

ENCLOSURE 2

SAFETY EVALUATION

DUKE ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT

DOCKET NO. 50-302

SAFETY EVALUATION BY  
THE OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS  
RELATED TO THE AMENDMENT TO PERMANENTLY DEFUELED  
TECHNICAL SPECIFICATIONS TO REFLECT PERMANENT REMOVAL OF  
SPENT FUEL FROM THE SPENT FUEL POOLS  
DOCKET NO. 50-302  
FACILITY OPERATING LICENSE NO. DPR-72

1.0 INTRODUCTION

By application dated August 31, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16243A249), Duke Energy Florida, Inc. (DEF), requested U.S. Nuclear Regulatory Commission (NRC) approval of an Amendment revising the Crystal River Unit 3 (CR-3) Facility Operating License and the Permanently Defueled Technical Specifications (PDTs) to reflect removal of all CR-3 spent nuclear fuel from the spent fuel pools and its transfer to dry cask storage within the Independent Spent Fuel Storage Installation (ISFSI) located within the CR-3 Protected Area.

2.0 BACKGROUND

CR-3 has been shutdown since September 26, 2009, and the final removal of fuel from its reactor vessel was completed on May 28, 2011. On February 5, 2013, DEF announced that CR-3 would be retired, and notified the NRC on February 20, 2013 of the permanent cessation of power operations and that CR-3 had removed all fuel from the reactor. Pursuant to 10 CFR 50.82(a)(2), the NRC has docketed these certifications and therefore the 10 CFR Part 50 license for CR-3 no longer authorizes operation of the reactor or emplacement or retention of fuel in the reactor vessel. CR-3 is authorized to possess and store irradiated nuclear fuel.

3.0 REGULATORY EVALUATION

In 10 CFR 50.36, the Commission established its regulatory requirements related to the content of Technical Specifications (TSs). In doing so, the Commission placed emphasis on those matters related to the prevention of accidents and the mitigation of accident consequences; the Commission noted that applicants were expected to incorporate into their TSs “those items that are directly related to maintaining the integrity of the physical barriers designed to contain radioactivity.” [“Technical Specification for Facility Licenses; Safety Analysis Reports,” 33 FR 18610 (December 17, 1968)]. Pursuant to 10 CFR 50.36, TSs are required to include items in the following five categories: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) surveillance requirements (SRs); (4) design features; and (5) administrative controls. However, the rule does not specify the particular requirements to be included in a plant’s TSs.

On July 22, 1993, the Commission published a Policy Statement (58 FR 39132) on the scope and purpose of TSs for nuclear power plants. This Policy Statement included guidance criteria to be used in determining which of the LCOs and associated surveillances should remain in the TSs. The Policy Statement established four criteria to define the scope of equipment and parameters to be included in the improved standard technical specifications. These criteria were developed for licenses authorizing operation and focused on instrumentation to detect degradation of the reactor coolant system pressure boundary and on equipment or process variables that affect the integrity of fission product barriers during design-basis accidents (DBAs) or transients. The fourth criterion refers to the use of operating experience and probabilistic risk assessment to identify and include in the TS structures, systems, and components shown to be significant to public health and safety. These criteria, codified by 10 CFR 50.36, are the source of the TS requirements for facilities licensed under 10 CFR Part 50. A general discussion of these considerations is provided below.

Criterion 1 of 10 CFR 50.36(c)(2)(ii)(A) states that TS LCOs must be established for “installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.” Since the CR-3 facility no longer has fuel in the reactor and is no longer licensed to operate, this criterion is not applicable.

Criterion 2 of 10 CFR 50.36(c)(2)(ii)(B) states that TS LCOs must be established for a “process variable, design feature, or operating restriction that is an initial condition of a DBA or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.” The purpose of this criterion is to capture those process variables that have initial values assumed in the DBA and transient analyses, and which are monitored and controlled during power operation. Since the CR-3 facility no longer has fuel in the reactor and is no longer licensed to operate, this criterion is not applicable.

