[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[Docket Nos. 50-259, 50-260, 50-296, and 72-052; NRC-2026-2509]

Tennessee Valley Authority; Browns Ferry Nuclear Power Plant; Independent Spent Fuel Storage Installation; Exemption

AGENCY: Nuclear Regulatory Commission.

ACTION: Notice; issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) issued a one-time exemption to Tennessee Valley Authority (TVA), permitting Browns Ferry Nuclear Power Plant (BFN) to allow use of the Vacuum Drying System (VDS) for one Holtec FW (CoC-1032) system canister (MPC-0431), despite exceeding the per assembly Region 2 decay heat limit per the requirements of CoC 1032 Appendix B, Table 2.3-4, “MPC-89 Heat Load Data”. This exemption will allow BFN to complete the loading of the MPC in the cask for ISFSI storage.

DATES: The exemption was issued on May 11, 2026.

ADDRESSES: Please refer to Docket ID NRC-2026-2509 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 Website:** Go to https://www.regulations.gov and search for Docket ID NRC-2026-2509. Address questions about Docket IDs in Regulations.gov to Bridget Curran; telephone: 301-415-1003; email: Bridget.Curran@nrc.gov. For technical questions, contact the individual(s) 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 https://www.nrc.gov/reading-rm/adams.html. To begin the search, select “Begin ADAMS Public Search.” For problems with ADAMS, please

contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, at 301-415-4737, or by email to PDR.Resource@nrc.gov. The ADAMS accession number for each document referenced (if it is available in ADAMS) is provided the first time that it is mentioned in this document.

- **NRC's PDR:** The PDR, where you may examine and order copies of publicly available documents, is open by appointment. To make an appointment to visit the PDR, please send an email to PDR.Resource@nrc.gov or call 1-800-397-4209 or 301-415-4737, between 8 a.m. and 4 p.m. eastern time (ET), Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: John-Chau Nguyen, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555; telephone: 301-415-0262; email: John-Chau.Nguyen@nrc.gov.

SUPPLEMENTARY INFORMATION: The text of the exemption is attached.

Authority: 42 U.S.C. 2011 *et seq*.

Dated: May 14, 2026.

For the Nuclear Regulatory Commission.

Yoira Diaz Sanabria,
Chief,
Storage and Transportation Licensing Branch,
Division of Fuel Management,
Office of Nuclear Material Safety, and Safeguards.

Attachment – Exemption.

NUCLEAR REGULATORY COMMISSION

Docket Nos. 50-259, 50-260, 50-296, and 72-052

Tennessee Valley Authority (TVA);

Browns Ferry Nuclear Power Plant (BFN).

Independent Spent Fuel Storage Installation;

Exemption

I. Background

TVA is the holder of Facility Operating Licenses Nos. DPR-33, DPR-52, and DPR-68, which authorize operation of the Browns Ferry Nuclear Power Plant (BFN), units 1, 2, and 3 in Tennessee, pursuant to Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR), "Domestic Licensing of Production and Utilization Facilities." The licenses provide, among other things, that the facility is subject to all rules, regulations, and orders of the U.S. Nuclear Regulatory Commission (NRC) now or hereafter in effect. Consistent with 10 CFR part 72, subpart K, "General License for Storage of Spent Fuel at Power Reactor Sites," a general license is issued for the storage of spent fuel in an Independent Spent Fuel Storage Installation (ISFSI) at power reactor sites to persons authorized to possess or operate nuclear power reactors under 10 CFR part 50. TVA is authorized to operate nuclear power reactors under 10 CFR part 50 and holds a 10 CFR part 72 general license for storage of spent fuel at the BFN ISFSI. Under the terms of the general license, TVA stores spent fuel at its BFN ISFSI using the HI-STORM FW System in accordance with Certificate of Compliance (CoC) No. 1032, Amendment No. 0 Revision 1.

