[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[Docket Nos. 72-1031, 50-413, and 50-414; NRC-2026-1486]

Duke Energy Carolinas, LLC;

Catawba Nuclear Station, Units 1 and 2;

Independent Spent Fuel Storage Installation;

Exemption

AGENCY: Nuclear Regulatory Commission.

ACTION: Notice; issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) issued an exemption to Duke Energy Carolinas, LLC (Duke), permitting Catawba Nuclear Station (CNS) to maintain one loaded transportable storage canister (TSC) and to load nine new TSCs in the MAGNASTOR® storage system at the CNS Units 1 and 2 independent spent fuel storage installation, beginning July 6, 2026, in a storage condition where the terms, conditions, and specifications in the Certificate of Compliance No. 1031, Amendment No. 15, are not met.

DATES: The exemption was issued on April 21, 2026.

ADDRESSES: Please refer to Docket ID NRC-2026-1486 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-2026-1486. 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 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: April 24, 2026.

For the Nuclear Regulatory Commission.

Signed by Diaz-Sanabria, Yoira on 04/24/26

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. 72-1031, 50-413, and 50-414

Duke Energy Carolinas, LLC

Catawba Nuclear Station, Units 1 and 2

Independent Spent Fuel Storage Installation

I. Background

Duke Energy Carolinas, LLC (Duke) is the holder of Facility Operating Licenses Nos. NPF-035 and NPF-052, which authorize operation of the Catawba Nuclear Station (CNS) in South Carolina, 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. Duke 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 CNS ISFSI. Under the terms of the general license, Duke stores spent fuel at its CNS ISFSI using the MAGNASTOR® storage system in accordance with Certificate of Compliance (CoC) No. 1031, Amendment No. 15.

II. Request/Action

By letter dated March 19, 2026 (Agencywide Documents Access and Management System [ADAMS] Accession Nos ML26078A371), Duke requested an

exemption from the requirements of 10 CFR §§ 72.212(a)(2), 72.212(b)(3), 72.212(b)(5)(i), 72.212(b)(11), 72.214, 72.154(b), and 72.174 that require CNS to comply with the terms, conditions, and specifications of CoC No. 1031, Amendment No. 15 (ML25112A096). If approved, Duke's exemption request would accordingly allow CNS to maintain one loaded and to load nine transportable storage canisters (TSCs) in the MAGNASTOR® storage system, beginning July 6, 2026, and thus, to load the systems in a storage condition where the terms, conditions, and specifications in CoC No. 1031, Amendment No. 15, are not met.

Duke currently uses the MAGNASTOR® storage system under CoC No. 1031, Amendment No. 15, for dry storage of spent nuclear fuel in TSC at the CNS ISFSI. The MAGNASTOR® storage system CoC provides the requirements, conditions, and operating limits necessary for use of the system to store spent fuel. In regard to neutron absorber materials, compliance with specifications such as minimum effective areal density (75% for Boral and 90% for borated aluminum/MMC) and a minimum ^{10}B loading of 0.040 g/cm², as outlined in the MAGNASTOR® technical specifications and final safety analysis report (FSAR), is verified through neutron transmission testing and acceptance inspections to ensure compliance with the CoC.

NAC International (NAC), the vendor of the MAGNASTOR® system, reported a fabrication deficiency on September 10, 2025 (ML25253A488) and provided an update on December 30, 2025 (ML25364A119), regarding certain neutron absorber panels supplied to NAC by 3M. These neutron absorber panels, installed by NAC in the MAGNASTOR® storage casks for use at the CNS ISFSI, did not meet requirements of the MAGNASTOR® technical specifications and FSAR. The deficiency occurred because test coupons were cut from non-approved areas of master sheets, violating established process controls. This error resulted in some coupons failing to meet the

required ^{10}B areal density, impacting 39 panels (three per sheet across 13 sheet). These panels are associated with several TSCs at Duke's Catawba site, including one loaded and nine unloaded TSCs.

The impacted TSCs include one already loaded, MAG-TSC-418-158, and nine that Duke plans to load: MAG-TSC-418-155; MAG-TSC-418-156; MAG-TSC-418-157; MAG-TSC-418-159; MAG-TSC-418-160; MAG-TSC-418-161; MAG-TSC-418-162; MAG-TSC-418-166; and MAG-TSC-418-167. Duke plans to load two of these TSCs in July 2026: MAG-TSC-418-155 and MAG-TSC-418-156. As explained by Duke, the remaining seven impacted TSCs for upcoming campaigns, already purchased and scheduled for loading beyond 2026, are included in the scope of the request.

