

NUCLEAR REGULATORY COMMISSION
DOCKET NOS. 72-32 and 50-331

January 27, 2022

ENVIRONMENTAL ASSESSMENT REGARDING THE EXEMPTION REQUEST FOR
NEXTERA ENERGY DUANE ARNOLD, LLC
DUANE ARNOLD ENERGY CENTER
INDEPENDENT SPENT FUEL STORAGE INSTALLATION
IN PALO, IOWA

1. INTRODUCTION

By letter dated October 21, 2021 (NextEra Energy Duane Arnold, LLC [NEDA], 2021a), as supplemented by letters dated December 10, 2021 (NEDA, 2021b), and January 6, 2022 (NEDA, 2022), NEDA submitted a one-time exemption request to the U.S. Nuclear Regulatory Commission (NRC) for the Duane Arnold Energy Center (DAEC) Independent Spent Fuel Storage Installation (ISFSI), in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 72.7, "Specific exemptions," from the requirements of 10 CFR 72.212 (a)(2), (b)(2), (b)(3), (b)(4), (b)(5)(i), (b)(11), and 72.214. Specifically, the one-time exemption request would, if granted, permit a failed fuel can (FFC) and its contents at DAEC to exceed the limits specified in Table 1-1t in Appendix B of NRC Certificate of Compliance (CoC) No. 1004, Renewed Amendment No. 17 (NRC, 2021a).

DAEC began operation in 1974 and is owned and operated by NEDA. DAEC permanently shut down its reactor on August 10, 2020. By letter dated August 27, 2020 (NEDA, 2020a), NEDA submitted its certification of permanent cessation of power operations, and by letter dated October 12, 2020 (NEDA, 2020b), NEDA certified that all fuel had been removed from the reactor as required under the provisions of 10 CFR 50.82.

The NRC staff reviewed and approved the Standardized NUHOMS® 61BTH Type 2 dry shielded canister (DSC), and the related basket structural analysis, as part of Amendment No. 10 to CoC No. 1004 (NRC, 2017a), and the FFC as part of Amendment No. 13 to CoC No. 1004 (NRC, 2017b). The Standardized NUHOMS® System FFC consists of a liner with an integral bottom lid assembly, and a removable top lid, designed to contain a failed fuel assembly and any associated fuel fragments/rubble to ensure assumptions made in the criticality analysis for the quantity and location of fuel rod material are maintained.

As discussed in its October 21, 2021 request, as supplemented on December 10, 2021, and January 6, 2022, NEDA identified a failed fuel assembly which, when stored with a modified FFC, will exceed the CoC Appendix B Technical Specifications (TS) Table 1-1t requirement that "[t]he total weight of each failed fuel can plus all its content shall be less than 705 lb." The modifications to the relevant FFC will be evaluated against the criteria in 10 CFR 72.48 to determine whether they require either a license or CoC amendment.

NEDA is proposing to modify an FFC to accommodate a damaged bail handle on a certain boiling water reactor failed fuel assembly. The proposed modification to the FFC would provide the damaged bail handle adequate clearance during loading operations to lower the failed fuel assembly into place without interference from surrounding components, allowing the fuel assembly to be safely lowered into its final position. Because of its proposed modification to the

FFC, NEDA cannot lift the FFC in the normal manner. Instead, it will have to use additional lifting hardware to accomplish this. The additional hardware to be used will cause the relevant FFC and its contents to exceed the 705-pound weight limit in CoC No. 1004, Renewed Amendment No. 17. If the exemption is granted, NEDA would be allowed to load a failed fuel assembly in an FCC, within a DAEC DSC No. 30 fuel cell, where the combined weight of the failed fuel assembly plus the FCC exceeds the 705-pound limit. As a condition of this exemption, however, NEDA would also be required to leave at least two adjacent DSC fuel cells empty to increase the available margin for weight.

The NRC staff is performing both a safety evaluation and an environmental review to determine whether to grant this exemption request. The NRC staff will prepare a separate safety evaluation report to document its safety review and analysis. The NRC's safety evaluation report will evaluate the proposed exemption to ensure reasonable assurance of adequate protection of public health and safety, and the common defense and security. This environmental assessment (EA) documents the environmental review which the NRC staff prepared in accordance with 10 CFR 51.21 and 51.30(a). The NRC's decision whether to grant the exemption will be based on the results of the NRC staff's review as documented in this EA, and the staff's safety review to be documented in the safety evaluation report.

2. THE PROPOSED ACTION

CoC No. 1004 constitutes the approval and contains the conditions for the use of the Standardized NUHOMS® Horizontal Modular Storage System for the storage of spent nuclear fuel under the general licensing provisions of 10 CFR 72.210. The proposed action is for the NRC to grant NEDA an exemption from the requirements of 10 CFR 72.212(b)(3), (b)(5)(i), (b)(11), and 72.214, which require general licensees to comply with the terms, conditions, and specifications of the CoC No. 1004, Renewed Amendment No. 17 and from the requirements of 10 CFR 72.212(a)(2), (b)(2), and (b)(4) to the extent those three provisions require licensees to use casks exactly as described in the relevant TS.

