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10 CFR 72.7

RS-24-022

March 8, 2024

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dresden Nuclear Power Station Unit 2 and 3
Renewed Facility Operating Licensee Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237, 50-249 and 72-37

Subject: Response to Request for Additional Information by the Office of Nuclear Material Safeguards and Safety to support Review of a Request for Exemption from Certain Requirements of 10 CFR 72.212 and 10 CFR 72.214 For Dresden Nuclear Power Station – Holtec MPC-68MCBS

References:

1. Request for Exemption from Certain Requirements of 10 CFR 72.212 and 10 CFR 72.214 For Dresden Nuclear Power Station – Holtec MPC-68MCBS (ML24054A031)

2. Electronic mail message from Yen-Ju Chen (NRC) to Christian Williams (Constellation Energy Generation, LLC) RE: "Request for Additional Information for Dresden Exemption Request" dated March 1, 2024 (ML24067A124)

By letter dated February 23, 2024 (Reference 1), Constellation Energy Generation, LLC requested an exemption from the requirements of 10 CFR 72.212(a)(2), 10 CFR 72.212(b)(3), 10 CFR 72.212(b)(5)(i), 10 CFR 72.212(b)(11), and 10 CFR 72.214 for the Dresden Independent Spent Fuel Storage Installation.

By email dated March 1, 2024 (Reference 2), the NRC communicated a request for additional information necessary to complete the review of the referenced request.

The attachment to this letter provides the request for additional information as well as the CEG response.

There are no regulatory commitments contained in this submittal.

If you have any questions or require additional information, please contact Christian Williams at (267) 533-5724.

Respectfully,

David T. Gudger

David T. Gudger
Sr. Manager, Licensing
Constellation Energy Generation, LLC

Attachment: Response to Request for Additional Information Needed for Constellation Request for Specific Exemption From Certain Requirements of 10 CFR 72.212 and 10 CFR 72.214 for Dresden Nuclear Power Station

cc: w/ Attachment
Regional Administrator - NRC Region III
Resident/Senior Resident Inspector – Dresden Nuclear Power Station
NRC Project Manager – Dresden Nuclear Power Station
Illinois Emergency Management Agency - Division of Nuclear Safety

Attachment

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NEEDED FOR CONSTELLATION REQUEST FOR SPECIFIC EXEMPTION FROM CERTAIN REQUIREMENTS OF 10 CFR 72.212 AND 10 CFR 72.214 FOR DRESDEN NUCLEAR POWER STATION (ML24054A031)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NEEDED FOR CONSTELLATION REQUEST FOR SPECIFIC EXEMPTION FROM CERTAIN REQUIREMENTS OF 10 CFR 72.212 and 10 CFR 72.214 FOR DRESDEN NUCLEAR POWER STATION

By letter dated February 23, 2024 (Reference 1), Constellation Energy Generation, LLC (CEG) requested an exemption from the requirements of 10 CFR 72.212(a)(2), 10 CFR 72.212(b)(3), 10 CFR 72.212(b)(5)(i), 10 CFR 72.212(b)(11), and 10 CFR 72.214 for the Dresden Independent Spent Fuel Storage Installation (ISFSI).

The exemption would allow Dresden to continue to store loaded Holtec 68M Multi-Purpose Canisters with a Continuous Basket Shim (MPC-68MCBS) and load MPC-68MCBS canisters during future campaigns.

By email dated March 1, 2024 (Reference 2), the NRC communicated a request for additional information necessary to complete the review of the referenced exemption request.

The requested information as well as the CEG responses are provided in this attachment.

From Reference 2:

"[T]he staff is requesting additional information to complete the review of Dresden's exemption request dated February 23, 2024 (ML24054A031). Please provide the following information by the end of business day today, March 1, 2024, in order to support your requested need date of April 18, 2024."

In response to the requested date of March 1, 2024, CEG informed the NRC that a response would be provided no later than March 8, 2024.

