a fuel assembly during fuel handling operations, and the subsequent rupture of fuel pins in the dropped assembly, and/or the impacted assembly. The accident is assumed to involve the drop of an assembly onto other assemblies, leading to the equivalent clad failure of the fuel rods. The fission product inventory in the fuel rod gap of the damaged rods is assumed to be released instantaneously into the fuel storage pool. The FHA dose analysis models 13 days of radioactive decay prior to the event. The NRC staff finds that the decay time assumed by the licensee is consistent with RG 1.183, Regulatory Position 3.1, “Fission Product Inventory,” and to be conservative because VY has been defueled since January 12, 2015, which is much greater than 13 days (approximately 11 months). Based on the actual time to date for spent fuel decay, the iodine source terms would be negligible.

Fission products released from the damaged fuel are decontaminated by passage through the pool water, with the degree of decontamination depending on their physical and chemical form. The licensee assumed no decontamination for noble gases, a decontamination factor of 200 for radioiodine, and retention of all aerosol and particulate fission products. In VY’s response, dated October 9, 2014 (Reference 28), to the NRC staff’s RAI, ENO compared the decontamination factors and number of damaged assemblies for an FHA in the SFP to those for an FHA over the reactor core. ENO stated that the minimum amount of water needed above a postulated dropped and damaged assembly, lying on top of a spent fuel rack, is 20.67 feet rather than the 23 feet assumed for the FHA over the reactor core. ENO also stated that although the decontamination factor in the SPF is reduced (due to there being 20.67 feet of water above the postulated damaged fuel assembly), this reduction is more than offset by the smaller number of postulated damaged fuel rods in the SFP.

The fission product inventory in the fuel rod gap of the damaged rods is assumed to be released instantaneously from the fuel and the overlying fuel pool to the secondary containment building. ENO’s FHA with an open containment model no longer credits several safety systems after 13 days of fuel decay, and, is consistent with RG 1.183, Appendix B, and Regulatory Position 5.3, “Meteorology Assumptions.” ENO’s FHA with an open containment model does not credit the secondary containment, standby gas treatment (SGT) system, or the reactor building ventilation. Consistent with Regulatory Position 5.3, the radioactivity that escapes the fuel pool is released to the environment over a 2-hour time period. Therefore, ENO assumes the release to the environment is an unfiltered ground-level release via the reactor building blowout panels.

The NRC staff also confirmed with the licensee that the release point from the reactor building to the control room uses the most limiting combination of release and receptor locations. Since ENO is assuming a ground level release, the staff finds it acceptable for the licensee to model the FHA using the control room, EAB, and LPZ atmospheric dispersion factors for an FHA with a ground level release. These were previously approved in License Amendment No. 223 (Reference 23).

The licensee concluded that the radiological consequences at the EAB, LPZ and in the control room are within the dose criteria for DBAs, as specified in 10 CFR 50.67 and SRP Section 15.0.1. The licensee also concluded that the radiological consequences are less than the dose criteria specified in the EPA PAG Manual. The NRC staff reviewed the licensee's evaluation and performed confirmatory calculations. In performing this review, the NRC staff relied upon information provided by the licensee, as well as NRC staff experience in performing similar reviews. The NRC staff reviewed the methods, parameters, and assumptions that the licensee used in its radiological dose consequence analyses and concludes that they are acceptable because they are consistent with the guidance provided in RG 1.183. Using the FHA analyses assumptions described above, the NRC staff's confirmatory analyses of the VY's FHA yields results for the EAB and LPZ that are less than the RG 1.183 and SRP 15.0.1 dose acceptance criteria and determined that they would not exceed the EPA PAG recommendations at the EAB.

### 3.1.2 Radioactive Waste Handling Accident

The licensee performed an analysis evaluating the consequences of a radioactive waste handling accident. The accident evaluated the drop of the largest high integrity container containing the highest concentration of radioactive materials (dewatered resin containing 19,415 curies of 25 various radionuclides), representing the highest activity waste at the facility. The dose consequence calculation postulates that the container is dropped 820 feet from the closest site boundary with a subsequent container failure with 1 percent of the liner contents released and 0.5 percent of the release becoming aerosolized and carried in the direction of the closest site boundary.

According to the VY UFSAR, the Radioactive Waste Systems are designed to dispose of the radioactive process wastes generated during station operation. These wastes can be liquid, solid, or gaseous. Due to both physical differences and differences in radioactivity or contamination levels, various methods are employed for processing and packaging the solid radioactive wastes. Wet solid wastes are packaged in appropriate liners or high integrity containers for transportation within licensed shipping casks. Wet wastes consist of spent demineralizer resins and filter sludge. Spent resins from the various filter systems are flushed to the Radwaste Processing System and normally combine for dewatering through the Dewatering System. The moisture content of the processed spent resins is less than 1 percent by weight. After filling the liner, it is closed and the cask is rolled to a decontamination area in the Radwaste Building where the cask is wiped or washed down to remove surface contamination. The cask is lifted to a truck for transportation to the onsite waste storage area or offsite to a waste disposal site. Design and use of the cask are in accordance with 10 CFR 71, "Packaging and Transport of Radioactive Material," and 49 CFR 170-178, with regards to transportation and specifications for packaging regulations of the Department of Transportation.

In ENO's response, dated October 21, 2014 (Reference 29), to the NRC staff's RAI, the licensee provided further details of the radioactive waste handling accident. The analysis assumed the liner contains all radionuclides found in plant radwaste, each of which is at the Department of Transportation limit for low specific activity materials (except I-129, which is at the 10 CFR 61 limit for disposal). Approximately 26 radionuclides are expected to be present in the waste (which represents a correction to the 25 stated radionuclides in the application). It is assumed that the liner contains 150 feet<sup>3</sup> of this waste, which includes about 19 radionuclides of approximately 1000 curries each and seven radionuclides with a slightly lesser amount. The licensee discusses that the radionuclides that typically are determined by laboratory analysis are present in reactor cleanup resin waste and that short lived gases, and volatile radionuclides are not detected in typical radwaste streams. The licensee assumes, for purposes of the radiological accident analysis that all radionuclides are at their upper limit. In reality, a small number of radionuclides may be expected to approach a limiting condition, while the majority would be at some lower activity level.

Activity released from the high integrity container is transported by atmospheric dispersion to the offsite EAB dose receptors. Consistent with RG 1.183 Regulatory Position 5.3, the atmospheric dispersion factors values for the EAB were approved by the NRC staff during implementation of the AST radiological analyses in License Amendment No. 223 (Reference 23). Consistent with RG 1.183 Regulatory Position 4.1.7, "[n]o correction should be made for depletion of the effluent plume by deposition on the ground."

The licensee concluded that the radiological consequences would not exceed the EPA PAG recommendations at the EAB. The NRC staff reviewed the licensee's evaluation and performed confirmatory calculations. In performing this review, the NRC staff relied upon information provided by the licensee, as well as NRC staff experience in performing similar reviews. The NRC staff reviewed the methods, parameters, and assumptions that the licensee used in its radiological dose consequence analyses and concludes that they are acceptable because the radiological consequences would not exceed the EPA PAG recommendations at the exclusion area boundary.

### 3.1.3 Design-Basis Accidents Conclusion

The NRC staff reviewed the assumptions, inputs, and methods used by the licensee to assess the radiological consequences of DBAs for the permanently defueled condition at VY. The NRC staff concludes that the licensee used analysis methods and assumptions consistent with the conservative regulatory requirements and guidance identified in Section 2.1 of this SE. The NRC staff compared the doses estimated by the licensee to the applicable criteria in the SRP and NEI 99-01, Revision 6, as well as to the results of confirmatory analyses conducted by the staff. The NRC staff finds, with reasonable assurance, that given the permanently shutdown and defueled condition of VY, with spent fuel stored in the SFP and ISFSI, the radiological consequences of DBAs are well below the limits of the offsite radiological release and exposure limits described in Section 2.0 of this SE. The NRC staff finds, with respect to the consequences of the remaining DBAs at VY, that any offsite radiological release will not exceed the EPA PAGs at the EAB. Therefore, the underlying purpose of the regulations applicable to EP would still be achieved if the requested EP exemptions were granted, as discussed in Section 2.0 of this SE.

### 3.2 Beyond-Design-Basis Accidents

In Section IV of Attachment 1 to the March 14, 2014 (Reference 3), Emergency Plan exemption request, ENO discussed a beyond-DBA scenario involving the loss of pool coolant inventory with adiabatic heatup of the hottest fuel assembly. In Attachment 2 to the Emergency Plan Exemption Request, the licensee provided an evaluation of this event. The NRC staff performed a review of the evaluation concerning the time for the hottest fuel assembly to heat adiabatically to a temperature at which runaway oxidation of the cladding is possible, as addressed below. The results of the licensee's analyses show that the adiabatic heatup of the hottest assembly to temperatures associated with a significant release would exceed 10 hours about 15.4 months following permanent reactor shutdown. The assessment of the adiabatic heatup is important because it is a criteria used by the NRC staff in its finding of special circumstances related to the emergency planning regulation exemptions.

#### 3.2.1 Implementation of Supporting Actions and Commitments

In accordance with the safety analysis in NUREG-1738 (Reference 9), the beyond-design-basis event sequences that dominate risk at a decommissioning power reactor are large earthquake and cask-drop events. This is an important difference relative to an operating power reactor, where typically a large number of different initiating events make significant contributions to risk.

Assurance that the results of the NUREG-1738 analysis bound the plant-specific conditions at VY can be established by assessing the facility against certain design and operational characteristics that were assumed in the analysis. These characteristics were identified in the NUREG-1738 study as recovery, mitigation, and emergency response activities assumptions that were relied on to evaluate the likelihood of success in event sequences. In Table 3 and Table 4 of Attachment 1 to the Emergency Plan Exemption Request, dated March 14, 2014 (Reference 3), the licensee described the conformance of the VY facility and operations with the IDCs and the SDAs. Included in the licensee's discussion of the IDCs and SDAs, ENO addressed measures in place to minimize the potential risk from event sequences that dominate risk at a decommissioning reactor with fuel stored in a SFP (for example, those IDCs and SDA related to fuel cask handling activities and seismic events).

The NRC staff's evaluation focuses on ENO's conformance with IDCs and SDAs that are related to the design and operation of structures, systems, and components associated with the SFPs. The following provides a summary of the IDC and SDA items, the licensee's response, and the staff's assessment:

##### IDC #1

IDC #1 states that the cask drop analyses will be performed or single failure-proof cranes will be in use for handling of heavy loads (i.e., phase II of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants: Resolution of Generic Technical Activity A-36") will be implemented (Reference 30)).

To provide for safe handling of heavy loads in the vicinity of the SFP, ENO has maintained procedures for handling heavy loads that comply with NUREG-0612 guidelines. Section 3.2 of the VY Defueled Safety Analysis Report (DSAR) references the Control of Heavy Loads

Program Document (PP 7023) that details the commitments to control the handling of heavy loads and describes that, pursuant to License Amendment Number 29, issued January 28, 1977, the reactor building crane was accepted as part of a single-failure-proof handling system. The NRC staff also accepted the administrative controls for control of heavy loads consistent with the guidance in NUREG-0612 by letter dated June 27, 1984. The NRC staff finds that the qualification and operation of the VY reactor building crane as a single-failure-proof handling system, as described in the VY DSAR, satisfies the conditions assumed in the staff's analysis presented in NUREG-1738, with respect to protection from potential cask drop events.