As discussed in its October 21, 2021, exemption request, as supplemented on December 10, 2021, and January 6, 2022, NEDA has identified a failed fuel assembly which weighs nominally 676 pounds. As previously discussed, this failed fuel assembly must be stored in a modified FFC because of a bent bail handle extending beyond the perimeter of the dry shielded canister fuel compartment. When this failed fuel assembly is stored with the modified FFC, the total weight will exceed the physical parameter limit for failed fuel, specified in CoC No. 1004, Renewed Amendment No. 17, Appendix B, TS Table 1-1t, which states: "The total weight of each failed fuel can plus all its content shall be less than 705 lb." As a result, NEDA is requesting an exemption to load an FFC such that the FFC and its contents exceed the TS limit for the DAEC ISFSI.

More specifically, NEDA is requesting NRC's approval for the FFC in question, plus all its contents, to weigh up to 800 lbs. NEDA further states that, should this exemption be granted, the FFC in question would be loaded within DSC No. 30, which is the final DSC in the near-term loading campaign and the final loading campaign for DAEC. In addition, as the NRC staff's safety evaluation shall discuss, NEDA stated that it is committing to leave a minimum of two adjacent fuel cells in DSC No. 30 empty.

3. NEED FOR THE PROPOSED ACTION

The proposed action is limited to allowing Standardized NUHOMS® 61BTH Type 2 DSC, No. 30, to be loaded and maintained at DAEC ISFSI in the storage condition such that the FCC and its contents weigh up to 800 pounds. This cask will remain in this condition for the duration of its use and will not meet the 705-pound weight limit for failed fuel specified in CoC No. 1004, Renewed Amendment No. 17, Appendix B, TS Table 1-1t, "BWR Fuel Specification for the Fuel to be Stored in the NUHOMS®-61BTH DSC."

DAEC is currently undergoing decommissioning. For NEDA to decommission the facility, it must place the failed fuel assembly in a storage cask. NEDA could dismantle the failed fuel assembly and place the dismantled component pieces of the failed fuel assembly into separate FFCs within a DSC to meet the total weight requirement specified in CoC No. 1004, Renewed Amendment No. 17, Appendix B, TS Table 1-1t. Dismantling the failed fuel assembly and placing the dismantled portions in multiple FFCs, however, would result in increased risk to plant personnel and the environment including additional occupational radiation dose and the generation of additional radiological waste.

4. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

This EA evaluates the potential environmental impacts of granting the exemption to allow Standardized NUHOMS® 61BTH Type 2 DSC, No. 30, to be loaded and maintained at DAEC ISFSI in the storage condition such that the FCC and its contents weigh up to 800 pounds for the duration of its use without restoring compliance with the weight limit for failed fuel as specified in CoC No. 1004, Renewed Amendment No. 17, Appendix B, TS Table 1-1t.

The potential environmental impacts of spent fuel storage under CoC No. 1004, Renewed Amendment No. 17, for the Standardized NUHOMS® 61BTH System, were evaluated by the NRC staff prior to Renewed Amendment No. No. 17 being added to the list of approved spent fuel storage casks in 10 CFR 72.214 (86 *Federal Register* (FR) 26651). For the proposed action, the only potential impacts from granting the exemption will be as discussed as follows. Nothing about increasing the weight of this FFC would cause any corresponding changes to the environmental impacts discussed during the original amendment. In addition, non-radiological impacts will not be greater than those considered in the EA for CoC No. 1004, Renewed Amendment No. 17.

On July 18, 1990 (55 FR 29181), the NRC amended 10 CFR part 72 to provide for the storage of spent fuel under a general license in cask designs approved by the NRC. The EA for the 1990 final rule analyzed the potential environmental impact of using NRC-approved storage casks. The EA for the NUHOMS® 61BTH System, CoC No. 1004, Renewed Amendment No. No. 17, tiers off the EA issued for the July 18, 1990, final rule. Tiering off earlier EAs is a standard process under the National Environmental Policy Act of 1969 (NEPA) by which the impact analyses of previous EAs can be cited by a subsequent EA, such as this one, to include the impacts of the proposed action within the scope of the previous EA.

On December 22, 1994 (59 FR 65898), the NRC amended 10 CFR part 72 to add the Standardized NUHOMS® Horizontal Modular System to the list of approved spent fuel storage casks under a general license. The EA for the December 22, 1994, final rule concluded that there would be no significant environmental impact to adding the Standardized NUHOMS® System, and therefore, the NRC issued a FONSI, which was validated through issuance of Renewed Amendment No. 17 to the CoC on June 7, 2021.