Criterion 3 of 10 CFR 50.36(c)(2)(ii)(C) states that TS LCOs must be established for structures, systems, or components (SSCs) that are part of the primary success path and which function or actuate to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. The intent of this criterion is to capture into the TS those SSCs that are part of the primary success path of a safety sequence analysis. The primary success path of a safety sequence analysis consists of a combination and sequences of equipment needed to operate (including consideration of the single failure criterion), so that the plant response to DBAs and transients limits the consequences of these events to within the appropriate acceptance criteria. Since fuel will have been removed from the spent fuel pool at the CR-3 facility prior to implementation of this amendment, this criterion is not applicable.

Criterion 4 of 10 CFR 50.36(c)(2)(ii)(D) states the TS LCOs must be established for SSCs which operating experience or probabilistic risk assessment has shown to be significant to public health and safety. The intent of this criterion is that risk insights and operating experience be factored into the establishment of TS LCOs. Since fuel will have been removed from the spent fuel pool at the CR-3 facility prior to implementation of this amendment, this criterion is not applicable.

Addressing administrative controls, 10 CFR 50.36(c)(5) states that administrative controls “are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner.” The

particular administrative controls to be included in the TSs, therefore, are the provisions that the Commission deems essential for the safe operation of the facility that are not already covered by other regulations. Accordingly, the NRC staff has determined that administrative control requirements that are not specifically required under Section 50.36(c)(5), and which are not otherwise necessary to obviate the possibility of an abnormal situation, or an event giving rise to an immediate threat to the public health and safety, may be relocated to more appropriate documents (e.g., Quality Assurance Program, Security Plan, or Emergency Plan), which are subject to regulatory controls. Similarly, while the required content of TS administrative controls is specified in 10 CFR 50.36(c)(5), particular details of these controls may be relocated to other licensee-controlled documents, where the 10 CFR 50.59 change evaluation process ensures that the licensee is providing adequate regulatory control.

The QA program is a logical candidate for relocations of administrative controls due to the controls imposed by such regulations as Appendix B to 10 CFR Part 50, the existing NRC-approved QA plans and commitments to industry QA standards, and the established QA program change control process in 10 CFR 50.54(a).

The NRC Administrative Letter (AL) 95-06, "Relocation of Technical Specification Administrative Controls Related to Quality Assurance," (<http://www.nrc.gov/reading-rm/doc-collections/gen-comm/admin-letters/1995/al95006.html>) provides guidance to licensees requesting amendments that relocate administrative controls to NRC-approved QA program descriptions, where subsequent changes are controlled pursuant to 10 CFR 50.54(a). AL 95-06 provides specific guidance in the areas of: (1) independent safety engineering group, (2) reviews and audits, (3) procedure review process, and (4) records and record retention.

Some relocations are specifically discussed in AL 95-06, while others are similar in nature to those discussed in the AL. Relocations not specifically discussed in AL 95-06 are evaluated with respect to the appropriateness of the relocation. Editorial changes are allowed without basis by 10 CFR 50.54(a)(3) and therefore are not explicitly evaluated in this safety evaluation report.

#### 4.0 TECHNICAL EVALUATION

The licensee is currently in the process of preparing to transfer all the spent nuclear fuel from the SFP to an ISFSI. After all the spent nuclear fuel has been transferred from the SFP to the ISFSI, many of the requirements in the license or technical specifications are inapplicable or are no longer appropriate. The licensee has proposed multiple changes to the license and technical specifications to reflect the change in status of spent fuel storage.