RAI 1: *For future loading, provide the procedures for handling the dry cask storage system (i.e., loading, handling, and transit) that demonstrate that the system is either handled with a single failure proof device such that a drop is considered non-credible or administrative controls are in place to protect the lift height, which include an acceptable analysis that the MPC confinement boundary is maintained. GLs can refer to specific FSAR section and describe how it applies to site specific situations.*

In the exemption request, under the technical justification for structural and confinement, Dresden stated that the structural assessment considered the handling operations for the dry cask storage system. Provide the handling procedures to support the justification in the exemption request.

CEG Response to RAI 1:

The following is taken from the Dresden 72.212 Evaluation Report, Revision 15

"Section 1.1 Conditions of the CoC

[…]

Section 1.1.4 Condition 5 – Heavy Loads Requirements

Condition 5 of CoC 1014 requires cask lifts to be performed in accordance with existing plant heavy load requirements and procedures.

[…]

Section 9.1.4.3.2 of the DNPS Units 2 & 3 UFSAR (Reference 6) specifies administrative controls applicable to handling heavy loads including spent fuel casks in the DNPS Units 2 and 3 Reactor Building. These administrative controls are implemented through procedures DOS 0800-06, "Unit 2/3 Reactor Building Crane Operations in Restricted Mode Test", DFP 0800-20, "Operation of 2/3 Reactor Building 125/9 ton Crane" and DMP 5800-18, "Load Handling of Heavy Loads and Lifting Devices" (References 15, 16 and 17, respectively).

Section 9.1.4.3.2 of the DNPS UFSAR describes the single-failure-proof design of the reactor building overhead crane. The reactor building overhead crane is licensed as single-failure-proof for loads up to 110 tons. Since the crane is single failure proof and the HI-TRAC/MPC lifting yokes and devices (References 69 and 70) comply with ANSI N14.6 (Reference 62), the requirements for the components used for heavy load lifting inside the Reactor Building in accordance with NUREG 0612 (Reference 71) have been met.

[…]

<u>Section 1.2 CoC 1014 Appendix A – Technical Specifications Compliance</u>

[…]

<u>Section 1.2.3.2 Section 5.5 Cask Transport Evaluation Program</u>

Section 5.5 establishes requirements for the site transportation of a loaded HI-STORM 100 overpack or HI-TRAC 100 transfer cask.

A loaded HI-TRAC is not required to be transported outside structures governed by 10 CFR 50 for West ISFSI operations. Therefore, Section 5.5 does not apply to HI-TRAC activities in this 72.212 Evaluation Report.

Transportation of a loaded HI-STORM 100 overpack into and out of the Reactor Building is provided by a low-profile transporter with Hilman Roller System that provides support from underneath in compliance with Section 5.5.

Transportation of a loaded HI-STORM 100 overpack between the Reactor Building and the ISFSI is accomplished by a VCT [Vertical Cask Transporter]. The VCT is a lifting device designed in accordance with ANSI N14.6 (Reference 62) and has redundant drop protection features (Reference 33). Accordingly, use of the VCT complies with Section 5.5.a.3 and the overpack may be lifted to any height necessary during transport operations."

The applicable procedures governing the activities discussed in Section 1.2.3.2 are listed below.

- DFP 0800-64 “TRANSPORTER OPERATIONS”
- DFP 0800-65 “SPENT FUEL CASK SITE TRANSPORTATION”
- DFP 0800-68 “HI-TRAC PREPARATION”
- DFP 0800-69 “HI-TRAC MOVEMENT WITHIN UNIT 2/3 REACTOR BUILDING”
- DFP 0800-70 “HI-TRAC LOADING OPERATIONS”
- DFP 0800-82 “HI-TRAC/MPC UNLOADING OPERATIONS IN THE UNIT 2/3 REACTOR BUILDING”

RAI 2: *Demonstrate that radiation release during a postulated accident is within the regulatory limits.*

The analyses in Holtec’s Final Safety Analysis Report (FSAR) for accident conditions demonstrate the consequences of accidents challenging the integrity of the confinement barrier and shielding design features should not exceed limits established in 10 CFR 72.106. The analyses in the FSAR also demonstrate that offsite doses during normal operations and anticipated occurrences should not exceed the limits of 10 CFR 72.104.