#### IDC #2

IDC #2 states that procedures and training of personnel will be in place to ensure that onsite and offsite resources can be brought to bear during an event.

#### IDC #3

IDC #3 states that procedures will be in place to establish communication between onsite and offsite organizations during severe weather and seismic events.

#### IDC #4

IDC #4 states that an offsite resource plan will be developed which will include access to portable pumps and emergency power to supplement onsite resources. The plan would principally identify organizations or suppliers where offsite resources could be obtained in a timely manner.

The licensee stated that EP Implementing Procedures (EIPs) and other Mitigating Strategies procedures are in place, that these procedures include provisions for access to onsite and offsite resources, and that appropriate personnel are trained on these procedures. As described by the licensee, a CEMP, as addressed in the Federal Emergency Management Agency's (FEMA) Comprehensive Preparedness Guide CPG-101, "Developing and Maintaining Emergency Operations Plans," will be employed for offsite response. Also, the licensee stated that EIPs provide communication protocols and practices for communication with offsite organizations. In its letter to the NRC, dated August 29, 2014 (Reference 5), ENO stated that VY maintains procedures and strategies for the movement of any necessary portable equipment that will be relied upon for mitigating the loss of SFP water. These mitigative strategies implement the requirements of VY's License Condition 3.N, "Mitigation Strategy License Condition." These diverse strategies provide defense-in-depth and ample time to provide makeup water or spray to the SFP prior to the onset of zirconium cladding ignition when considering very low probability beyond-design-basis events affecting the SFP. Therefore, the NRC staff concludes that ENO has adequate procedures and resource plans to satisfy the conditions assumed in the NRC staff's analysis presented in NUREG-1738 regarding effective use of onsite and offsite resources to respond to events affecting the SFP.

#### IDC #5

IDC #5 states that SFP instrumentation will include readouts and alarms in the control room (or where personnel are stationed) for SFP temperature, water level, and area radiation levels.

The licensee described that two narrow range channels of continuous SFP water level, water temperature, and refueling floor area radiation levels are available in the main control room. In addition, the facility is equipped with control room alarms for high and low SFP level, SFP high temperature via a recorder, and high refueling floor area radiation levels. Therefore, the NRC staff finds that the licensee will maintain adequate SFP monitoring instrumentation to satisfy the conditions assumed in the NRC staff's analysis presented in NUREG-1738 regarding monitoring events affecting the SFP.

#### IDC #6

IDC #6 states that SFP seals that could cause leakage leading to fuel uncover in the event of seal failure shall be self-limiting to leakage or otherwise engineered so that drainage could not occur.

The VY SFP is separated from the refueling cavity area by inner and outer gates. The licensee described that these gates have static seals with no credible catastrophic failure mechanism and the top of the refueling slot opening is located above the top of the fuel storage racks. Therefore, the configuration of the gate openings limits the potential leakage from the storage pool. The NRC staff finds that the described design features that limit the potential for drainage through the gate openings are consistent with the assumptions used in the NRC staff's analysis presented in NUREG-1738.

#### IDC #7

IDC #7 states that procedures or administrative controls to reduce the likelihood of rapid draindown events will include (1) prohibitions on the use of pumps that lack adequate siphon protection or (2) controls for pump suction and discharge points. The functionality of anti-siphon devices will be periodically verified.

The licensee described procedures and design elements that reduce the likelihood of a rapid draindown event. The licensee's procedure allows certain volumes to be letdown or pumped from the SFP. The licensee stated that the procedure satisfies the intent of this IDC by controlling the suction and discharge points. In addition, the licensee stated that there are no operations related to ISFSI operations that could rapidly drain the SFP at VY. The response to SDA #4, as well as Section 3, "Systems," of the VY DSAR, described that piping within the pool could not remove water from the pool by siphon substantially below the normal water level. Other piping that may be used when the gates are open would be isolated by valves if level instrumentation indicated a decreasing pool level. The piping within the SFP does not contain anti-siphon devices because the installed SFP cooling piping cannot siphon the pool to an elevation that would uncover the fuel. The NRC staff finds that the described procedures and design features minimize the potential for rapid drainage through permanent systems and are consistent with the assumptions used in the NRC staff's analysis presented in NUREG-1738.

#### IDC #8

IDC #8 states that an onsite restoration plan will be in place to provide repair of the SFP cooling systems or to provide access for makeup water to the SFP. The plan will provide for remote alignment of the makeup source to the SFP without requiring entry to the refuel floor.

The licensee described procedures in place to restore the SFP cooling systems, provide normal makeup to the SFP, and provide an alternate path for makeup water to the SFPs without requiring entry to the refuel floor. The NRC staff finds that the licensee's planned SFP cooling and makeup water capability conformed to the capabilities assumed for the NRC staff's analysis presented in NUREG-1738.

#### IDC #9

IDC #9 states that procedures will be in place to control SFP operations that have the potential to rapidly decrease SFP inventory. These administrative controls may require additional operations or management review, management physical presence for designated operations or administrative limitations such as restrictions on heavy load movements.

The licensee described that procedures govern SFP operations, such as water transfer from the SFP, and that the ISFSI equipment design is such that there are no ISFSI related SFP activities that could have the potential to rapidly decrease SFP inventory. The licensee stated that the procedures control SFP inventory by limiting the suction and discharge points for water transfer operations. The NRC staff finds that the described procedures conform to the administrative controls considered in the NRC staff's analysis presented in NUREG-1738.

#### IDC #10

IDC #10 states that routine testing of the alternative fuel pool makeup system components will be performed and administrative controls for equipment out of service will be implemented to provide added assurance that the components would be available, if needed.

The licensee described that alternate makeup may be provided by the SW system and fire pumps that can supply makeup water to the SFP via the fire water system or the SW system. The licensee stated that the SW system runs continuously and the VY Technical Requirements Manual contains administrative controls for the fire pumps that address operation with equipment out-of-service and functionality testing. In addition, the licensee stated that VY also has an emergency engine-driven pump that can provide SFP makeup from the cooling tower deep basin and that the systems and components necessary for this capability are routinely tested. The NRC staff finds that the described administrative controls conform to those considered in the NRC staff's analysis presented in NUREG-1738.

#### SDA #1

SDA #1 states that the licensee's SFP cooling design will be at least as capable as that assumed in the risk assessment, including instrumentation. Licensees will have at least one motor-driven and one diesel-driven fire pump capable of delivering inventory to the SFP.



Section 3.3.1.3.3 of the VY DSAR describes the standby fuel pool cooling system. The standby fuel pool cooling system is a Seismic Class I and non-safety related system configured in two parallel trains. The standby fuel pool cooling system heat exchangers are cooled by the Seismic Class I, non-safety-related station SW system, as described in the DSAR and in the response related to SDA #1. In addition to the SW system makeup capabilities, the licensee described that electric motor-driven and diesel engine-driven fire water pumps will be maintained to provide additional makeup water capability. Instrumentation was described above in the discussion of IDC #5. The NRC staff finds that the cooling and makeup capabilities, as described in the licensee's application exceeded the capabilities considered in the NRC staff analysis presented in NUREG-1738.

#### SDA #2

SDA #2 states that walk-downs of SFP systems will be performed at least once per shift by the operators. Procedures will be developed for and employed by the operators to provide guidance on the capability and availability of onsite and offsite inventory makeup sources and time available to initiate these sources for various loss of cooling or inventory events.

The licensee stated that operations personnel perform a walk-down of SFP systems once per day due to dose considerations. The licensee is evaluating whether to increase this walk-down frequency following shutdown. The SFP instrumentation provides substantial capability to monitor SFP conditions from the control room. Abnormal procedures provide the necessary guidance to address loss of SFP cooling and loss of level conditions. The NRC staff finds that the proposed monitoring of the SFP systems would be comparable to the capability assumed for the NRC staff's analysis presented in NUREG-1738.

#### SDA #3

SDA #3 states that control room instrumentation that monitors SFP temperature and water level will directly measure the parameters involved. Level instrumentation will provide alarms at levels associated with calling in offsite resources and with declaring an emergency.

The licensee described that level and temperature instrumentation that is based on direct measurement of the relevant parameters is provided in the main control room. The licensee stated that in-place procedures direct response to abnormally low levels in the SFP, including provisions of necessary makeup, first by normal means, and then by utilizing all available onsite resources. The NRC staff finds that the SFP monitoring capability is consistent with the assumptions in the NRC staff's analysis presented in NUREG-1738.

#### SDA #4

SDA #4 states that the licensee determines that there are no drain paths in the SFP that could lower the pool level (by draining, suction, or pumping) more than 15 feet below the normal pool operating level.

The licensee described potential drain or siphon paths within the SFP. Neither credible path within the SFP could lower pool level more than approximately 10 feet below the normal

operating level. Therefore, the SFP design reasonably protects against drainage consistent with the assumptions used in the NRC staff's analysis presented in NUREG-1738.

#### SDA #5

SDA #5 states that the load drop consequence analysis will be performed for facilities with non-single failure-proof systems. The analyses and any mitigative actions necessary to preclude catastrophic damage to the SFP that would lead to a rapid pool draining would be sufficient to demonstrate that there is high enough confidence in the [facility's] ability to withstand a heavy load drop.

As discussed under IDC #1, above, the licensee committed to use single-failure proof cranes for such loads. Therefore, the NRC staff finds that the protection against heavy load drops is consistent with the assumptions considered in the NRC staff's analysis presented in NUREG-1738.

#### SDA #6

SDA #6 states that each decommissioning plant will successfully complete the seismic checklist provided in Appendix 2B to NUREG-1738. If the checklist cannot be successfully completed, the decommissioning plant will perform a plant-specific seismic risk assessment of the SFP and demonstrate that SFP seismically induced structural failure and rapid loss of inventory is less than the generic bounding estimates provided in NUREG-1738 ( $<1 \times 10^{-5}$  per year including non-seismic events).

The NRC staff included a seismic risk estimate in Attachment 2 to Appendix 2B of NUREG-1738. This seismic assessment concludes that the frequency of a seismically-induced structural failure for the VY SFP will be well below the pool performance guideline specified in NUREG-1738. Therefore, the plant-specific seismic risk assessment results are acceptable for VY.

#### SDA #7

SDA #7 states that licensees will maintain a program to provide surveillance and monitoring of Boraflex in high-density spent fuel racks until such time as spent fuel is no longer stored in these high-density racks.

The VY SFP storage racks contain Boral rather than Boraflex panels for nuclear criticality control. As described in Section 7.2.19 of the VY DSAR, an aging management program is in place to manage loss of material and reduction of neutron absorption capacity of Boral neutron absorption panels in the spent fuel racks. The NRC staff finds that the criticality prevention methods at VY satisfy the assumption regarding the integrity of solid neutron absorbing panels assumed in the NRC staff's analysis presented in NUREG-1738.

#### 3.2.1.1 Summary of NRC Staff Evaluation of IDCs and SDAs

Based on the above evaluations, the NRC staff concludes that the design and operation of structures, systems, and components associated with SFP storage provide for safe storage of

spent fuel and are consistent with the capabilities assumed in the NRC staff's analysis presented in NUREG-1738.