Duke submitted this exemption request to allow for the continued storage of one already loaded TSC, and future loading of nine TSC beginning on July 6, 2026, in the MAGNASTOR® storage system at the CNS ISFSI, even though, because of the neutron absorber panels' fabrication deficiency, 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 Duke to maintain loaded and to load TSC in the MAGNASTOR® storage system at its CNS ISFSI, beginning July 6, 2026, in a storage condition where the terms, conditions, and specifications in CoC No. 1031, Amendment

No. 15, are not met. Duke 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 Duke to maintain one loaded and to load nine TSCs in the MAGNASTOR® storage system at its CNS ISFSI, beginning July 6, 2026, in a storage condition where the terms, conditions, and specifications in CoC No. 1031, Amendment No. 15, are not met. Minor manufacturing variations in neutron absorber panels, caused by misalignment during coupon cutting, affected ten TSCs, with three master sheets slightly below the minimum ^{10}B areal density requirement of 0.040 g/cm². NAC performed a safety assessment to evaluate the reduced ^{10}B conditions. In support of this exemption request, Duke asserts that issuance of the exemption would not endanger life or property or the common defense and security because NAC's safety assessment demonstrates that the reduced ^{10}B areal density results in a change in reactivity of less than 2 $\Delta k/\sigma$, which is not statistically significant, and the neutron absorber continues to perform within the licensing basis safety margins. TSC incorporates a welded closure to prevent the loss of contents and ensure public health and safety during long-term storage. When installed in a storage cask, the TSC benefits

from structural protection, radiation shielding, and natural convection cooling, while the cask also provides environmental protection under adverse conditions. NAC's calculation further demonstrates using the licensing basis method of evaluation and the lowest measured ^{10}B areal densities from the coupons
cut in the wrong area of the master sheet, the "reduced absorber sheet" ^{10}B has a less than 2 $\Delta k/\sigma$, effect on system reactivity which is not statistically significant. NAC's calculation shows the lower neutron absorber result produces similar system reactivities for each fuel assembly and will therefore have the same relative effect.

Additionally, technical specifications require surface dose rate measurements before storage operations to ensure compliance with regulatory limits and detect potential misloads, providing an extra layer of safety assurance. NAC's analysis confirmed that even with reduced neutron absorber levels, the system remains subcritical under all analyzed conditions. NAC determined there are no impacts to thermal performance, structural integrity, shielding effectiveness, or confinement boundaries, and site boundary doses remain within regulatory limits. In addition, the combined radiation dose from all storage systems located at the CNS ISFSI will remain within the annual dose limits established in 10 CFR 72.104(a) for normal operations and anticipated operational occurrences and will also remain below the limits of 10 CFR 72.106 for design-basis accident conditions. Duke notes that the requested exemption does not affect any physical security requirements, nor does it impact the protection or defensive capabilities of the CNS ISFSI.

The NRC staff reviewed Duke'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. 1031 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 request does not change the fundamental design, components, or safety features of the storage system.

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 criticality, materials, and operations safety areas, which the staff determined are the relevant technical disciplines affected by this exemption.

Criticality Evaluation

In support of its exemption request, Duke asserts that issuance of the exemption would not endanger life or property, or the common defense or security. Duke based this conclusion on NAC's safety assessment provided in Calculation 12418-6002, "MAGNASTOR Criticality Evaluation for Duke Catawba Reduced Absorber Sheet B-10 Content," which evaluated the effect of reduced ^{10}B areal density in certain neutron absorber sheets. NAC's analysis demonstrates that, when applying the licensing-basis method of evaluation and using the lowest measured ^{10}B areal densities obtained from coupons cut from an incorrect portion of the master sheet, the resulting change in reactivity is less than $2\Delta k/\sigma$. NAC concluded, and NRC staff confirmed in its own safety evaluation, that this change is not statistically significant. NAC's calculation further shows that the reduced absorber sheet ^{10}B values produce system reactivities comparable to those obtained using fully compliant absorber material, and therefore the reduced boron content yields no meaningful change in relative reactivity.