In the exemption request, under environmental consideration, Dresden states that the confinement boundary maintains its structural integrity during accident conditions. Demonstrate that the site-specific dose calculations for the postulated release would be within the regulatory limits, e.g., information/calculations from the 72.212 report.

CEG Response to RAI 2:

In a memorandum, “SAFETY DETERMINATION OF A POTENTIAL STRUCTURAL FAILURE OF THE FUEL BASKET DURING ACCIDENT CONDITIONS FOR THE HI-STORM 100 AND HI-STORM FLOOD/WIND DRY CASK STORAGE SYSTEMS” dated January 31, 2024 (Reference 3 of the subject exemption request), (ML24018A085), the NRC documented the following conclusion:

“A non-mechanistic tip-over accident condition is considered a hypothetical accident scenario and may affect the HI-STORM FW overpack by resulting in limited and localized damage to the outer shell and radial concrete shield. As the damage is localized and the vast majority of the shielding material remains intact, the effect on the dose at the site boundary is negligible. Therefore, the site boundary doses for the loaded HI-STORM FW overpack for accident conditions are equivalent to the normal condition doses, which meet the Title 10 of the Code of Federal Regulations (10 CFR) Section 72.106 radiation dose limits.”

Dresden’s Radiation Shielding Analysis demonstrating compliance with 10 CFR 72.104 is documented in Section 3.1 of the Dresden 72.212 Evaluation Report Revision 15 (Reference 4 of the subject exemption request). The results of the shielding analysis are provided in Section 3.1.3

Regarding compliance with 10 CFR 72.106, Section 11.2.3.3 of the HI-STORM 100 Final Safety Analysis Report, Revision 11.1 (Reference 5 of the subject exemption request) demonstrates that there are no accidents which would significantly affect shielding effectiveness of the HI-STORM 100 system and that the requirements of 10 CFR 72.106 are easily met by the HI-STORM 100 system for the postulated tip-over event.

The minimum distance from the West ISFSI to the Site boundary is, as documented in Section 3.1.3 of the Dresden 72.212 Evaluation Report, Revision 15, approximately 650 meters and the distance to the restricted area boundary is approximately 150 meters both of which are greater than the 100-meter minimum distance specified in 10 CFR 72.106.

Based on the above and the NRC's conclusion that damage is localized and the vast majority of the shielding material remains intact, compliance with 10 CFR 72.104 and 10 CFR 72.106 is not impacted by a non-mechanistic tip-over event resulting in basket failure. Therefore, compliance is not impacted by approving the subject exemption request.

RAI 3: *Demonstrate that this exemption is otherwise in [the] public interest. Provide site-specific information on why this exemption is needed right now and why it is in the public interest to grant this exemption.*

CEG Response to RAI 3:

From Reference 1:

C) Otherwise in the Public Interest

> *It is in the public's interest to grant an exemption, since dry storage places the fuel in an inherently safe, passive system, and the exemption would permit the continued storage of already loaded canisters before full compliance. This exemption would also allow upcoming loading campaigns to proceed on time to move fuel into the dry storage condition and maintain the ability to offload fuel from the reactor, thus allowing continued safe reactor operation*.

The following Dresden-specific information is being provided to demonstrate that this exemption is otherwise in the public's interest.

<u>*Maintain Full Core Discharge Capabilities*</u>*:*

The most significant impact of not being able to use CBS type canisters in upcoming campaigns relates to the ability to effectively manage the margin to full core discharge capability (FCDC) in the Dresden Unit 3 (DRE-3) and Dresden Unit 2 (DRE-2) Spent Fuel Pools (SFP).

The following margin discussion is based on anticipated loading schedules, which are not controlled documents, and should be considered estimates or targets.