This exemption request involves neither the disturbance of land, the construction of new facilities, nor modifications to current operating practices. The EA for NUHOMS® 61BTH System, CoC No. 1004, Renewed Amendment No. 17, analyzed the effects of design-basis accidents that could occur during storage. Design-basis accidents account for human-induced events and the most severe natural phenomena reported for the site and surrounding area and the resultant effects on the storage cask. The NRC staff evaluated the exemption request and concludes that the structural integrity and confinement of the NUHOMS® 61BTH System are maintained within regulatory requirements and the environmental impacts of the proposed action will be insignificant. In addition, the NRC staff determined that higher weight limit for failed fuel, requested under this exemption, would not adversely affect structural performance, and the Type 2 DSC structural performance would not be affected by the exemption request. Therefore, there would be no significant change in the types or amounts of any effluent released, no significant increase in individual or cumulative radiation exposures, and no significant increase in the potential for or consequences of radiological accidents will occur. The NRC staff also finds that occupational exposure and offsite dose rates from this exemption request will remain within applicable 10 CFR part 20 limits. Therefore, the proposed exemption request will not result in radiological or non-radiological environmental impacts that significantly differ from impacts evaluated in the EA supporting the NUHOMS® 61BTH System, CoC No. 1004, Renewed Amendment No. 17, direct final rule. For these reasons, the NRC concludes there are no significant environmental impacts associated with the exemption request for the NUHOMS® 61BTH System Type 2 DSC.

5. ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES TO THE PROPOSED ACTION

In addition to the proposed action, the NRC staff also considered the no-action alternative of denial of the proposed exemption request. Denial of the exemption request would require NEDA to dismantle the failed fuel assembly and place the resulting dismantled component pieces into separate FFCs within a DSC to meet the total weight requirement specified in CoC No. 1004, Renewed Amendment No. 17, Appendix B, TS Table 1-1t. Dismantling the failed fuel assembly and placing its dismantled components in multiple FFCs would result in increased risk to plant personnel and the environment including additional occupational radiation dose and the generation of additional radiological waste. Therefore, the alternative could result in equal or greater environmental impacts.

6. AGENCIES CONSULTED

By email dated December 17, 2021 (NRC, 2021b), the NRC provided a copy of this draft EA to the Bureau of Radiological Health, Iowa Department of Public Health, for review. By email dated January 4, 2022 (Iowa, 2022), the Iowa Department of Public Health indicated that it had no comments.

Endangered Species Act Section 7 Consultation

Section 7 of the Endangered Species Act requires Federal agencies to consult with the U.S. Fish and Wildlife Service or National Marine Fisheries Service regarding actions that may affect listed species or designated critical habitats. The Endangered Species Act is intended to prevent further decline of endangered and threatened species and restore those species and their critical habitat.

The NRC staff determined that a consultation under Section 7 of the Endangered Species Act is not required because the proposed action will not affect listed species or critical habitat.

National Historic Preservation Act Section 106 Consultation

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to consider the effects of their undertakings on historic properties. As stated in the NHPA, historic properties are any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register of Historic Places.

The NRC determined that the scope of activities described in this exemption request do not have the potential to cause effects on historic properties because the NRC's approval of this exemption request will not authorize new construction or land disturbance activities. The NRC staff also determined that the proposed action is not a type of activity that has the potential to impact historic properties because the proposed action would occur within the established DAEC site boundary. Therefore, in accordance with 36 CFR 800.3(a)(1), no consultation is required under Section 106 of NHPA.

7. CONCLUSION

The environmental impacts of the proposed action — an exemption allowing NEDA to load and maintain a modified FFC for DAEC ISFSI in the storage condition such that the FCC and its contents weigh up to 800 pounds instead of the current limit specified in CoC No. 1004, Renewed Amendment No. No. 17, Appendix B, TS Table 1-1t — have been reviewed under the requirements in 10 CFR part 51, which implement NEPA.

In this EA, the NRC determined that the environmental impacts of granting this exemption will be no greater than those described in the EA for the NUHOMS® 61BTH System, CoC No. 1004, Renewed Amendment No. 17, direct final rule and that nothing about increasing the weight of this FFC would cause any corresponding changes to the environmental impacts discussed during the original amendment. No changes are being made in the types or quantities of effluents that may be released offsite, and there is no significant increase in occupational or public radiation exposures. Accordingly, the NRC has determined that a FONSI is appropriate, and an environmental impact statement is not warranted. The NRC will publish the FONSI in the *Federal Register*.

8. REFERENCES

The references related to this EA can be found online at the NRC's Electronic Reading Room or the NRC's webpage, www.nrc.gov. The Electronic Reading Room can be accessed at <http://www.nrc.gov/reading-rm/adams.html>. From this website, you can access ADAMS, which provides text and image files of NRC's public documents. The ADAMS accession numbers for the documents are provided in this section.