NRC staff notes that the MAGNASTOR® system design basis requires a minimum neutron absorber content of 0.040 g/cm² ^{10}B. The reduced ^{10}B content values used in the analysis were derived from destructive testing of three coupons taken from the affected master sheets. For coupon C89842, two absorber panels installed in

MAG-TSC-418-167 had a minimum measured ^{10}B areal density of 0.03910 g/cm². Coupons C89789-1 and C89810-1 showed minimum measured values of 0.03994 g/cm² and were used in the remaining affected TSCs. Although these values are slightly below the nominal ^{10}B requirement, staff noted that the measurements trend toward the design basis 0.040 g/cm² specification. Due to limitations arising from the cutting pattern of the master sheet, insufficient material remained to definitively confirm compliance. Accordingly, NAC performed a criticality analysis using the measured reduced boron values for each affected TSC.

For the two absorber sheets affected in MAG-TSC-418-167, NAC modified the licensing-basis MCNP input files to explicitly model the reduced ^{10}B areal density of 0.03910 g/cm², as described in Figure 4-1 of the calculation package, after applying the MAGNASTOR® design assumption that credits only 90 percent of the nominal boron content as illustrated in Figure 6-1. For the remaining nine TSCs, NAC modeled all absorber sheets using the reduced 10B value of 0.03994 g/cm², adjusting only the absorber material density and composition.

The NRC staff reviewed the exemption request, including NAC's criticality evaluation for the MAGNASTOR® TSCs containing absorber sheets with reduced ^{10}B content. Based on the information provided, the staff finds that NAC appropriately modified the licensing-basis analyses to account for the reduced boron areal density in the affected absorber panels. NAC demonstrates, and the staff confirms, that all ten affected TSCs remain adequately subcritical. The changes in reactivity resulting from the reduced boron content are less than $2\Delta k/\sigma$ for all evaluated configurations, which the staff concludes is not statistically significant. Considering the limited number of TSCs affected, the conservatism inherent in the MAGNASTOR® Amendment No. 15 design-basis analyses, and the results of NAC's revised evaluations, the staff finds, with

reasonable assurance, that the affected MAGNASTOR® TSCs meet the criticality safety requirements of 10 CFR part 72.

Materials Evaluation

In support of its exemption request, Duke cited NAC's analysis which showed that even when the material properties criteria for the borated metal matrix composite neutron absorbing panels at issue is altered to accommodate the fabrication deficiency, materials safety is maintained. NAC identified 13 master sheets (39 panels in total) that were not fabricated in accordance with their prescribed processes, resulting in ten TSCs being fabricated with certain panels that may not meet the 0.04 g/cm^2 required ^{10}B minimum actual areal density, as described in Table 8.8-1 of the FSAR. NAC performed additional neutron attenuation testing of affected neutron panels, as documented in NAC Surveillance Report 25-S-21. As a result of the findings of this additional testing, NAC proposed using the following ^{10}B areal density values for demonstrating the acceptability of the fabricated neutron absorbing panels in their criticality evaluation of these ten TSCs:

- Two sheets in the basket at 0.03910 g/cm^2 boron 10.
- All sheets in the basket at 0.03994 g/cm^2 boron 10.

The NRC staff reviewed the testing methodology and results in NAC Surveillance Report 25-S-21 and determined that these values of ^{10}B areal density are bounding of the results and are appropriate for the evaluation of the affected TSCs. Additionally, the staff reviewed the exemption request and determined that granting the request would not impact the material properties or critical design characteristics of the borated metal matrix composite neutron absorbing panels. Per the above discussion, the NRC staff finds, with reasonable assurance, the material properties of the neutron absorbing

materials in the exemption request acceptable and that the affected MAGNASTOR® TSCs meet the materials safety requirements of 10 CFR part 72.

Operations

The NRC staff evaluated whether the identified condition affects operating procedures associated with fuel loading and storage operations. The exemption request does not propose changes to loading procedures, fuel selection criteria, loading configurations, or administrative controls credited in the FSAR. In addition, the exemption does not change the configuration or function of the neutron absorber panels within the fuel basket.

Based on the information provided by Duke in the exemption request and supporting correspondence, certain neutron absorber panel material verification activities did not fully demonstrate conformance with the specified boron content requirements. Specifically, NAC indicated that some test coupons used for boron content verification were obtained from non-representative locations within absorber panel sheets and that certain supplier oversight activities associated with the testing laboratory did not fully meet established quality assurance program requirements. The staff notes that this condition represents a fabrication and procurement control issue rather than a loss of safety function.