### 3.2.2 Site-Specific Analyses

The licensee performed a site-specific quantitative analysis of a beyond-DBA affecting fuel stored in the VY SFP. In Attachment 2 to the ENO letter dated March 14, 2014 (Reference 3), the licensee provided the analysis used to determine the time for the hottest fuel assembly to heat adiabatically from its normal storage temperature to a temperature of 900 degrees C (1652 degrees F). A temperature of 565 degrees C (1049 degrees F) is associated with a 10-hour creep rupture of the fuel cladding and represents the lowest temperature where incipient cladding failure may occur. Zirconium oxidation may generate significant additional heat if oxygen can freely react with the zirconium cladding, and above 900 degrees C, runaway zirconium oxidation is expected to begin.

#### 3.2.2.1 Heatup Analysis Assuming No Air Cooling

The licensee presented its evaluation of the response of the hottest fuel assemblies under conditions where the heat generated within the assembly would be retained within the assembly. The calculation used an assumed initial temperature, the calculated thermal capacity of the fuel assembly within the heated length of the assembly, and an estimated decay heat rate for the hottest fuel assembly. From this information, the licensee calculated the time to reach 900 degrees C, which corresponds to runaway cladding oxidation and the potential for a large radiological release.

An initial fuel assembly temperature of approximately 50 degrees C (120 degrees F) was assumed based on the SFP high temperature alarm setpoint. The time for the fuel assembly to reach specified temperatures was calculated assuming the fuel assembly was dry at the initial temperature, which is conservative relative to the actual conditions following a rare and challenging event that could lead to a loss of SFP water inventory. For these events, water would be expected to be present for a significant time, considering the large volume of water initially in the pool, and absorb nearly all the decay heat generated during that time.

The thermal capacity of the fuel assembly was calculated based on the dimensions and materials used for the most recent fuel assembly design, which are also the assemblies producing the highest decay heat. Cladding properties were based on those of pure zirconium because the alloy used for the cladding would not significantly affect the density and specific heat.

The calculation of heatup time used the decay heat of the highest heat load assembly. Table 4.2 in the heatup analysis provided the decay heat rate of this assembly based on days since final shutdown at 30-day intervals from 30 days after shut down to 1200 days after shut down. The values were derived from Sargent & Lundy Calculation 2013-13824, "Decay Heat Rate Analysis for a Bounding Discharged Assembly," Revision 0. In response to an NRC staff's RAI, the licensee provided this calculation in Attachment 2 to a letter dated October 21, 2014 (ADAMS Accession No. ML14300A014). The decay heat calculation was based on full power operation until the projected shutdown date of December 31, 2014. In actuality, the reactor began a power coast-down on about September 24, 2014, and permanently shut down on

December 29, 2014, from a power of approximately 75 percent of full power. Therefore, the projected decay heat is conservatively high as a result of the lower actual power history prior to shutdown. The limiting assembly was selected from a group of assemblies with the highest burnup (greater than (>) 50,000 MW-days/metric ton-uranium) used in the last cycle based on a calculation of the assembly decay heat rate using an accepted ORIGEN model. For decay times where short-lived fission products do not significantly contribute to decay heat generation, the NRC staff agrees that burnup is the most important parameter for determining decay heat rate.

The licensee calculated the heatup time by dividing the heat necessary to raise the temperature of the heated length of the fuel, fuel cladding, and guide tube material from approximately 50 degrees C to 900 degrees C by the decay heat rate of the fuel. The licensee determined that, after approximately 15.4 months of decay, the time for the fuel assembly to reach 900 degrees C would exceed 10 hours. Using the same methodology, the licensee determined the time to heat the fuel to the temperature associated with incipient cladding damage (i.e., 565 degrees C) would exceed 6 hours after 15.4 months decay.

The NRC staff reviewed the calculation to verify that important physical properties of materials were within acceptable ranges and the results were accurate. The staff determined that physical properties were appropriate, and the staff completed independent confirmatory calculations that produced similar results. Therefore, the staff found that after 15.4 months decay, more than 10 hours would be available before a significant offsite release could begin. The staff concluded that the adiabatic heatup calculation provided an acceptable method for determining the minimum time available for deployment of mitigation equipment and, if necessary, implementing comprehensive emergency plans.

### 3.2.3 Conclusion Concerning Beyond-Design-Basis Loss of SFP Cooling Water Inventory Accidents

The NRC staff has confirmed the licensee's analysis showing that as of April 15, 2016, there will be over 10 hours, from the initiation of the very unlikely beyond-DBA where the SFP coolant inventory is lost in such a manner that all methods of heat removal from the spent fuel are no longer available, until the spent fuel cladding reaches a temperature where significant offsite radiological release might occur. Furthermore, as discussed in Section 3.1 of this SE, the design and operation of structures, systems, and components associated with SFP storage provide for safe storage of spent fuel and are consistent with the capabilities assumed in the analysis presented in NUREG-1738. This confirms that there is sufficient time available to support deployment of mitigation equipment consistent with plant conditions and, if needed, for offsite agencies to take protective actions using a comprehensive emergency plan to protect the health and safety of the public.

## 4.0 EXEMPTIONS

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50 when: (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) when special circumstances are present. Evaluation of the exemption criteria (1) for each of the following exemptions is

addressed in the NRC exemption, Section III.A, III.B and III.C, of Enclosure 1 to this letter. The evaluation of the special circumstances provision in (2) above is evaluated in Sections 4.1 and 4.2 of this SE.

Special circumstances exist when application of the regulation in the particular circumstance would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule (10 CFR 50.12(a)(2)(ii)). The underlying purpose of Section 50.54(q) is to ensure that licensees follow and maintain in effect emergency plans that provide reasonable assurance that adequate protective measures can and will be taken in the event of an emergency at a nuclear reactor. Sections 50.47(b) and (c) outline the planning standards and size of EPZs, respectively, that are to be considered in emergency plans, and Appendix E to 10 CFR Part 50 identifies the information that must be included in emergency plans.

This section reflects the NRC staff's technical evaluation of the licensee's exemption requests, as provided to the Commission in SECY-14-0125 (Reference 15), which was approved by the Commission in the SRM to SECY-14-0125 dated March 2, 2015 (Reference 6).

#### 4.1 Specific Exemptions for 10 CFR 50.47

ENO's letters dated March 14, 2014 (Reference 3) and August 29, 2014 (Reference 5) requested an exemption from certain sections (as indicated by strikeout and bolded text) of 10 CFR 50.47 for VY.

##### 4.1.1 10 CFR 50.47(b)

The onsite ~~and, except as provided in paragraph (d) of this section, offsite~~ emergency response plans for nuclear power reactors must meet the following standards:

The NRC requires a level of licensee EP commensurate with the potential consequences to public health and safety, and common defense and security at the licensee's site. ENO's exemption request included radiological analyses to show that, as of 17 days after the final reactor shutdown, the radiological consequences of DBAs would not exceed the limits of the EPA PAGs at the EAB. The licensee also concluded and the NRC staff confirmed that, as of 15.4 months after the final reactor shutdown, in the unlikely event that all cooling is lost to the spent fuel and a heatup under adiabatic conditions results, 10 hours would be available before the hottest fuel assembly reached 900 degrees C to take mitigative actions, or if necessary, for offsite authorities to implement protective actions using a CEMP approach. The NRC staff's evaluation of the licensee's analyses can be found in Section 3.0 of this SE.

Considering the very low probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated zirconium cladding fire, formal offsite REP plans, in accordance with 44 CFR 350, are not necessary for a permanently shutdown and defueled nuclear power reactor.

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR 50.47(b), above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.1.2 10 CFR 50.47(b)(1)

Primary responsibilities for emergency response by the nuclear facility licensee and by State and local organizations ~~within the Emergency Planning Zones~~ have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis.

NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," dated November 1978 (Reference 31), provided that emergency response plans should be useful for responding to any accident that would produce offsite radiological doses in excess of the EPA PAGs. Additionally, it introduced the concept of generic plume exposure pathway zones as a basis for the planning of response actions, which would result in dose savings in the environs of nuclear facilities in the event of a serious power reactor accident. As previously discussed in Section 4.1.1, ENO has provided revised radiological analyses that show that, as of 17 days after the final reactor shutdown, the radiological consequences for DBAs at VY will not exceed the limits of the EPA PAGs at the EAB. In addition, reactor core melt (Class 9) scenarios, which were also considered in NUREG-0396, are no longer applicable to a permanently shutdown and defueled power reactor.

In the Statements of Consideration (SOC) for the Final Rule for EP requirements for ISFSIs and for Monitored Retrievable Storage (MRS) facilities (Reference 32), the Commission responded to comments concerning an EPZ for an ISFSI and MRS, and concluded that, "...based on the potential inventory of radioactive material, potential driving forces for distributing that amount of radioactive material, and the probability of the initiation of these events, the Commission concludes that the offsite consequences of potential accidents at an ISFSI or a MRS would not warrant establishing Emergency Planning Zones."

Considering the very low probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated zirconium cladding fire, offsite REP plans are not needed. Therefore, designated plume exposure and ingestion pathway EPZs are no longer needed.

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(1), above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.1.3 10 CFR 50.47(b)(3)

Arrangements for requesting and effectively using assistance resources have been made, ~~arrangements to accommodate State and local staff at the licensee's Emergency Operations Facility have been made~~, and other organizations capable of augmenting the planned response have been identified.

The NRC requires a level of licensee EP commensurate with the potential consequences to public health and safety and common defense and security at the licensee's site. With the termination of reactor power operations at VY and the permanent removal of the fuel from the reactor vessel to the SFP, most of the accident scenarios postulated for operating power reactors are no longer possible. The spent fuel is now stored in the SFP and the ISFSI and will remain onsite until it can be moved offsite for long-term storage or disposal. The reactor, RCS and secondary system are no longer in operation and have no function related to the storage of the spent fuel. Therefore, postulated accidents involving failure or malfunction of the reactor, RCS, or supporting systems are no longer applicable. During reactor decommissioning, the principal public safety concerns involve the radiological risks associated with the storage of spent fuel onsite.

The emergency operations facility (EOF) is a support facility for the purpose of managing the overall licensee emergency response (including coordination with Federal, State, and local officials), coordination of radiological and environmental assessments, and determination of recommended public protective actions. Considering the very low probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated zirconium cladding fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, an EOF would not be needed to coordinate these types of assessments for determining public protective actions. Onsite operations staff will continue to maintain and provide for communication and coordination capabilities with offsite authorities and OROs for the level of support required for remaining DBAs and the prompt implementation of mitigative actions in response to a SFP accident.

Based on the above analysis and the analysis provided in Section 4.1.1 of this SE, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(3), above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.1.4 10 CFR 50.47(b)(4)

A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, ~~and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures.~~

Considering the very low probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed,

for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated zirconium cladding fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirement for minimum initial offsite response measures is not needed.

Based on the above analysis and the analysis provided in Section 4.1.1 of this SE, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(4), above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.1.5 10 CFR 50.47(b)(5)

Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and followup messages to response organizations ~~and the public~~ has been established; ~~and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established.~~

Considering the very low probability of beyond design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated zirconium cladding fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, a means to provide early notification and clear instruction to the populace within a designated plume exposure EPZ is no longer needed.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.1.2 of this SE, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(5) above is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.1.6 10 CFR 50.47(b)(6)

Provisions exist for prompt communications among principal response organizations to emergency personnel ~~and to the public.~~

Considering the very low probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated zirconium cladding fire, formal offsite REP plans in accordance with 44 CFR 350, are not needed. Therefore, the requirement to provide prompt communication to the public within a designated plume exposure EPZ in regards to initial or pre-determined protective actions is no longer needed.



Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.1.2 of this SE, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(6), above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.1.7 10 CFR 50.47(b)(7)

~~Information is made available to the public on a periodic basis on how they will be notified and what their initial actions should be in an emergency (e.g., listening to a local broadcast station and remaining indoors), [T]he principal points of contact with the news media for dissemination of information during an emergency (including the physical location or locations) are established in advance, and procedures for coordinated dissemination of information to the public are established.~~

Considering the very low probability of beyond design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated zirconium cladding fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirement to provide periodic information to the public within a designated plume exposure EPZ on how they will be notified and what their initial or predetermined protective actions should be in an emergency is not needed.

Based on the above analysis and the analysis provided in Section 4.1.1 of this SE, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(7), above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.1.8 10 CFR 50.47(b)(9)

Adequate methods, systems, and equipment for assessing and monitoring actual or potential ~~offsite~~ consequences of a radiological emergency condition are in use.

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirement for assessing or monitoring offsite consequences beyond the EAB is not needed.

Based on the above analysis and the analysis provided in Section 4.1.1 of this SE, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(9), above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.1.9 10 CFR 50.47(b)(10)

~~A range of protective actions has been developed for the plume exposure pathway EPZ for emergency workers and the public. In developing this range of actions, consideration has been given to evacuation, sheltering, and, as a supplement to these, the prophylactic use of potassium iodide (KI), as appropriate. Evacuation time estimates have been developed by applicants and licensees. Licensees shall update the evacuation time estimates on a periodic basis. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place, and protective actions for the ingestion exposure pathway EPZ appropriate to the locale have been developed.~~

In 1995, the Commission provided its view on evacuation planning for an ISFSI (not at an operating reactor site) in its Statement of Considerations for the Final Rule for EP requirements for an ISFSI and a MRS (60 FR 32430) (Reference 32) stating: "The Commission does not agree that as a general matter emergency plans for an ISFSI must include evacuation planning."

The NRC staff finds the licensee's proposal to discontinue formal offsite REP planning activities in accordance with 44 CFR 350, and reduce the scope of onsite emergency planning acceptable, in view of the greatly reduced offsite radiological consequences associated with the permanently shutdown and defueled state of the power reactor. The NRC staff has determined that no credible events within the design basis would result in doses to the public that would exceed the EPA PAGs at the EAB. Therefore, EPZs beyond the EAB and the associated protective actions developed from evacuation time estimates (ETEs) are no longer needed. Additionally, in the unlikely event of an SFP accident, the iodine isotopes, which contribute to an offsite dose from an operating power reactor accident, are not present; therefore, potassium iodide (KI) distribution would no longer serve as an effective or necessary supplemental protective action. As such, the NRC staff concludes that ENO provides for an acceptable level of emergency preparedness at VY in its permanently shutdown and defueled condition, and also provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at VY.

Although formal offsite REP planning, in accordance with 44 CFR 350, has typically been exempted for decommissioning sites, OROs will continue to be relied upon for firefighting, law enforcement, ambulance and medical services in support of the licensee's (onsite) emergency plan. The licensee is responsible for providing protective measures for any emergency workers responding onsite. Additionally, the licensee is responsible for control of activities within the EAB, including public access. The licensee actions that are necessary to protect the health and safety of members of the public who are in the EAB may include, but is not limited to, evacuation, sheltering and decontamination in the unlikely event of a release of radioactive materials.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.1.2 of this SE, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(10), above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.1.10 10 CFR 50.47(c)(2)

~~Generally, the plume exposure pathway EPZ for nuclear power plants shall consist of an area about 10 miles (16 km) in radius and the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius. The exact size and configuration of the EPZs surrounding a particular nuclear power reactor shall be determined in relation to local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries.~~ The size of the EPZs ~~also~~ may be determined on a case-by-case basis for gas-cooled nuclear reactors and for reactors with an authorized power level less than 250 MW thermal. ~~The plans for the ingestion pathway shall focus on such actions as are appropriate to protect the food ingestion pathway.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirement for an EPZ is not needed.

Section 50.47(c)(2) and footnote 1 to Appendix E to Part 50 both state: "The size of the EPZs also may be determined on a case-by-case basis for gas-cooled nuclear reactors and for reactors with an authorized power level less than 250 MW thermal." This is not applicable to VY, and therefore, requires no exemption.

Based on the above analysis and the analysis provided in Section 4.1.9 of this SE, the NRC staff concludes that the exempted language from 10 CFR 50.47(c)(2), above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2 Specific Exemptions for 10 CFR Part 50, Appendix E, Section IV

ENO's letters dated March 14, 2014 (Reference 3), and August 29, 2014 (Reference 5), requested an exemption from certain sections (as indicated by strikeout and bolded text) of Appendix E to 10 CFR Part 50 for VY.

##### 4.2.1 10 CFR Part 50, Appendix E, Section IV.1

The applicant's emergency plans shall contain, but not necessarily be limited to, information needed to demonstrate compliance with the elements set forth below, *i.e.*, organization for coping with radiological emergencies, assessment actions, activation of emergency organization, notification procedures, emergency facilities and equipment, training, maintaining emergency preparedness, recovery, ~~and onsite protective actions during hostile action~~. In addition, the emergency response plans submitted by an applicant for a nuclear power reactor

operating license under this part, or for an early site permit (as applicable) or combined license under 10 CFR part 52, shall contain information needed to demonstrate compliance with the standards described in § 50.47(b), and they will be evaluated against those standards.

After the terrorist attacks of September 11, 2001, the NRC evaluated the EP planning basis to ensure it continued to protect the public health and safety in the current threat environment. In 2002, the NRC staff issued Orders (Reference 33) requiring compensatory measures which include nuclear security and EP. The NRC staff determined that the EP planning basis continued to protect public health and safety; however, the NRC staff recognized that the enhancements were desirable to ensure effective plan implementation during security-related events at nuclear power reactors. Examples of such enhancements include more timely NRC notification, improvement to onsite protective actions and revision of emergency action levels to identify security-related emergencies more succinctly. The NRC issued NRC Bulletin (BL) 2005-02, "Emergency Preparedness and Response Actions for Security-Based Events," dated July 18, 2005 (Reference 34), to obtain information from licensees on progress in implementing security-event-related EP program enhancements. The 2011 EP Final Rule made generically applicable the security-based response elements of BL 2005-02. ENO certified that it had permanently ceased operations at VY and that all fuel had been removed from the reactor vessel. The enhancements of BL 2005-02 were not applicable to holders of operating licenses for nuclear power reactors that had permanently ceased operations and had certified that fuel had been removed from the reactor vessel. Therefore, the enhancements for hostile actions, as required by the 2011 EP Final Rule, are not necessary for VY in its permanently shutdown and defueled status.

Additionally, the NRC excluded non-power reactors from the definition of "hostile action" at the time of the 2011 rulemaking because, as defined in 10 CFR 50.2, a non-power reactor is not considered a nuclear power reactor and a regulatory basis had not been developed to support the inclusion of non-power reactors in the definition of "hostile action." Similarly, a decommissioning power reactor or ISFSI is not a "nuclear reactor" as defined in the NRC's regulations. Like a non-power reactor, a decommissioning power reactor also has a lower likelihood of a credible accident resulting in radiological releases requiring offsite protective measures than does an operating power reactor. For all of the above reasons, the NRC staff concludes that a decommissioning power reactor is not a facility that falls within the definition of "hostile action."

Although this analysis provides a justification for exempting VY from "hostile action" related requirements, some EP requirements for security-based events are maintained. The classification of security-based events, notification of offsite authorities, and coordination with offsite agencies under a CEMP approach are still required.

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.1, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.2 10 CFR Part 50, Appendix E, Section IV.2

~~This nuclear power reactor license applicant shall also provide an analysis of the time required to evacuate various sectors and distances within the plume exposure pathway EPZ for transient and permanent populations using the most recent U.S. Census Bureau data as of the date the applicant submits its application to the NRC.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirements for an EPZ and ETEs are not needed.

Based on the above analysis and the analysis provided in Section 4.1.9 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.2, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.3 10 CFR Part 50, Appendix E, Section IV.3

~~Nuclear power reactor licensees shall use NRC approved evacuation time estimates (ETEs) and updates to the ETEs in the formulation of protective action recommendations and shall provide the ETEs and ETE updates to State and local governmental authorities for use in developing offsite protective action strategies.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Since formal offsite REP plans are not needed, the requirement to have an ETE and to perform an update to the ETE is not needed.

Based on the above analysis and the analysis provided in Sections 4.2.2 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.3, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.4 10 CFR Part 50, Appendix E, Section IV.4

~~Within 365 days of the later of the date of the availability of the most recent decennial census data from the U.S. Census Bureau or December 23, 2011, nuclear power reactor licensees shall develop an ETE analysis using this decennial data and submit it under § 50.4 to the NRC. These licensees shall submit this ETE analysis to the NRC at least 180 days before using it~~

~~to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Since formal offsite REP plans are not needed, the requirement to have an ETE and to perform an update to the ETE is not needed.

Based on the above analysis and the analysis provided in Sections 4.2.2 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.4, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.5 10 CFR Part 50, Appendix E, Section IV.5

~~During the years between decennial censuses, nuclear power reactor licensees shall estimate EPZ permanent resident population changes once a year, but no later than 365 days from the date of the previous estimate, using the most recent U.S. Census Bureau annual resident population estimate and State/local government population data, if available. These licensees shall maintain these estimates so that they are available for NRC inspection during the period between decennial censuses and shall submit these estimates to the NRC with any updated ETE analysis.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Since formal offsite REP plans are not needed, the requirement to have an ETE and to perform an update to the ETE is not needed.

Based on the above analysis and the analysis provided in Sections 4.2.2 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.5, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.6 10 CFR Part 50, Appendix E, Section IV.6

~~If at any time during the decennial period, the EPZ permanent resident population increases such that it causes the longest ETE value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ to increase by 25 percent or 30 minutes, whichever is less, from the nuclear power reactor licensee's currently NRC~~

~~approved or updated ETE, the licensee shall update the ETE analysis to reflect the impact of that population increase. The licensee shall submit the updated ETE analysis to the NRC under § 50.4 no later than 365 days after the licensee's determination that the criteria for updating the ETE have been met and at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Since formal offsite REP plans are not needed, the requirement to have an ETE and to perform an update to the ETE is not needed.

Based on the above analysis and the analysis provided in Section 4.2.2 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.6, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.7 10 CFR Part 50, Appendix E, Section IV.A.1

A description of the normal plant ~~operating~~ organization.

With the certifications of 10 CFR 50.82(a)(1)(ii), the 10 CFR Part 50 license for VY no longer authorizes operation of the VY reactor, or emplacement or retention of fuel into the reactor vessel, as specified in 10 CFR 50.82(a)(2). Because the licensee is no longer authorized to operate the reactor, the licensee does not have a plant "operating" organization. A description of the plant organization, as it relates to the requirements in 10 CFR Part 50, Appendix E, Section IV.A.1, is still required.