II. Request/Action

By letter dated May 10, 2026 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML26130A001), TVA requested an expedited exemption from the requirements of 10 CFR 72.212(b)(3), 72.212(b)(5)(i), and 72.212(b)(11) that require BFN to comply with the terms, conditions, and specifications of CoC No. 72-1032, Amendment No. 0 Revision 1 (ML16112A306)(Package) and allow

use of Vacuum Drying System (VDS) for Multi-Purpose Canister (MPC)-0431 prior to loading into a HI-STORM FW storage cask. If approved, TVA's exemption request would accordingly allow BFN to complete the loading of the MPC in the cask for ISFSI storage, despite exceeding the per assembly Region 2 decay heat limit per the requirements of CoC 1032 Appendix B Table 2.3-4, "MPC-89 Heat Load Data". TVA uses the Holtec HI-STORM FW MPC storage system (model MPC-89CBS), certified under CoC No. 1032, Amendment 0, Revision 1, at the BFN under its general license. During dry cask campaign 18, TVA identified a failure of the Forced Helium Dehydration (FHD) system while processing MPC-0431. Following completion of fuel loading, lid installation, and hydrostatic testing, blowdown was performed as expected; however, upon initiating drying operations, the FHD blower experienced elevated differential pressure and sheath temperature, resulting in repeated system trips. Subsequent borescope inspections verified proper engagement of the vent and drain port plugs, and TVA determined that the MPC drain line had become disengaged from the lid coupling and had settled onto the baseplate. This condition restricted airflow and prevented effective FHD drying and helium backfill.

As an interim measure, TVA isolated MPC-0431 under a helium blanket within the HI-TRAC VW transfer cask, placing the canister in a temporary analyzed condition. TVA notes that this off-normal configuration requires continuous monitoring of canister pressure and temperature and could introduce additional operational risk, including increased industrial hazards, radiological dose, and dependence on temporary confinement boundaries such as valve seats and O-rings. TVA consulted with the certificate holder, Holtec International, which recommended the use of the VDS as an alternative moisture-removal method. TVA notes that VDS applies vacuum at each port and is capable of achieving drying and helium backfill even in the presence of restricted flow through a single port. As explained in the application for expedited review, VDS equipment is expected to be available at BFN for moisture removal beginning May 13,

2026. This equipment is provided by Holtec for a limited time to support MPC processing.

Dry storage in the HI-STORM FW system is a passive design that provides the required safety functions of heat removal, criticality control, shielding, and confinement. TVA performed a site-specific, steady-state thermal evaluation for MPC-0431 under VDS conditions using the licensing-basis MPC-89 thermal model and the analytical methodology described in the HI-STORM FW Final Safety Analysis Report (FSAR).

For the evaluation, TVA applied a bounding heat-load distribution consisting of 0.256 kW per cell in Region 1, 0.440 kW per cell in Region 2, and 0.252 kW per cell in Region 3, for a total canister heat load of 29.98 kW, which is conservative relative to the actual configuration. The acceptance criteria required the peak cladding temperature to remain below the applicable limit in FSAR Table 2.2.3 for high-burnup fuel and all MPC component temperatures to remain below their respective short-term operational limits.

The staff reviewed TVA's steady-state thermal evaluation for VDS operation and finds that the calculated peak cladding temperature and all MPC component temperatures remain below the corresponding limits specified in Table 2.2.3 of the HI-STORM FW FSAR. Based on these results, the staff concludes that VDS drying of MPC-0431 at BFN can be conducted without imposed time restrictions. Therefore, an exemption is warranted to allow BFN to use VDS for MPC-0431 prior to loading into a HI-STORM FW storage cask, even though, the terms, conditions and specifications of the CoC will not be met.

III. Discussion

Pursuant to 10 CFR 72.7, "Specific exemptions," 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.

A. The Exemption is Authorized by Law

This exemption would allow TVA to deviate from Holtec CoC No. 1032, Amendment No. 0 Revision 1, Appendix B, Table 2.3-4 (MPC-89 Heat Load Data) and allow use of VDS for MPC-0431 prior to loading into a HI-STORM FW storage cask.

TVA is requesting an exemption from the provisions in 10 CFR part 72 that require the licensee to comply with the terms, conditions, and specifications of the CoC for the approved cask model it uses. Section 72.7 allows the NRC to grant exemptions from the requirements of 10 CFR part 72. This authority to grant exemptions is consistent with the Atomic Energy Act of 1954, as amended, and is not otherwise inconsistent with NRC's regulations or other applicable laws. Additionally, no other law prohibits the activities that would be authorized by the exemption. Therefore, the NRC concludes that there is no statutory prohibition on the issuance of the requested exemption, and the NRC is authorized to grant the exemption by law.