If you do not have access to ADAMS or if there are problems in accessing ADAMS, contact the NRC's public document room staff at 1-800-397-4209 or by email at pdr@nrc.gov.

10 CFR Part 51. *Code of Federal Regulations*, Title 10, Energy, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Washington, D.C.

10 CFR Part 72. *Code of Federal Regulations*, Title 10, Energy, Part 72, “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste.” Washington, D.C.

55 FR 29181. Final Rule: Storage of Spent Fuel in NRC-Approved Storage Casks at Power Reactor Sites. *Federal Register* Volume 55, Issue 138. July 18, 1990.

59 FR 65898. Final Rule: List of Approved Spent Fuel Storage Casks: Addition. *Federal Register* Volume 59, Issue 245. December 22, 1994.

86 FR 26651. Direct Final Rule: List of Approved Spent Fuel Storage Casks: TN Americas LLC Standardized NUHOMS® Horizontal Modular Storage System, Certificate of Compliance No. 1004, Renewed Amendment No. 17. *Federal Register* Volume 86, Issue 93. May 17, 2021.

Endangered Species Act of 1973, as amended. 16 USC §1531 et seq.

Iowa, 2022. Email from State of Iowa Department of Public Health regarding “Draft Environmental Assessment for the Exemption Request for NextEra Energy Duane Arnold, LLC Duane Arnold Energy Center, Independent Spent Fuel Storage Installation, in Palo, Iowa.” January 4, 2022. ADAMS Accession No. ML22021B505.

National Historic Preservation Act of 1966. 16 USC §470 et seq.

NEDA, 2020a. Letter from NextEra Energy to NRC, “Certification of Permanent Cessation of Power Operations.” August 27, 2020. ADAMS Accession No. ML20240A067.

NEDA, 2020b. Letter from NextEra Energy to NRC, “Certification of Permanent Removal of Fuel from the Reactor Vessel for Duane Arnold Energy Center.” October 12, 2020. ADAMS Accession No. ML20286A317.

NEDA, 2021a. Letter from NextEra Energy to NRC, “Exemption Request for Failed Fuel Can Weight in a Certificate of Compliance 1004 Renewed Amendment No. 17 61BTH Type 2 Dry Shielded Canister.” October 21, 2021. ADAMS Accession No. ML21294A280.

NEDA, 2021b. Letter from NextEra Energy to NRC, “Supplement to Exemption Request for Failed Fuel Can Weight in a Certificate of Compliance 1004 Renewed Amendment 17 61BTH Type 2 Dry Shielded Canister.” December 10, 2021. ADAMS Accession No. ML21344A186.

NEDA, 2022. Letter from NextEra Energy to NRC, “Supplement to Exemption Request for Failed Fuel Can Weight in a Certificate of Compliance 1004 Renewed Amendment 17 61BTH Type 2 Dry Shielded Canister.” January 6, 2022. ADAMS Accession No. ML22006A105.

NRC, 2017a. Renewal of Initial Certificate and Amendment Nos. 1 Through 11 and 13, Revision 1, and Amendment No. 14 of Certificate of Compliance No. 1004 for the Standardized NUHOMS® Horizontal Modular Storage System. Enclosure 21, Renewed Certificate of Compliance No. 1004, Amendment 10, Revision 1; Enclosure 22, Conditions for Cask Use and Technical Specifications, Renewed Amendment 10, Revision 1, December 4, 2017. ADAMS Accession Nos. ML17338A113 and ML17338A114, respectively.

NRC, 2017b. Renewal of Initial Certificate and Amendment Nos. 1 Through 11 and 13, Revision 1, and Amendment No. 14 of Certificate of Compliance No. 1004 for the Standardized

NUHOMS® Horizontal Modular Storage System. Enclosure 25, Renewed Certificate of Compliance No. 1004, Amendment 13, Revision 1; Enclosure 26, Conditions for Cask Use and Technical Specifications, Renewed Amendment 13, Revision 1, December 4, 2017. ADAMS Accession Nos. ML17338A117 and ML17338A118, respectively.

NRC, 2021a. Issuance of Certificate of Compliance No. 1004, Renewed Amendment No. 17, for the Standardized NUHOMS® Horizontal Modular Storage System. June 7, 2021. ADAMS Package Accession No. ML21109A325.

NRC, 2021b. Email from NRC to Iowa Department of Public Health Transmitting “Draft Environmental Assessment for the Exemption Request for NextEra Energy Duane Arnold, LLC Duane Arnold Energy Center, Independent Spent Fuel Storage Installation, in Palo, Iowa.” December 17, 2021. ADAMS Accession No. ML21354A672.