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.1, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.8 10 CFR Part 50, Appendix E, Section IV.A.3

~~A description, by position and function to be performed, of the licensee's headquarters personnel who will be sent to the plant site to augment the onsite emergency organization.~~

The number of staff at decommissioning sites is generally small, but is commensurate with the need to safely store spent fuel at the facility in a manner that is protective of public health and safety. Decommissioning power reactor sites typically have a level of emergency response that does not require a response by the licensee's headquarters organization. However, this would not preclude the use of licensee staff normally located offsite to

augment the on-shift organization, if needed. As discussed previously in Section 1.1, ENO furnished information concerning its SFP inventory makeup strategies that could be used in the event of a catastrophic loss of SFP water inventory and stated that designated on-shift personnel are trained to implement such strategies with equipment maintained onsite. ENO has site personnel designated to respond within 2 hours of the Alert classification to assist the on-shift staff. As such, designation of specific licensee headquarters personnel is not necessary to augment the on-shift staff, and, therefore, neither is its description.

Based on the above analysis and the analysis provided in Section 4.1.1 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.3, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.9 10 CFR Part 50, Appendix E, Section IV.A.4

Identification, by position and function to be performed, of persons within the licensee organization who will be responsible for making ~~offsite~~ dose projections, and a description of how these projections will be made and the results transmitted to State and local authorities, NRC, and other appropriate governmental entities.

The licensee's analysis demonstrated that, as of 17 days after the final reactor shutdown, no DBAs result in doses in excess of the EPA PAGs to the public beyond the EAB. While it is unlikely that a beyond-DBA would result in doses in excess of the EPA PAGs to the public beyond the EAB, the licensee still must be able to determine if a radiological release is occurring, thereby achieving the underlying purpose of the rule. If a release is occurring, then the licensee's staff should promptly communicate that information to offsite authorities for their consideration. The offsite authorities are responsible for deciding what, if any, protective actions should be taken based on a CEMP approach, rather than that based on a detailed formal offsite REP plan.

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirement for offsite dose projections is not needed.

Based on above analysis and the analysis provided in Section 4.1.1 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.4, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.10 10 CFR Part 50, Appendix E, Section IV.A.5

~~Identification, by position and function to be performed, of other employees of the licensee with special qualifications for coping with emergency conditions that may arise. Other persons with special~~



~~qualifications, such as consultants, who are not employees of the licensee and who may be called upon for assistance for emergencies shall also be identified. The special qualifications of these persons shall be described.~~

The number of licensee's staff at decommissioning sites is generally smaller than that for an operating power reactor, but is still commensurate with the need to operate the facility in a manner that is protective of public health and safety. The NRC staff considered the similarity between the staffing levels at a permanently shutdown and defueled reactor and staffing levels at an operating power reactor site, since the spectrum of accidents at a decommissioning facility is greatly reduced requiring less specialized qualifications. The minimal systems and equipment needed to maintain the spent nuclear fuel in the SFP or in a dry cask system in a safe condition requires minimal personnel and is governed by technical specifications.

As discussed previously in Section 1.1, ENO furnished information concerning its VY SFP inventory makeup strategies that could be used in the event of a catastrophic loss of SFP water inventory and stated that designated on-shift personnel are trained to implement such strategies with equipment maintained onsite. ENO has site personnel designated to respond within 2 hours of the Alert classification to assist the on-shift staff. As such, additional employees or other persons with special qualifications are not anticipated.

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirement for personnel with special qualifications in 10 CFR Part 50, Appendix E, Section IV.A.5, is not needed.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.2.8 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.5, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.11 10 CFR Part 50, Appendix E, Section IV.A.7

~~By June 23, 2014, identification of, and a description of the assistance expected from, appropriate State, local, and Federal agencies with responsibilities for coping with emergencies, including hostile action at the site. For purposes of this appendix, "hostile action" is defined as~~ an act directed toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force.

In the EP Final Rule, the Commission defined "hostile action" as, in part, "an act directed toward a nuclear power plant or its personnel." The EP Final Rule made generically applicable, the

security-based response elements of BL 2005-02 (Reference 34). The enhancements BL 2005-02 were applicable to all holders of operating licenses for nuclear power reactors, except those who have permanently ceased operation and have certified that fuel has been removed from the reactor vessel.

Although the "hostile action" enhancements in the EP Final Rule are not applicable to a decommissioning reactor, the licensee's physical security plan must continue to provide high assurance against a potential security event impacting a designated target set. Therefore, some EP requirements for security-based events are maintained, such as the classification of security-based events, notification of offsite authorities, and coordination for the response of OROs (i.e., law enforcement, firefighting, medical assistance) onsite.

With the certifications of 10 CFR 50.82(a)(1)(ii), 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). Therefore, the enhancements for hostile actions required by the 2011 EP Final Rule are not applicable for VY in its permanently shutdown and defueled status.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.2.1 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.7, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.12 10 CFR Part 50, Appendix E, Section IV.A.8

**~~Identification of the State and/or local officials responsible for planning for, ordering, and controlling appropriate protective actions, including evacuations when necessary.~~**

Considering the very low probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated zirconium cladding fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, identification of the State and/or local officials responsible for detailed pre-planning for, ordering, and controlling appropriate protective actions, including evacuations when necessary, is no longer needed.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.1.2 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.8, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.13 10 CFR Part 50, Appendix E, Section IV.A.9

**~~By December 24, 2012, for nuclear power reactor licensees, a detailed analysis demonstrating that on-shift personnel assigned emergency plan implementation functions are not assigned responsibilities that would prevent the timely performance of their assigned functions as specified in the emergency plan.~~**

The number of staff required at decommissioning sites is generally small but is commensurate with the need to safely store spent fuel at the facility, in a manner that is protective of public health and safety. The duties of the on-shift personnel at a decommissioning reactor facility are not as complicated and diverse as those for an operating power reactor. The systems and equipment needed to maintain the spent fuel in a SFP or in a dry cask storage system in a safe condition require minimal personnel and are governed under Technical Specifications. In the 2011 EP Final Rule (Reference 35), the NRC required nuclear power plant licensees to provide a detailed analysis to show that on-shift personnel assigned emergency plan implementation functions were not assigned any responsibilities that would prevent them from performing their assigned emergency plan functions. As part of the 2011 EP Final Rule, the NRC concluded that the staffing analysis requirement was not necessary for non-power reactor licensees due to the small staffing levels required to operate the facility. Therefore, based on similarities of non-power reactors and decommissioning reactors with regard to staffing, and as discussed in Section 4.2.1, a detailed staffing analysis is not needed for a decommissioning reactor.

As part of the ENO exemption request, it provided information stating that the assigned operators on shift were trained in the use of the procedures and adequate in number to carry out the actions required for restoring SFP cooling/level in accordance with their procedures. ENO estimates the SFP mitigation strategies can be implemented within 2 hours, using the on-shift staffing complement (Shift Manager/Emergency Director, Noncertified Operator and Radiation Protection Technician), without impacting the ability to meet all of the major functional areas of Table B-1 in NUREG-0654/FEMA-REP-1. The licensee has committed to maintaining the important mitigation strategies for the loss of large areas of the plant due to explosion or fire previously required under 10 CFR 50.54(hh)(2). These strategies will continue to be required as a license condition.

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.9, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

#### 4.2.14 10 CFR Part 50, Appendix E, Section IV.B.1

The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described, including emergency action levels that are to be used as criteria for determining the need for notification and participation of local and State agencies, the Commission, and other Federal agencies, and the emergency action levels that are to be used for determining when and what type of protective measures should be considered within ~~and outside~~ the site boundary to protect health and

safety. The emergency action levels shall be based on in-plant conditions and instrumentation in addition to onsite ~~and offsite~~ monitoring. ~~By June 20, 2012, for nuclear power reactor licensees, these action levels must include hostile action that may adversely affect the nuclear power plant.~~ The initial emergency action levels shall be discussed and agreed on by the applicant or licensee and State and local governmental authorities, and approved by the NRC. Thereafter, emergency action levels shall be reviewed with the State and local governmental authorities on an annual basis.

NEI 99-01, Revision 6 (Reference 24) is an acceptable method for development of an EAL scheme for a non-passive operating nuclear power reactor, a permanently defueled power reactor, and an ISFSI. NEI 99-01, Revision 6, was endorsed by the NRC in a letter dated March 28, 2013 (Reference 25). No offsite protective actions are anticipated to be necessary, so classification above the Alert level is no longer required, which is consistent with exemptions for previous decommissioning power reactors. The licensee will still be required to maintain EALs for the classification of security-based events to the Alert level, which was requested by ENO in a letter dated February 5, 2015 (Reference 36). In the EP Final Rule, the Commission defined "hostile action" as, in part, "an act directed toward a nuclear power plant or its personnel." The EP Final Rule made generically applicable the security-based response elements of BL 2005-02, (Reference 34). BL 2005-02 provided numerous enhancements to licensee emergency plans including security-based EALs. The NRC staff is maintaining the requirement for security-based EALs similar to power reactors as they were required by the NRC Order, "Order Modifying Licenses for Interim Safeguards and Security Compensatory Measures," dated May 23, 2002 (Reference 33). Exemption from hostile action enhancements for decommissioning reactors was previously discussed in Section 4.2.1 of this SE.

Considering the very low probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated zirconium cladding fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, a decommissioning reactor is not required to have EALs to determine protective measures offsite.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.2.1 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.B.1, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.15 10 CFR Part 50, Appendix E, Section IV.C.1

The entire spectrum of emergency conditions that involve the alerting or activating of progressively larger segments of the total emergency organization shall be described. The communication steps to be taken to alert or activate emergency personnel under each class of emergency shall be described. Emergency action levels (based not only on onsite ~~and offsite~~ radiation monitoring information but also on readings from a number of sensors that

indicate a potential emergency, ~~such as the pressure in containment and the response of the Emergency Core Cooling System~~) for notification of offsite agencies shall be described. The existence, but not the details, of a message authentication scheme shall be noted for such agencies. The emergency classes defined shall include: (1) Notification of unusual events, (2) alert, ~~(3) site area emergency, and (4) general emergency~~. These classes are further discussed in NUREG-0654/FEMA-REP-1.

Containment and emergency core cooling system parameters no longer provide an indication of a potential emergency for a permanently shutdown and defueled power reactor, and emergency core cooling systems are no longer required. Other indications, such as SFP level, SFP temperature, and area radiation monitors indicate the conditions at VY.

In the SOC for the Final Rule for EP requirements for ISFSIs and for MRS facilities (60 FR 32430) (Reference 32), the Commission responded to comments concerning a general emergency at an ISFSI and MRS, and concluded, "An essential element of a General Emergency is that '[a] release can be reasonably expected to exceed EPA Protective Action Guidelines exposure levels off site for more than the immediate site area.' As previously discussed, NRC studies have concluded that the maximum offsite dose would be less than 1 rem which is within the EPA Protective Action Guides." It further provides a response to comments concerning an EPZ for an ISFSI and MRS: "[B]ased on the potential inventory of radioactive material, potential driving forces for distributing that amount of radioactive material, and the probability of the initiation of these events, the Commission concludes that the offsite consequences of potential accidents at an ISFSI or a MRS would not warrant establishing Emergency Planning Zones."

