[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[Docket Nos. 72-1014, 72-59, and 50-271; NRC-2018-0020]

Entergy Nuclear Operations, Inc.; Vermont Yankee Nuclear Power Station; Independent Spent Fuel Storage Installation

AGENCY: Nuclear Regulatory Commission.

ACTION: Exemption; issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is issuing an exemption in response to a request submitted by Entergy Nuclear Operations, Inc. (ENO) on May 16, 2017, and supplemented on September 7, 2017 and December 7, 2017, for its general license to operate an independent spent fuel storage installation (ISFSI) at the Vermont Yankee Nuclear Power Station (VYNPS). This exemption would permit the VYNPS to use a new regionalized loading pattern, load fuel cooled for at least 2 years, and establish a per-cell maximum average burnup limit at 65,000 megawatt days per metric ton of uranium (MWD/MTU) in HI-STORM 100 multi-purpose canister (MPC)-68M using Certificate of Compliance (CoC) No. 1014, Amendment No. 10.

DATES: [INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

ADDRESSES: Please refer to Docket ID **NRC-2018-0020** 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-2018-0020**. Address questions about NRC dockets to Carol Gallagher; telephone: 301-287-9127; e-mail: Jennifer.Broges@nrc.gov. For

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FOR FURTHER INFORMATION CONTACT: Yen-Ju Chen, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555; telephone: 301-415-1018; e-mail: yen-ju.chen@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. Background

The VYNPS began operation in 1972. The reactor was permanently shut down on December 29, 2014. The VYNPS has stored spent boiling-water reactor (BWR) fuel assemblies at its ISFSI in thirteen (13) HI-STORM 100 casks under CoC No. 1014, Amendment No. 2. The remaining spent fuel assemblies were removed from the reactor and transferred to the spent fuel pool. ENO, which owns the facility, submitted the VYNPS Post-Shutdown Decommissioning Activities Report (PSDAR) (ADAMS Accession No. ML14357A110) to the NRC on December 19, 2014, and supplemented with a schedule change in a letter dated on April 12, 2017 (ADAMS Accession No. ML17104A050). In the PSDAR, as supplemented, ENO stated its intention to move all of the spent nuclear fuel assemblies into dry cask storage in late 2018, and put the plant into SAFSTOR[1] until it is ready to fully decommission the facility.

Consistent with subpart K of part 72 of title 10 of the *Code of Federal Regulations* (10 CFR), a general license is issued for the storage of spent fuel in an ISFSI at power reactor sites to persons authorized to possess or operate nuclear power reactors under 10 CFR part 50. ENO is currently authorized to store spent fuel at the VYNPS ISFSI under the 10 CFR part 72 general license provisions. ENO plans to use Holtec HI-STORM 100 storage casks, as approved by the NRC under CoC No. 1014, Amendment No. 10, at the VYNPS for dry storage of spent nuclear fuel in MPC-68M canisters.

[1] 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.

II. Request/Action

By application dated May 16, 2017 (ADAMS Accession No. ML17142A354), as supplemented on September 7, 2017 (ADAMS Accession No. ML17255A236) and December 7, 2017 (ADAMS Accession No. ML17346A685), ENO submitted a request for an exemption from those provisions of 10 CFR 72.212(a)(2), 72.212(b)(3), 72.212(b)(5)(i), 72.212(b)(11), and 72.214 that require compliance with the terms, conditions, and specifications of CoC No. 1014, Amendment No. 10 (ADAMS Accession No. ML16172A294), for the VYNPS to use a new regionalized loading pattern, load fuel cooled for at least 2 years, and establish a per-cell maximum average burnup limit at 65,000 MWD/MTU in Holtec HI-STORM 100 MPC-68M canister.

III. Discussion

Pursuant to 10 CFR 72.7, the Commission may, upon application by any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations of 10 CFR part 72 as it determines are authorized by law and will not endanger life or property or the common defense and security, and are otherwise in the public interest.

The NRC staff prepared a safety evaluation report (SER) (ADAMS Accession No. ML17298A135) to document the evaluation of the proposed actions (i.e., using a new regionalized loading pattern, loading fuel cooled for at least 2 years, and establishing a per-cell maximum average burnup limit at 65,000 MWD/MTU in MPC-68M), to assure continued protection of public health and safety, common defense and security, and the environment. As summarized below, the NRC's safety review concludes that the requested exemption does not affect the ability of the cask system to meet the requirements of 10 CFR part 72.

A. The Exemption is Authorized by Law

This exemption would permit the VYNPS to use a new regionalized loading pattern, load fuel cooled for at least 2 years, and establish a per-cell maximum average burnup limit at 65,000 MWD/MTU in MPC-68M using CoC No. 1014, Amendment No. 10.