Based on its review, the NRC staff concludes that the identified condition does not necessitate changes to the procedures used for loading or storing spent fuel in the affected TSCs. Considering the maintained margin to subcriticality demonstrated in the supporting analyses, along with the corrective actions described by NAC, the staff finds that there is reasonable assurance that granting the exemption will continue to support safe operation of the facility and compliance with applicable regulatory requirements.

C. The Exemption is Otherwise in the Public Interest

The proposed exemption would allow the already loaded TSC in the MAGNASTOR® storage system to remain in storage at the Catawba ISFSI and would authorize future use of the nine affected TSCs in planned loading campaigns, beginning July 6, 2026, in storage conditions where the terms, conditions, and specifications in CoC No. 1031, Amendment No. 15, are not met. According to Duke, the exemption is in the public interest because it would maintain the safe, passive dry-storage configuration, and avoid unnecessary fuel handling.

Duke states that dry storage provides a passive, stable inherently safe configuration, and leaving the already loaded canister undisturbed eliminates any additional fuel-handling risks, aligning with the public interest in minimizing operational dose and fuel handling events. Duke explains that approval of this exemption prevents unnecessary unloading and reloading of spent fuel, which would increase radiation exposure and operational risk without a corresponding safety benefit. It also supports timely fuel offload from the reactor, ensuring continued safe operation.

Duke states that timely transfers of spent fuel to dry storage supports timely transfers of spent fuel from the spent fuel pool (SFP), which maintains adequate SFP capacity, supports heat-load management on the cooling system, and limits additional fuel-handling operations that could increase worker dose or the potential for handling events. Maintaining SFP margin ensures Duke can offload the reactor when needed and conduct refueling activities efficiently, allowing the reactor's continued safe operation.

Duke further explains that without the ability to use the identified canisters, upcoming loading campaigns could be delayed or disrupted and the margin to SFP margin in the CNS SFP would be significantly reduced, creating operational challenges in managing SFP inventory and conducting safe fuel-handling operations during

outages. Loading campaigns rely on limited specialized personnel and equipment scheduled years in advance. As Duke explains, these specialty resources support multiple competing activities and priorities. The available windows to complete cask loading campaigns are limited and delays have a cascading impact on other scheduled activities. Delays could have broader operational impacts and thus impair future reactor safety to the detriment of the public interest.

Duke states that if the exemption is not approved, the loading campaign would need to be rescoped as designed, because this would constitute a substantial change in planned loading sequence affecting the overall campaign, the SFP configuration, and associated analyses. This would interfere with the safe operation of the reactor.

For the reasons described by Duke in the exemption request, the NRC staff agree that it is in the public interest to grant the exemption. If the exemption is not granted, for the already loaded TSC, Duke would be required to unload and reload the spent fuel into a new TSC to bring it in compliance with the CoC, creating safety risks. For the nine TSCs scheduled for future loading, in order to comply with the CoC, Duke would have to keep spent fuel in the spent fuel pool if it is not permitted to use the MAGNASTOR® storage system during loading and transport operations, thus impacting Duke's ability to effectively manage the SFP margin, pool capacity and reactor fuel offloading. Moreover, should spent fuel pool capacity be reached, the ability to refuel the operating reactor unit is challenged. The inability to load the TSCs could also challenge spent fuel heat removal and impact the availability of the specialized resources and equipment which is planned years in advance and needed to support competing fuel loading and operational activities at CNS, including spent fuel pool clean-up and refueling outages. Thus, if the nine impacted TSCs could not load, there may be

consequences impacting safe, continued reactor operations to the detriment of the public interest.

Therefore, for these reasons, the staff concludes that granting 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. For this proposed action, the NRC staff performed an environmental assessment pursuant to 10 CFR 51.30, "Environmental Assessment." 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 would be 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 April 21, 2026 (91 FR 21330).

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 Duke an exemption from the requirements of §§ 72.212(a)(2), 72.212(b)(3), 72.212(b)(5)(i), 72.212(b)(11), and 72.214, 72.154(b), and 72.174 with respect to the continued storage of MAG-TSC-418-158 and future loading of MAG-TSC-418-155, 156, 157, 159, 160, 161, 162, 166, and 167 in the MAGNASTOR® storage system beginning in July 6, 2026.

This exemption is effective upon issuance.

Dated: April 21, 2026.

For the Nuclear Regulatory Commission.

/RA/

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