As discussed in Section 3.1 of this SE, the licensee's analysis demonstrates that no DBA would reach the dose criteria for the declaration of a SAE or a GE. As discussed in Section 3.2 of this SE, the probability of a beyond-DBA condition that could reach emergency classifications of an SAE or a GE is very low. In the unlikely event of a severe beyond-DBA resulting in the loss of all cooling to the stored fuel, as of 15.4 months after the final reactor shutdown, it would take 10 hours from the time the fuel is uncovered until it reaches a temperature of 900 degrees C. During this time, the licensee could initiate mitigative actions consistent with plant conditions, and if necessary, notify offsite authorities to consider appropriate protective measures using a CEMP approach.

Considering the very low probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach, between the loss of both water and air cooling to the spent fuel and before the onset of a postulated zirconium cladding fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, a decommissioning reactor is not required to use offsite radiation monitoring information and emergency classification levels of an SAE or a GE.

Based on the above analysis and the analysis provided in Section 4.1.1 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.C.1, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.16 10 CFR Part 50, Appendix E, Section IV.C.2

~~By June 20, 2012, nuclear power reactor~~[L]icensees shall establish and maintain the capability to assess, classify, and declare an emergency condition ~~within 15 minutes~~ after the availability of indications to plant operators that an emergency action level has been exceeded and shall promptly declare the emergency condition as soon as possible following identification of the appropriate emergency classification level. Licensees shall not construe these criteria as a grace period to attempt to restore plant conditions to avoid declaring an emergency action due to an emergency action level that has been exceeded. Licensees shall not construe these criteria as preventing implementation of response actions deemed by the licensee to be necessary to protect public health and safety provided that any delay in declaration does not deny the State and local authorities the opportunity to implement measures necessary to protect the public health and safety.

In the 2011 EP Final Rule (Reference 35), nuclear power reactor licensees were required to assess, classify and declare an emergency condition within 15 minutes. Non-power reactors do not have the same potential impact on public health and safety as do power reactors, and as such, non-power reactor licensees do not require complex offsite emergency response activities and are not required to assess, classify and declare an emergency condition within 15 minutes. Similarly, a decommissioning power reactor has a lower likelihood of a credible accident resulting in radiological releases requiring offsite protective measures than does an operating power reactor. Unlike operating reactor accident sequences potentially leading to large early releases, accident scenarios at decommissioning plants' SFPs evolve slowly and provide a longer time period to initiate SFP mitigative actions or protective actions, including implementation of appropriate protective measures for the public, if necessary. Because a decommissioning power reactor, like a non-power reactor, does not have the same potential radiological impact on public health and safety as a power reactor, the NRC staff concludes that a decommissioning power reactor should not be required to assess, classify and declare an emergency condition within 15 minutes.

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.C.2, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.17 10 CFR Part 50, Appendix E, Section IV.D.1

Administrative and physical means for notifying local, State, and Federal officials and agencies ~~and agreements reached with these officials and agencies for the prompt notification of the public and for public evacuation or other protective measures, should they become necessary,~~ shall be described. This description shall include identification ~~of the appropriate officials, by title and agency,~~ of the State and local government agencies ~~within the EPZs.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirement for prompt notification of the public and an EPZ are not needed.

Based on the above analysis and the analyses provided in Sections 4.1.1, 4.1.2 and 4.1.6 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.D.1, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.18 10 CFR Part 50, Appendix E, Section IV.D.2

~~Provisions shall be described for yearly dissemination to the public within the plume exposure pathway EPZ of basic emergency planning information, such as the methods and times required for public notification and the protective actions planned if an accident occurs, general information as to the nature and effects of radiation, and a listing of local broadcast stations that will be used for dissemination of information during an emergency. Signs or other measures shall also be used to disseminate to any transient population within the plume exposure pathway EPZ appropriate information that would be helpful if an accident occurs.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirement for dissemination of emergency planning information to the public and an EPZ are not required.

Based on the above analysis and the analyses provided in Sections 4.1.1, 4.1.2, and 4.1.5 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.D.2, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.19 10 CFR Part 50, Appendix E, Section IV.D.3

A licensee shall have the capability to notify responsible State and local governmental agencies ~~within 15 minutes~~ after declaring an emergency. ~~The licensee shall demonstrate that the appropriate governmental authorities have the capability to make a public alerting and notification decision promptly on being informed by the licensee of an emergency condition. Prior to initial operation greater than 5 percent of rated thermal power of~~

~~the first reactor at the site, each nuclear power reactor licensee shall demonstrate that administrative and physical means have been established for alerting and providing prompt instructions to the public with the plume exposure pathway EPZ. The design objective of the prompt public alert and notification system shall be to have the capability to essentially complete the initial alerting and initiate notification of the public within the plume exposure pathway EPZ within about 15 minutes. The use of this alerting and notification capability will range from immediate alerting and notification of the public (within 15 minutes of the time that State and local officials are notified that a situation exists requiring urgent action) to the more likely events where there is substantial time available for the appropriate governmental authorities to make a judgment whether or not to activate the public alert and notification system. The alerting and notification capability shall additionally include administrative and physical means for a backup method of public alerting and notification capable of being used in the event the primary method of alerting and notification is unavailable during an emergency to alert or notify all or portions of the plume exposure pathway EPZ population. The backup method shall have the capability to alert and notify the public within the plume exposure pathway EPZ, but does not need to meet the 15 minute design objective for the primary prompt public alert and notification system. When there is a decision to activate the alert and notification system, the appropriate governmental authorities will determine whether to activate the entire alert and notification system simultaneously or in a graduated or staged manner. The responsibility for activating such a public alert and notification system shall remain with the appropriate governmental authorities.~~

In the permanently shutdown and defueled condition of the reactor, the rapidly developing scenarios associated with events initiated during reactor power operation are no longer credible. The slow progression of SFP events allows greater time for the licensee to successfully mitigate the accidents and, if necessary, for offsite authorities to implement appropriate protective measures using a CEMP approach to protect the health and safety of the public.

VY proposes in its exemption requests to complete emergency notifications within 60 minutes after an emergency declaration or a change in classification. Although VY is a general licensed ISFSI and the Emergency Plan is based on 10 CFR Part 50, the NRC staff considers the requirements in 10 CFR 72.32(a) to ensure consistency between general and specific licensed ISFSIs. The 60 minute notification timeliness is consistent with the notification time requirements for emergency plans based on the requirements in 10 CFR 72.32. Information will be disseminated to the public and media in accordance with State and local plans.

In the SOC for the Final Rule for EP requirements for ISFSIs and for MRS facilities (60 FR 32430) (Reference 32), the Commission responded to comments concerning a notification time of 15 minutes, and concluded that, "[t]he Commission has established a reasonable time limit for notification which has proven to be adequate in the past. 'The licensee shall also commit to notify the NRC Operations Center immediately after notifications of the



appropriate offsite response organizations and not later than one hour after the licensee declares an emergency.”

Considering the very low probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach, between the loss of both water and air cooling to the spent fuel and before the onset of a postulated zirconium cladding fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, decommissioning reactors are not required to notify State and governmental agencies within 15 minutes. Additionally, the requirement for prompt notification of the public and an EPZ is not needed.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.1.2 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.D.3, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.20 10 CFR Part 50, Appendix E, Section IV.D.4

**~~If FEMA has approved a nuclear power reactor site's alert and notification design report, including the backup alert and notification capability, as of December 23, 2011, then the backup alert and notification capability requirements in Section IV.D.3 must be implemented by December 24, 2012. If the alert and notification design report does not include a backup alert and notification capability or needs revision to ensure adequate backup alert and notification capability, then a revision of the alert and notification design report must be submitted to FEMA for review by June 24, 2013, and the FEMA approved backup alert and notification means must be implemented within 365 days after FEMA approval. However, the total time period to implement a FEMA approved backup alert and notification means must not exceed June 22, 2015.~~**

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach, between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirements for prompt notification of the public and an EPZ, including backup alert and notification capabilities, are not needed.

Based on the above analysis and the analysis provided in Section 4.2.19 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.D.4, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.21 10 CFR Part 50, Appendix E, Section IV.E 8.a.(i)

A licensee ~~onsite technical support center and an emergency operations~~ facility from which effective direction can be given and effective control can be exercised during an emergency;

NUREG-0696, "Functional Criteria for Emergency Response Facilities," dated February 1981 (Reference 37), provides that the technical support center (TSC) is an onsite facility located close to the control room that shall provide plant management and technical support to the reactor operating personnel located in the control room during emergency conditions. As there are no DBA's that would exceed the EPA PAGs at the EAB, the low probability of beyond-DBAs to exceed the EPA PAGs at the EAB, and the available time to take mitigation actions consistent with plant conditions, and, if necessary, for offsite authorities to implement appropriate protective measures using a CEMP approach, an EOF would not be required to support an offsite agency response. Coordination with offsite authorities and response organizations can be coordinated from the control room or another onsite location.

In addition, onsite actions may be directed from the control room or other onsite location, without the requirements imposed on a TSC. Due to the reduced size of on-shift and Emergency Response Organization (ERO) staffing for a permanently shutdown and defueled power reactor, separate facilities to accommodate emergency response staffing are no longer required. As such, greater efficiency and coordination is gained by locating staff in a central onsite facility.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.1.3 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.8.a.(i), above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.22 10 CFR Part 50, Appendix E, Section IV.E.8.a.(ii)

~~For nuclear power reactor licensees, a licensee onsite operational support center;~~

The Operational Support Center (OSC) is an onsite area separate from the control room and the TSC where licensee operations support personnel will assemble in an emergency. The OSC should provide a location where plant logistic support can be coordinated during an emergency and restrict control room access to those support personnel specifically requested by the shift supervisor.

With the permanently shutdown and defueled status of the VY reactor and the storage of the spent nuclear fuel in the SFP and the ISFSI, an OSC is no longer needed to meet its original purpose during an emergency, nor to support initial SFP mitigation actions if needed. The VY Permanently Defueled Emergency Plan (PDEP) provides that the Control Room is where plant systems and equipment parameters are monitored. The Control Room is the onsite center for emergency command and control. Control Room personnel assess plant conditions, evaluate the magnitude and potential consequences of abnormal conditions, initiate preventative, mitigating and corrective actions, and perform notifications. When activated, the ERO reports to

the Emergency Director to assist the on-shift staff in the assessment, mitigation and response to an emergency and to support the dispatch of emergency teams. A general assembly area for emergency mitigation and radiation protection personnel is also maintained.