Section 72.7 allows the Commission to grant exemptions from the requirements of 10 CFR part 72 if the exemption is authorized by law and will not endanger life or property nor the common defense and security. Issuance of this exemption is consistent with the Atomic Energy Act of 1954, as amended, and not otherwise inconsistent with NRC's regulations or other applicable laws. Therefore, issuance of the exemption is authorized by law.

B. The Exemption Presents no Undue Risk to Public Health and Safety and Will Not Endanger Life or Property or the Common Defense and Security

Approval of this exemption request will allow VYNPS to use a new regionalized loading pattern, load fuel cooled for at least 2 years, and establish a per-cell maximum average burnup limit at 65,000 MWD/MTU in MPC-68M using CoC No. 1014, Amendment No. 10. As discussed in the SER and summarized in the following sections, the NRC staff has found that ENO's proposed action is acceptable and will not endanger life or property or the common defense and security.

Review of the Requested Exemption

ENO requested this exemption to maintain its decommissioning schedule through its optimized loading campaigns. The exemption will allow VYNPS to use a more optimized regionalized loading pattern for MPC-68M, so that VYNPS could store hotter fuel from its final operating cycle, as well as store damaged fuel or fuel debris in a DFC, with cooler fuel in the same cask. The exemption will also allow VYNPS to load

fuel that has been cooled for at least 2 years into the MPC-68M. In addition, the exemption will allow VYNPS to establish a per-cell maximum average burnup limit at 65,000 MWD/MTU in MPC-68M rather than using an equation to calculate the maximum burnup.

The NRC staff reviewed the requested exemption and determined that it does not change the fundamental design, components, or safety features of the storage system. The NRC staff evaluated the applicable potential safety impacts of granting the exemption to assess the potential for any danger to life or property or the common defense and security. Specifically, the NRC staff reviewed the applicant's structural, thermal, shielding, radiation protection, and material evaluations for the proposed exemption.

Structural Review for the Requested Exemption: The NRC staff evaluated the exemption request to ensure that the cask system will maintain confinement, subcriticality, radiation shielding, and retrievability or recovery of the fuel, as applicable, under all credible loads for normal and off-normal conditions accidents, and natural phenomenon events. Since the maximum projected MPC-68M heat load for fuels to be loaded at VYNPS will be 24.5 kW, well below the maximum heat load limit of 36.9 kW for MPC-68M approved in CoC No. 1014, Amendment No. 10, the proposed exemption is bounded by NRC's previous evaluation and would not alter the structural integrity of the dry storage system.

Thermal Review for the Requested Exemption: The NRC staff evaluated the exemption request to ensure that the cask and fuel material temperatures of the dry storage system will remain within the allowable values or criteria for normal, off-normal, and accident conditions. The staff verified that the calculated fuel cladding temperatures and other cask component temperatures are below the allowable design temperature

limits for normal, off-normal, and accident conditions of storage at VYNPS ISFSI. The staff also confirmed that the heat removal capability of the MPC-68M, using the new regionalized loading pattern and actual total aggregated cask heat load of 36.9 kW, loaded with all undamaged fuel assemblies or loaded with damaged fuel and/or fuel debris at VYNPS ISFSI remains acceptable and continues to meet the requirements of 10 CFR 72.122(h)(1) and 72.236(f).

Shielding Review for the Requested Exemption: The NRC staff evaluated the exemption request to ensure that the design of the HI-STORM 100 cask system continues to provide adequate protection against direct radiation to the onsite operating workers and members of the public, and that the ISFSI continues to satisfy the regulatory requirements during normal operating, off-normal, and design-basis accident conditions. The staff determined the new regionalized loading pattern is bounded by the design basis loading pattern previously approved by the NRC and will allow the MPC-68M to maintain the dose rates below the applicable regulatory limits in 10 CFR 72.104 and 72.106. In addition, the staff found that the use of the maximum average burnup limit of 65,000 MWD/MTU is acceptable as it provides sufficient conservatism in comparison with the actual site-specific maximum.

Radiation Protection Review for the Requested Exemption: The NRC staff evaluated the exemption request to determine whether the design features and operations meet the regulatory requirements. The staff evaluated the source terms and the calculated dose rates for normal, off-normal, and accident conditions, and found that the dose rates and annual dose are in compliance with the dose limits specified in 10 CFR 72.104 and 72.106.

Material Review for the Requested Exemption: The NRC staff evaluated the exemption request to ensure adequate material performance of components important to

safety of the spent fuel storage system under normal, off-normal, and accident conditions. The staff found that the material properties of structures, systems, and components important to safety will be maintained during normal, off-normal, and accident conditions so that the spent nuclear fuel can be safely stored for the minimum required years and maintenance can be conducted as required.