B. The Exemption Will Not Endanger Life or Property or the Common Defense and Security

This exemption would allow TVA to deviate from Holtec CoC No. 1032, Amendment No. 0, Revision 1, Appendix B, Table 2.3-4 (MPC-89 Heat Load Data) and allow use of VDS for MPC-0431 prior to loading into a HI-STORM FW storage cask. In support of this exemption request, TVA asserts that issuance of the exemption would not endanger life or property or the common defense and security because the safety assessment demonstrates that the TVA's proposed use of the VDS provides adequate thermal control, maintains confinement integrity, and does not pose an undue risk to the safe processing of the loaded cask.

For these reasons, 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, "Standards for Protection Against Radiation", and, therefore, will not endanger life or property or the common defense and security.

The staff reviewed TVA's exemption request and concluded, as discussed below, that the proposed exemption from certain requirements of 10 CFR Part 72 will not cause CoC No. 1032 to encounter conditions beyond those for which it has already been evaluated and demonstrated to meet the applicable safety requirements in 10 CFR Part 72.

The staff's evaluation focused on the application and those calculations and analyses submitted with the application. The staff followed the guidance in NUREG-2215 to complete its safety evaluation. The NRC's staff evaluation includes thermal and materials safety areas, which are the relevant technical disciplines affected by this exemption.

Thermal Evaluation

The licensee conducted a comprehensive thermal analysis of the current cask configuration, utilizing a loading pattern designed to encompass the BFN MPC-0431 cask. This approach ensured that the analysis would address a most challenging operational scenario, relevant to the cask's performance.

The NRC staff reviewed the applicant's thermal models used throughout the analysis. As part of this evaluation, the staff examined the code inputs to verify the selection of appropriate material properties and boundary conditions. This step was crucial in ensuring the models reflected realistic conditions and accurately represented the thermal behavior of the storage system.

The staff also reviewed the suitability of the code models and underlying assumptions. The staff's evaluation focused on whether the models and assumptions could reliably capture the heat transfer characteristics inherent to the HI-STORM FW storage system's geometry, as well as the specific scenario of vacuum drying.

To further validate the applicant's analysis, the staff performed energy and mass balance checks. These checks were complemented by an assessment of the

convergence of the thermal analysis under vacuum drying conditions, ensuring the reliability and accuracy of the results.

Additional sensitivity analyses were performed by adjusting critical assumptions within the model. This procedure was instrumental in confirming the correct characterization of heat transfer mechanisms and supported the robustness of the overall analysis.

Based on the comprehensive review and verification procedures, the staff concludes that the maximum temperatures reported in the exemption request are acceptable. This finding demonstrates compliance with regulatory requirements and confirms the thermal safety of the cask configuration under the analyzed conditions.

Materials Evaluation

As noted in II. Request/Action, the applicant stated that 16 of the high burnup fuel assemblies have decay heats that exceed the limits for vacuum drying under HI-STORM FW Amendment 0 Revision 1 Technical Specifications Appendix B, Table 2.3-4. Subsequently, the applicant provided a specific analysis for the vacuum drying of MPC 0431 that showed the maximum fuel cladding temperature would be below the 400 °C temperature limit for the high burnup fuel specified in Table 2.2.3 of the HI-STORM FW FSAR. In addition, the supplemental analysis showed that all during the vacuum drying operation, all MPC components remain below the short-term operation temperature limits specified in Table 2.2.3 of the HI-STORM FW FSAR.

The staff reviewed the information provided by the applicant and compared the operations conducted and planned for MPC 0431 against the approved HI-STORM FW FSAR and Technical Specifications and the guidance in NUREG-2215, “Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities.” The staff determined that the results of the supplemental analysis provided by the applicant showed that the peak cladding temperature limits and MPC component temperature limits were below

the maximum temperatures listed in the HI-STORM FW FSAR and Technical Specifications.

The staff also reviewed the guidance in NUREG-2215 on spent fuel and loading operations. Specifically, the staff reviewed the following guidance in NUREG-2215 Chapter 8, “Materials Evaluation,” and Chapter 11, “Operation Procedures and Systems Evaluation.”