Based on the above analysis and the analysis provided in Section 4.2.21 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.8.a.(ii), above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.23 10 CFR Part 50, Appendix E, Section IV.E.8.b

~~For a nuclear power reactor licensee's emergency operations facility required by paragraph 8.a of this section, either a facility located between 10 miles and 25 miles of the nuclear power reactor site(s), or a primary facility located less than 10 miles from the nuclear power reactor site(s) and a backup facility located between 10 miles and 25 miles of the nuclear power reactor site(s). An emergency operations facility may serve more than one nuclear power reactor site. A licensee desiring to locate an emergency operations facility more than 25 miles from a nuclear power reactor site shall request prior Commission approval by submitting an application for an amendment to its license. For an emergency operations facility located more than 25 miles from a nuclear power reactor site, provisions must be made for locating NRC and offsite responders closer to the nuclear power reactor site so that NRC and offsite responders can interact face-to-face with emergency response personnel entering and leaving the nuclear power reactor site. Provisions for locating NRC and offsite responders closer to a nuclear power reactor site that is more than 25 miles from the emergency operations facility must include the following:~~

~~(1) Space for members of an NRC site team and Federal, State, and local responders;~~

~~(2) Additional space for conducting briefings with emergency response personnel;~~

~~(3) Communication with other licensee and offsite emergency response facilities;~~

~~(4) Access to plant data and radiological information; and~~

~~(5) Access to copying equipment and office supplies;~~

Based on the analyses provided in Sections 4.1.1 and 4.1.3 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.8.b, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.24 10 CFR Part 50, Appendix E, Section IV.E.8.c

~~By June 20, 2012, for a nuclear power reactor licensee's emergency operations facility required by paragraph 8.a of this section, a facility having the following capabilities:~~

~~(1) The capability for obtaining and displaying plant data and radiological information for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves;~~

~~(2) The capability to analyze plant technical information and provide technical briefings on event conditions and prognosis to licensee and offsite response organizations for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves; and~~

~~(3) The capability to support response to events occurring simultaneously at more than one nuclear power reactor site if the emergency operations facility serves more than one site; and~~

Based on the analyses provided in Sections 4.1.1 and 4.1.3 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.8.c, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.25 10 CFR Part 50, Appendix E, Section IV.E.8.d

~~For nuclear power reactor licensees, an alternative facility (or facilities) that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff and collectively having the following characteristics: the capability for communication with the emergency operations facility, control room, and plant security; the capability to perform offsite notifications; and the capability for engineering assessment activities, including damage control team planning and preparation, for use when onsite emergency facilities cannot be safely accessed during hostile action. The requirements in this paragraph 8.d must be implemented no later than December 23, 2014, with the exception of the capability for staging emergency response organization personnel at the alternative facility (or facilities) and the capability for communications with the emergency operations facility, control room, and plant security, which must be implemented no later than June 20, 2012.~~

Based on the analyses provided in Sections 4.1.1, 4.2.1 and 4.2.11 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.8.d, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.26 10 CFR Part 50, Appendix E, Section IV.E.8.e

**~~A licensee shall not be subject to the requirements of paragraph 8.b of this section for an existing emergency operations facility approved as of December 23, 2011;~~**

Based on the analyses provided in Sections 4.1.3 and 4.2.21 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.8.e, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.27 10 CFR Part 50, Appendix E, Section IV.E.9.a

**~~Provision for communications with contiguous State/local governments within the plume exposure pathway EPZ. Such communications shall be tested monthly.~~**

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach, between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, provisions for communications with contiguous State/local governments within the plume exposure pathway EPZ are not needed.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.1.2 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.9.a, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.28 10 CFR Part 50, Appendix E, Section IV.E.9.c

**~~Provision for communications among the nuclear power reactor control room, the onsite technical support center, and the emergency operations facility, and among the nuclear facility, the principal State and local emergency operations centers, and the field assessment teams. Such communications systems shall be tested annually.~~**

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach, between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, as discussed in Sections 4.2.21 and 4.2.22 of this SE, there is no need for a TSC, an EOF, or offsite field assessment teams to meet the underlying purpose of the rule. With the elimination of the requirements for a TSC, EOF and the field assessment teams, the requirements to perform annual testing is no longer needed. Communications with State/local

governments will continue to be tested monthly under 10 CFR Part 50, Appendix E, Section IV.E.9.a.

Based on the above analysis and the analyses provided in Sections 4.1.1, 4.1.3, 4.2.21 and 4.2.22 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.9.c, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.29 10 CFR Part 50, Appendix E, Section IV.E.9.d

Provisions for communications by the licensee with NRC Headquarters and the appropriate NRC Regional Office Operations Center from the **nuclear power reactor control room, the onsite technical support center, and the emergency operations** facility. Such communications shall be tested monthly.

Based on the smaller facility staff and the greatly reduced required interaction with State and local emergency response facilities, the NRC staff concludes that the functions of the control room, EOF, TSC, and the OSC may be combined into one or more locations.

As discussed in Section 4.2.21 and 4.2.22 of this SE, there is no need for the TSC and EOF. As a result, communications between the EOF and TSC, and the NRC, and monthly testing of these capabilities are no longer needed. Communications with NRC headquarters and the appropriate NRC Regional Office Operations Center will be conducted from one or more locations and will continue to be tested monthly.

Based on the above analysis and the analyses provided in Sections 4.1.1, 4.1.3, 4.2.21, and 4.2.22 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.9.d, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.30 10 CFR Part 50, Appendix E, Section IV.F.1

The program to provide for: (a) The training of employees and exercising, by periodic drills, of emergency plans to ensure that employees of the licensee are familiar with their specific emergency response duties, and (b) The participation in the training and drills by other persons whose assistance may be needed in the event of a radiation emergency shall be described. This shall include a description of specialized initial training and periodic retraining programs to be provided to each of the following categories of emergency personnel:

- i. Directors and/or coordinators of the plant emergency organization;
- ii. Personnel responsible for accident assessment, including control room shift personnel;
- iii. Radiological monitoring teams;

- iv. Fire control teams (fire brigades);
- v. Repair and damage control teams;
- vi. First aid and rescue teams;
- vii. Medical support personnel;
- viii. ~~Licensee's headquarters support personnel;~~**
- ix. Security personnel.

In addition, a radiological orientation training program shall be made available to local services personnel; e.g., local emergency services/~~Civil Defense~~, local law enforcement personnel, ~~local news media persons~~.

The number of staff required at decommissioning sites is generally small, but is commensurate with the need to safely store spent fuel at the facility, in a manner that ensures public health and safety. Decommissioning sites typically have a level of emergency response that does not require additional response by licensee headquarters personnel, therefore training of these personnel is not needed. Training for licensee personnel responding from company locations offsite will still be required to be trained based on ERO positions specified above.

"Civil Defense" is an outdated term and no longer used. The category of offsite responders, which could be expected to respond onsite, is captured under "local emergency services" and "local law enforcement." Local news media are not included in the category of local services personnel requiring periodic radiological orientation training. ENO's Corporate Public Affairs Office is the principal point of contact for the dissemination of information during an event at VY. Information is disseminated to the public and briefings will be held with pertinent media organizations in accordance with Entergy corporate communication protocols.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.2.8 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.1, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.31 10 CFR Part 50, Appendix E, Section IV.F.2

The plan shall describe provisions for the conduct of emergency preparedness exercises as follows: Exercises shall test the adequacy of timing and content of implementing procedures and methods, test emergency equipment and communications networks, ~~test the public alert and notification system~~, and ensure that emergency organization personnel are familiar with their duties.

Based on the analyses provided in Sections 4.1.1 and 4.2.19 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2,

above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.32 10 CFR Part 50, Appendix E, Section IV.F.2.a

~~A full participation exercise which tests as much of the licensee, State, and local emergency plans as is reasonably achievable without mandatory public participation shall be conducted for each site at which a power reactor is located. Nuclear power reactor licensees shall submit exercise scenarios under § 50.4 at least 60 days before use in a full participation exercise required by this paragraph 2.a.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach, between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirement to conduct a full participation exercise with State and local agencies is not needed.

Based on above analysis and the analysis provided in Section 4.1.1 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.a, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.33 10 CFR Part 50, Appendix E, Section IV.F.2.b

Each licensee at each site shall conduct a subsequent exercise of its onsite emergency plan every 2 years. ~~Nuclear power reactor licensees shall submit exercise scenarios under § 50.4 at least 60 days before use in an exercise required by this paragraph 2.b. The exercise may be included in the full participation biennial exercise required by paragraph 2.c. of this section.~~ In addition, the licensee shall take actions necessary to ensure that adequate emergency response capabilities are maintained during the interval between biennial exercises by conducting drills, including at least one drill involving a combination of some of the principal functional areas of the licensee's onsite emergency response capabilities. The principal functional areas of emergency response include activities such as management and coordination of emergency response, accident assessment, event classification, notification of offsite authorities, assessment of the onsite ~~and offsite~~ impact of radiological releases, ~~protective action recommendation development, protective action decision making, plant~~ system repair and mitigative action implementation. During these drills, activation of all of the licensee's emergency response facilities (~~Technical Support Center (TSC), Operations Support Center (OSC), and the Emergency Operations Facility (EOF)~~) would not be necessary, licensees would have the opportunity to consider accident management strategies, supervised instruction would be permitted, operating staff in all participating facilities would have the opportunity to resolve problems (success paths) rather



than have controllers intervene, and the drills may focus on the onsite exercise training objectives.

The intent of submitting exercise scenarios at an operating power reactor site, in advance, is to check that licensees utilize different scenarios in order to prevent the preconditioning of responders at power reactors. For decommissioning power reactor sites, there are limited events that could occur, and as such, the submittal of exercise scenarios for the purpose of ensuring that responders do not get preconditioned to certain scenarios is not necessary to achieve the underlying purpose of the rule.

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, drills involving principal functional areas associated with formal offsite REP are not needed.

Based on the above analysis and the analyses provided in Sections 4.1.1, 4.2.21, 4.2.22, and 4.2.32 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.b, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.34 10 CFR Part 50, Appendix E, Section IV.F.2.c

~~Offsite plans for each site shall be exercised biennially with full participation by each offsite authority having a role under the radiological response plan. Where the offsite authority has a role under a radiological response plan for more than one site, it shall fully participate in one exercise every two years and shall, at least, partially participate in other offsite plan exercises in this period. If two different licensees each have licensed facilities located either on the same site or on adjacent, contiguous sites, and share most of the elements defining co-located licensees, then each licensee shall:~~

- ~~(1) Conduct an exercise biennially of its onsite emergency plan;~~
- ~~(2) Participate quadrennially in an offsite biennial full or partial participation exercise;~~
- ~~(3) Conduct emergency preparedness activities and interactions in the years between its participation in the offsite full or partial participation exercise with offsite authorities, to test and maintain interface among the affected State and local authorities and the licensee. Co-located licensees shall also participate in emergency preparedness activities and interaction with offsite authorities for the period between exercises;~~

~~(4) Conduct a hostile action exercise of its onsite emergency plan in each exercise cycle; and~~

~~(5) Participate in an offsite biennial full or partial participation hostile action exercise in alternating exercise cycles.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirement to conduct a full participation exercise with State and local agencies is not needed.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.2.32 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.c, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.35 10 CFR Part 50, Appendix E, Section IV.F.2.d

~~Each State with responsibility for nuclear power reactor emergency preparedness should fully participate in the ingestion pathway portion of exercises at least once every exercise cycle. In States with more than one nuclear power reactor plume exposure pathway EPZ, the State should rotate this participation from site to site. Each State with responsibility for nuclear power reactor emergency preparedness should fully participate in a hostile action exercise at least once every cycle and should fully participate in one hostile action exercise by December 31, 2015. States with more than one nuclear power reactor plume exposure pathway EPZ should rotate this participation from site to site.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. In addition, the requirement to exercise the offsite portion of the REP plan is also not needed. Therefore, the requirement to ensure the State fully participate in the ingestion pathway portion of the exercise is not required.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.2.32 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.d, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.36 10 CFR Part 50, Appendix E, Section IV.F.2.e

Licensees shall enable any State or local Government ~~located within the plume exposure pathway EPZ~~ to participate in the licensee's drills when requested by such State or local Government.