Review of Common Defense and Security: The NRC staff also considered potential impacts of granting the exemption on the common defense and security. The requested exemption for the VYNPS ISFSI does not relate to security or the common defense, and therefore, granting the exemption would not result in any potential impacts to common defense and security.

Based on its review, the NRC staff has determined that under the requested exemption, the storage system will continue to meet the safety requirements of 10 CFR part 72 and the offsite dose limits of 10 CFR part 20 and, therefore, will not endanger life or property. The NRC staff also found that the exemption would not endanger common defense and security.

D. Otherwise in the Public Interest

In determining whether the exemption is in the public interest, the staff considered the no-action alternative of denying the exemption request. Denial of the exemption request would require ENO to load and store spent fuel in accordance with the current conditions of Amendment No. 10 of CoC No. 1014, which uses the regionalized loading pattern shown in CoC Appendix B, Figure 2.1-4; requires fuel to be cooled for at least 3 years; and use the equation in Appendix B, Section 2.4.3, to calculate maximum allowable fuel assembly average burnup based on fuel decay heat, enrichment, and cooling time.

ENO's proposed exemption would allow VYNPS to use a new regionalized loading pattern, load fuel that has been cooled for at least 2 years in MPC-68M, and use a per-cell maximum average burnup limit at 65,000 MWD/MTU. With this exemption, VYNPS stated that it would be able to use a more optimized loading pattern for MPC-68M, so that VYNPS could store hotter fuel from its final operating cycle, as well as for storing damaged fuel or fuel debris in a DFC, with cooler fuel in the same cask.

ENO also noted that by loading higher-burned, shorter-cooled assemblies into the inner regions of the cask and low-burned, longer-cooled assemblies on the periphery of the cask, the longer-cooled assemblies on the periphery of the cask acts as shielding and blocks the radiation from the shorter-cooled fuel assemblies stored in the inner region of the cask, and thus reduces dose rates to the onsite workers and at the site boundary. This exemption request will also allow VYNPS to maintain continuous loading campaign without interruption to wait for the fuel to meet the heat loading requirement. ENO noted that this could avoid potential higher personal exposure and human errors due to loss of experienced workers.

ENO indicated that by using this exemption, VYNPS would be able to complete the transfer of irradiated fuel to the ISFSI within a shorter time period. It would permit the spent fuel pool related structures, systems, and components to be removed from service earlier, and allow for staffing reductions to a level commensurate with dry fuel storage only operations. The staff determined if the transfer of irradiated fuel to the ISFSI is completed in a shorter time, that there would be a savings to the Decommissioning Trust Fund. The staff also determined, based on Entergy Nuclear Vermont Yankee, LLC. Master Decommissioning Trust Agreement for Vermont Yankee Nuclear Power Station, Exhibit D (ADAMS Accession No. ML15111A086), that savings to the Decommission Trust Fund could financially benefit the electric consumers.

The staff has reviewed the information provided by ENO and concluded that granting the requested exemption continues to provide adequate protection of public health and safety and is otherwise in the public interest.

E. Environmental Considerations

The NRC staff also considered whether there would be any significant environmental impacts associated with the exemption. For this proposed action, the NRC staff performed an environmental assessment pursuant to 10 CFR 51.30. The environmental assessment concluded that the proposed action would not significantly impact the quality of the human environment. The NRC staff concluded that the proposed action would not result in any changes in the types or amounts of any radiological or non-radiological effluents that may be released offsite, and there is no significant increase in occupational or public radiation exposure because of the proposed action. The Environmental Assessment and the Finding of No Significant Impact was published on January 23, 2018 (83 FR 3192).

IV. Conclusion

Accordingly, the Commission has determined that, pursuant to 10 CFR 72.7, this exemption is authorized by law, will not endanger life or property or the common defense and security, and is otherwise in the public interest. Therefore, the Commission hereby grants ENO an exemption from those provisions of 10 CFR 72.212(a)(2), 10 CFR 72.212(b)(3), 10 CFR 72.212(b)(5)(i), 10 CFR 72.214, and the portion of 10 CFR 72.212(b)(11) that require compliance with terms, conditions, and specifications of the CoC No. 1014, Amendment No. 10, for the VYNPS to use a new regionalized loading pattern, load fuel cooled for at least 2 years, and establish a per-cell maximum average burnup limit at 65,000 MWD/MTU in MPC-68M using CoC No. 1014, Amendment No. 10.

The exemption is effective upon issuance.

Dated at Rockville, Maryland, this 8th day of February, 2018.

For the Nuclear Regulatory Commission.

Meraj Rahimi,

Acting Chief,

Spent Fuel Licensing Branch,

Division of Spent Fuel Management,

Office of Nuclear Material Safety

and Safeguards.

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