Currently, DRE-3 has a FCDC margin of 54 open cells in the SFP. Loading 3 MPC-68M and 1 MPC-68MCBS in the 2024 Spent Fuel Loading Campaign (SFLC) will increase this margin to 326 open cells. The upcoming 2024 refueling outage (D3R28) will decrease the FCDC margin to 78 open cells due to a planned discharge of 248 fuel bundles. If DRE-3 removes the 1 MPC-68MCBS canister from 2024 SFLC scope, the FCDC margin will drop to only 10 open cells. Since DRE-3 doesn't have a SFLC scheduled in 2025, the FCDC margin will remain at 10 until the 2026 SFLC. Having a FCDC margin of only 10 open cells for over a year of DRE-3 operation is an unnecessary risk to spent fuel pool (SFP) inventory and SFP operations. Also, in order to maintain a positive FCDC margin through the DRE-3 2026 refueling outage, the site will need to load 4 MPC-68MCBS canisters during the 2026 SFLC. The Spent Fuel Management Strategy for DRE-3 currently shows only 3 MPC-68MCBS in scope for the 2026 SFLC.

Currently DRE-2 has a FCDC margin of 67 open cells in the SFP. Loading 4 MPC-68MCBS in the 2025 Spent Fuel Loading Campaign (SFLC) will increase this margin to 339 open cells. The 2025 refueling outage (D2R29) will decrease the FCDC margin to 119 open cells due to a planned discharge of 220 fuel bundles. If DRE-2 can't load any MPC-68MCBS canisters in 2025 the margin to FCDC will go negative (margin of -153). FCDC margin will remain negative until the 2027 SFLC. Having a negative margin for over a year of DRE-2 operation is an unnecessary risk to spent fuel pool (SFP) inventory and SFP operations. Also, in order to recover a positive FCDC margin through the DRE-2 2027 refueling outage, the site will need to load 6 MPC-68MCBS canisters during the 2027 SFLC. The Spent Fuel Management Strategy for DRE-2 currently shows only 4 MPC-68MCBS in scope for the 2027 SFLC.

Having low margins to FCDC makes it difficult to stage the complete reload batch of fuel in the SFP in preparation for outages. This presents a potential reactivity management risk to fuel handling operations during pre- and post-outage.

Decay Heat Removal Requirements:

Each spent fuel bundle contributes to the decay heat removal demand on the spent fuel pool cooling systems. The estimated decay heat from the spent fuel that is scheduled to be moved to dry storage is 1 to 2% per cask. Additionally, removing spent fuel bundles from the fuel pool allows for dispersion of the remaining heat load.

Accident Consequences and Probability:

Design Bases Accidents associated with the fuel pool include a loss of fuel pool cooling event and a fuel handling accident (FHA). The consequence of a loss of fuel pool cooling is made worse due to the 1 to 2% additional decay heat load contributing to increasing fuel pool temperatures as well as the additional spent fuel experiencing the loss of cooling.

The consequence of an FHA is not impacted however the likelihood of an FHA is increased based on additional fuel moves required to manage fuel pool loading with extra bundles in to pool.

Margin to Capacity:

Once spent fuel pool capacity is reached, the ability to refuel to the operating reactor is limited thus taking away a highly reliable clean energy source.

Logistical Considerations and Cascading Impact:

Cask Loading campaigns are budgeted, planned, and scheduled years in advance of the actual performance. Campaigns are scheduled based on the availability of the specialized work force and equipment that is shared throughout the CEG fleet. These specialty resources support multiple competing priorities including refueling outages, loading campaigns, fuel pool cleanouts, fuel inspections, fuel handling equipment upgrades and maintenance, fuel sipping, new fuel receipt, and crane maintenance and upgrades. Each of these activities limit the available windows to complete cask loading campaigns and delays in any one of these activities has an obvious cascading impact on all other scheduled specialized activities.

Conclusion:

Maintaining adequate FCDC margin ensures operational flexibility necessary for sustained safe and efficient operation of the operating nuclear facility.

Additionally, based on the logistic and financial impact on CEG as discussed above when compared to the minimal safety benefit discussed in the NRC safety memo, delaying the use of the MPC-68MCBS canisters does not provide a measurable public benefit.

In contrast, approval of the referenced exemption request supports the continued safe, efficient, and cost-effective operation of the Dresden Nuclear Power Station.