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 and their associated EPZs are not needed. Therefore, identifying State and local Governments in relation to a plume exposure pathway EPZ that is no longer required, is not needed.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.1.2 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.e, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.37 10 CFR Part 50, Appendix E, Section IV.F.2.f

Remedial exercises will be required if the emergency plan is not satisfactorily tested during the biennial exercise, such that NRC, ~~in consultation with FEMA,~~ cannot (1) find reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency or (2) determine that the Emergency Response Organization (ERO) has maintained key skills specific to emergency response. ~~The extent of State and local participation in remedial exercises must be sufficient to show that appropriate corrective measures have been taken regarding the elements of the plan not properly tested in the previous exercises.~~

Considering the very low-probability of beyond-design-basis events affecting the VY SFP, and with the time available to initiate mitigative actions consistent with plant conditions or, if needed, for offsite authorities to implement appropriate protective measures using a CEMP approach between the loss of both water and air cooling to the spent fuel and before the onset of a postulated fire, formal offsite REP plans in accordance with 44 CFR 350 are not needed. Therefore, the requirement to conduct a full participation exercise with State and local agencies is not needed. Since the NRC staff previously concluded that full participation emergency plan exercises are not required and FEMA does not have responsibilities related to onsite emergency preparedness, NRC consultation with FEMA is not necessary.

Based on the above analysis and the analyses provided in Sections 4.1.1 and 4.2.32 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.f, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.38 10 CFR Part 50, Appendix E, Section IV.F.2.i

Licensees shall use drill and exercise scenarios that provide reasonable assurance that anticipatory responses will not result from preconditioning of participants. ~~Such scenarios for nuclear power reactor licensees must include a wide spectrum of radiological releases and events, including hostile action.~~ Exercise and drill scenarios as appropriate must emphasize coordination among onsite and offsite response organizations.

The NRC staff previously evaluated the issue of preconditioning drill scenarios in Section 4.2.32 of this SE. The NRC staff previously evaluated the issue of including hostile action scenarios at decommissioning plants in Section 4.2.1 of this SE. In each instance, the NRC staff concluded that the exempted words were not needed to achieve the underlying purpose of the rule.

Based on the above analysis and the analyses provided in Sections 4.1.1, 4.2.1 and 4.2.32 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.i, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

4.2.39 10 CFR Part 50, Appendix E, Section IV.F.2.j

~~The exercises conducted under paragraph 2 of this section by nuclear power reactor licensees must provide the opportunity for the ERO to demonstrate proficiency in the key skills necessary to implement the principal functional areas of emergency response identified in paragraph 2.b of this section. Each exercise must provide the opportunity for the ERO to demonstrate key skills specific to emergency response duties in the control room, TSC, OSC, EOF, and joint information center. Additionally, in each eight calendar year exercise cycle, nuclear power reactor licensees shall vary the content of scenarios during exercises conducted under paragraph 2 of this section to provide the opportunity for the ERO to demonstrate proficiency in the key skills necessary to respond to the following scenario elements: hostile action directed at the plant site, no radiological release or an unplanned minimal radiological release that does not require public protective actions, an initial classification of or rapid escalation to a Site Area Emergency or General Emergency, implementation of strategies, procedures, and guidance developed under § 50.54(hh)(2), and integration of offsite resources with onsite response. The licensee shall maintain a record of exercises conducted during each eight year exercise cycle that documents the content of scenarios used to comply with the requirements of this paragraph. Each licensee shall conduct a hostile action exercise for each of its sites no later than December 31, 2015. The first eight year exercise cycle for a site will begin in the calendar year in which the first hostile action exercise is conducted. For a site licensed under Part 52, the first eight year exercise cycle begins in the calendar year of the initial exercise required by Section IV.F.2.a.~~

In the SOC for the EP Final Rule, the NRC discussed the addition of a new Section IV.F.2.j to Appendix E to require all nuclear power reactor licensees to provide an opportunity for the ERO to demonstrate proficiency in response to a wide spectrum of scenarios, including a "hostile action" and a loss of large areas of the plant due to fire or explosion. The NRC staff previously evaluated the need for hostile action enhancements in Section 4.2.1 above. Section IV.F.2.j further provides that the ERO must demonstrate key skills specific to emergency response duties in the control room, TSC, OSC, EOF and joint information center. The NRC staff previously concluded that the functions of the control room, EOF, TSC and the OSC may be combined into one or more locations in Sections 4.2.21, 4.2.22 and 4.2.29 above. A dedicated joint information center is also not needed based on the analysis in Section 4.2.30 above. At a decommissioning site, where only the SFP and its related support systems, structures, and components remain, there are no other facilities in which ERO personnel could demonstrate proficiency.

Based on the above analysis and the analyses provided in Sections 4.1.1, 4.2.1 and 4.2.33 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.j, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

#### 4.2.40 10 CFR Part 50, Appendix E, Section IV.I

**~~By June 20, 2012, for nuclear power reactor licensees, a range of protective actions to protect onsite personnel during hostile action must be developed to ensure the continued ability of the licensee to safely shut down the reactor and perform the functions of the licensee's emergency plan.~~**

Based on the analysis provided in Section 4.2.1 of this SE, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.I, above, is not necessary to achieve the underlying purpose of the rule as it applies to VY and, therefore, meets the special circumstances provision of 10 CFR 50.12(a)(2)(ii).

## 5.0 ENVIRONMENTAL CONSIDERATION

The environmental considerations for the exemption request are addressed in Section III.E of the associated EP exemption (ADAMS Accession No. ML15180A047).

## 6.0 CONCLUSION

The NRC staff has completed its review of the licensee's request for an exemption from certain requirements of 10 CFR 50.47(b), 10 CFR 50.47(c), and Appendix E to 10 CFR Part 50, as specified in this SE. The standards of 10 CFR 50.47(b) and the requirements of Appendix E to 10 CFR Part 50 that remain in effect are provided in the licensee's letter dated March 14, 2014 (Reference 3), as supplemented by letter dated August 29, 2014 (Reference 5) and October 21, 2014 (Reference 29). On the basis of its review, the NRC staff concludes that the postulated dose to the general public from any DBA would not exceed the EPA PAGs and, for those beyond-DBAs that could result in a radiological release beyond the EAB, the length of time available to implement pre-planned mitigation measures consistent with plant conditions and, if

necessary, for offsite authorities to implement protective actions using a CEMP approach provides confidence that offsite measures for the public could be taken without preplanning. The conclusion is consistent with the NRC staff's evaluation, as provided to the Commission in SECY-14-0125 (Reference 15), which was approved by the Commission in the SRM to SECY-14-0125 (Reference 6).

The exemptions will maintain the requirements for an onsite emergency plan and will continue to ensure the capability to communicate and coordinate with offsite response authorities. Examples of the reduced EP requirements include: setting the highest emergency plan event classification as an "Alert"; extending the timing requirements for notification of offsite authorities consistent with the regulations in 10 CFR 72.32(a); requiring only onsite exercises with the opportunity for ORO participation; and only maintaining arrangements for ORO (i.e., law enforcement, fire and medical services) that may respond to onsite emergencies. Thus, the underlying purpose of the regulations will not be adversely affected by eliminating offsite emergency planning activities or reducing the scope of onsite emergency planning.

The review considered the permanently shutdown and defueled status of VY and the low likelihood of any credible accident resulting in radiological releases requiring offsite protective measures. This SE was supported by the licensee's analyses and NRC staff's assessment of both DBAs and beyond-DBAs. The NRC staff concludes that the emergency planning requirements for VY, as modified by the exemptions described in this SE, would provide: (1) an adequate basis for an acceptable state of emergency preparedness; and (2) in conjunction with arrangements made with offsite response agencies, reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at VY.

Accordingly, the NRC staff has determined that, pursuant to 10 CFR 50.12(a), the exemptions evaluated above are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security. Also, special circumstances are present. Specifically, the NRC staff finds the licensee's requested exemptions meet the underlying purpose of the planning standards in 10 CFR 50.47 and requirements in Appendix E to 10 CFR Part 50, and acceptably satisfy the special circumstances in 10 CFR 50.12(a)(2)(ii) in view of the reduced risk of offsite radiological consequences associated with the permanently shutdown and defueled state of the plant, and can be implemented as of April 15, 2016.

The VY PDEP and EAL scheme license amendment request that incorporate these exemptions will be reviewed separately under the 10 CFR 50.90 license amendment process. The NRC staff's approval of this exemption is not based on information or commitments contained in the PDEP and EAL scheme.

## 7.0 REFERENCES

1. Perito, M., Entergy Nuclear Operations, Inc., letter to U.S. Nuclear Regulatory Commission, "Notification of Permanent Cessation of Power Operations, Vermont Yankee Nuclear Power Station, Docket No. 50-271 License No. DPR-28," dated September 23, 2013 (ADAMS Accession No. ML13273A204).
2. Wamser, C. J., Entergy Nuclear Operations, Inc., letter to U.S. Nuclear Regulatory Commission, "Certifications of Permanent Cessation of Operations and Permanent Removal of Fuel from the Reactor Vessel, Vermont Yankee Nuclear Power Station, Docket No. 50-271 License No. DPR-28," dated January 12, 2015 (ADAMS Accession No. ML15013A426).
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Date: December 10, 2015

December 10, 2015

Site Vice President  
Entergy Nuclear Operations, Inc.  
Vermont Yankee Nuclear Power Station  
P.O. Box 250  
Governor Hunt Road  
Vernon, VT 05354

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION – EXEMPTIONS FROM  
CERTAIN EMERGENCY PLANNING REQUIREMENTS AND RELATED  
SAFETY EVALUATION (CAC NO. MF3614)

Dear Sir or Madam:

The U.S. Nuclear Regulatory Commission (NRC) has approved the enclosed exemptions from specific requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.47, "Emergency plans," and Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50 to be effective as of April 15, 2016. This action is in response to your application for exemptions dated March 14, 2014, as supplemented by letters dated August 29, 2014, and October 21, 2014.

The exemptions are provided in Enclosure 1 and the NRC staff's related safety evaluation is provided in Enclosure 2. The exemptions will be forwarded to the Office of the Federal Register for publication.

Sincerely,  
**/RA/**  
James Kim, Project Manager  
Plant Licensing IV-2 and Decommissioning  
Transition Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures:

1. Exemptions
2. Safety Evaluation

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**ADAMS Accession Nos.: Letter: ML15180A054 Exemption: ML15180A047** \*via memo \*\* via e-mail

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DATE	10/30/2015	10/13/2015	6/17/2015	5/11/2015
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DATE	2/27/2015	9/02/2015	11/19/2015	11/23/2015
OFFICE	NRR/DORL/DD	NRR/DORL/D	NRR/DORL/LPL4-2/PM	
NAME	GWilson (ABoland for)	ABoland	JKim	
DATE	11/24/2015	11/24/2015	12/10/2015	

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Letter to Site Vice President from James Kim dated December 10, 2015.

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION – EXEMPTIONS FROM  
CERTAIN EMERGENCY PLANNING REQUIREMENTS AND RELATED  
SAFETY EVALUATION (CAC NO. MF3614)

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