- Section 8.5.15.2.4, “Maximum (Peak) Cladding Temperature,” which states that the maximum calculated fuel cladding temperature should not exceed 400°C (752°F) for normal conditions of storage and short-term loading operations including drying, backfilling with inert gas, and transfer of the cask to the storage pad.
- Section 8.5.15.2.5, “Thermal Cycling during Drying Operations,” which states that repeated thermal cycling (repeated heatup or cooldown cycles) during loading operations is limited to less than 10 cycles, where cladding temperature variations during each cycle do not exceed 65 °C (117 °F).
- Section 8.5.15.2.6, “Cover Gas,” which provides options for evaluating cladding oxidation including the option to maintain the fuel rods in an inerted environment such as argon, nitrogen gas, or helium to prevent oxidation.
- Section 11.5.2.6, “Draining and Drying,” which states that the container should be drained of as much water as practicable and evacuated to less than or equal to 4.0x10-4 MPa (4 millibar, 3.0 millimeters of mercury or Torr). After evacuation, adequate moisture removal should be verified by maintaining a constant pressure over a period of about 30 minutes without vacuum pump operation (or the vacuum pump is running but is isolated from the container with its suction vented to atmosphere).

The staff determined that the HI-STORM FW FSAR, Technical Specifications, and the specific analysis for the vacuum drying of MPC 0431 are consistent with the

NRC guidance. Therefore, the staff determined that the applicant's exemption request is acceptable.

C. The Exemption is Otherwise in the Public Interest

TVA requests exemption from meeting the requirements of 10 CFR 72.212(b)(3), 72.212(b)(5)(i), and 72.212(b)(11) that require BFN to comply with the terms, conditions, and specifications of CoC No. 72-1032, Amendment No. 0, Revision 1 (ML16112A306)(package) and allow use of VDS for MPC-0431 prior to loading into a HI-STORM FW storage cask.

According to TVA, the exemption is in the public interest because it would allow for safe storage of spent nuclear fuel at the BFN ISFSI. TVA indicates that the current condition at BFN involves non-safety equipment maintaining stable temperature and pressure for the loaded MPC. There is no redundancy to this equipment, so 24-hour continuous monitoring is necessary, which over an extended period of time adds risk of additional radiological dose to personnel. TVA also identified that the only alternative to obtaining the exemption (defueling the MPC-0431) would introduce substantially more risk than the proposed action. Defueling the canister has not been previously performed at BFN and would require additional handling of the loaded storage system, removal of the canister lid, creation of contaminated waste, and exposure of the spent fuel to additional thermal cycles. Additionally, defueling the canister would introduce the risk of dropping a fuel assembly in the spent fuel pool. These activities would subject personnel to increased radiation exposure and potentially further limit operational flexibility at BFN. Delaying resolution of MPC-0431 condition could affect the licensee's broader ability to manage spent fuel handling activities.

Upon staff's review, staff concludes that approving the exemption is in the public interest.

Environmental Consideration

The NRC staff also considered whether there would be any significant environmental impacts associated with the exemption. The staff has determined that this action is categorically excluded under 10 CFR 51.22(d)(7), and there are no extraordinary circumstances present that would preclude reliance on this exclusion. The NRC staff have made this finding because granting the exemption would result in no changes other than a change in process operations or equipment, and as such, will not cause any ground disturbance, effluent changes, increased additional exposure or increased accident consequences. Therefore, pursuant to 10 CFR 51.22, no environmental impact statement or environmental assessment need be prepared in connection with granting an exemption to allow BFN to complete the loading of the MPC in the cask for ISFSI storage.

IV. Conclusion

Based on these considerations, the NRC has determined that, pursuant to 10 CFR 72.7, the 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 NRC grants TVA an exemption from the requirements of §§ 10 CFR 72.212(b)(3), 72.212(b)(5)(i), and 72.212(b)(11) to deviate from Holtec CoC No. 1032, Amendment No. 0, Revision 1, Appendix B, Table 2.3-4 (MPC-89 Heat Load Data) and allow use of VDS for MPC-0431 prior to loading into a HI-STORM FW storage cask.

This exemption is effective upon issuance.

Dated: May 11, 2026.

For the Nuclear Regulatory Commission.

/RA/

Shana Helton, Director,
Division of Fuel Management,
Office of Nuclear Material Safety,
and Safeguards.

[FR Doc. 2026-09887 Filed: 5/15/2026 8:45 am; Publication Date: 5/18/2026]