AREVA submitted an Application for Amendment 14, to the standardized NUHOMS Certificate of Compliance (CoC) No. 1004 for Spent Fuel Storage Casks, Revision 0, on April 16, 2015 (ADAMS Accession No. ML15114A056). AREVA submitted a revision to the above referenced Application for Amendment 14 of this CoC on November 11, 2015 (ADAMS Accession No. ML15331A350). This revision requests the removal of language in the TSs that required a TC containing a DSC be returned to the spent fuel pool following a drop of over 15 inches, and instead permit the general licensee to determine the best available option for inspection of the TC/DSC by either returning it to the spent fuel pool or an alternate means. The CoC was

amended on December 19, 2016 (ADAMS Accession No. ML16265A064). Amendment 14, to the standardized NUHOMS CoC No. 1004 for Spent Fuel Storage Casks was published in the Federal Register on January 25, 2017 and was effective on April 25, 2017. With the issuance of amendment 14 to CoC No. 1004, there is no longer a requirement to be able to return spent fuel to the spent fuel pools.

Each of the proposed changes is evaluated below based on the premise that the changes will not take effect until after all the spent nuclear fuel has been transferred to the ISFSI.

#### 4.1 Facility Operating License Changes

The licensee has proposed changes to License Conditions (LC) 1.E and 2.A to reflect that Duke Energy Florida, LLC completely owns CR-3, and all previous co-owners have been removed from the license. Currently LC 1.E. and 2.A. refer to "the licensee" and Duke Energy Florida as separate entities. This is a hold-over from when the license referred to multiple licensees who owned the facility and to Duke Energy as the one licensee who operated the facility. The last of the facility co-owners were removed from the license by amendment no. 250 (ADAMS Accession No. ML16293A191). Because of the minority co-owners were removed by previous amendment, and Duke Energy Florida, LLC is the sole owner and operator of the facility, these proposed changes are administrative in nature and are, therefore acceptable.

The licensee proposed to Eliminate License Condition 2.C.(14) related to mitigation strategy. License Condition 2.C.(14) requires the development and maintenance of strategies for addressing large fires and explosions which must address certain specified key areas. The NRC issued this license condition on August 23, 2007, to incorporate the requirements for the Interim Compensatory Measures (ICM) Order EA-02-026, Section B.5.b mitigation strategies (dated February 25, 2002). Subsequently, 10 CFR 50.54(hh)(2) became effective on May 26, 2009. The requirements in section 50.54(hh) set forth mitigation strategies and response procedure requirements for loss of large areas of the plant due to explosions or fire. However, as stated in 10 CFR 50.54(hh)(3), this section does not apply to a defueled reactor that has submitted the certification for permanent removal of fuel under 10 CFR 50.82(a). On November 28, 2011, the NRC issued a letter that rescinded Item B.5.b of the ICM Order EA-02-26. Therefore, neither the ICM Order nor 10 CFR 50.54(hh) continue to apply to CR-3. Because 10 CFR 50.54(hh) does not apply to CR-3 and Item B.5.b of the ICM Order EA-02-26 has been rescinded, there is no longer a need for CR-3 to develop and maintain mitigation strategies for addressing large fires and explosions. Based on the above, the proposed deletion of License Condition 2.C.(14) is acceptable.

The licensee has proposed to revise License Condition 2.G. Currently LC 2.G states: "This amended license is effective as of the date of issuance. Facility Operating License No. DPR-72, as amended, shall expire at midnight, December 3, 2016." The licensee has proposed to add to the existing text: "Duke Energy Florida, LLC submitted the 10 CFR 50.82(a)(1) notification to the Nuclear Regulatory Commission on February 20, 2013. Per 10 CFR 50.51(b), the Facility Operating License No. DPR-72 continues in effect until the Commission notifies the licensee that the License has been terminated." This proposed change simply restates the 10 CFR 50.51(b) provision to clarify the extension of the license until termination irrespective of the original expiration date. This change is administrative in nature and therefore acceptable.

The licensee also proposed several administrative changes to the license. Page 2 of the CR-3 Facility Operating License has a statement that this revised page was submitted on 2-24-77. This statement is being proposed for deletion as it does not tie to a specific section of the facility operating license and may confuse rather than clarify. Other than for historical purposes, there is no need to keep this statement as it provides no valuable information. Additionally, the license proposed to reformat the pages by moving up text and eliminating blank spaces and pages. These changes are administrative in nature and are therefore acceptable.

#### 4.2 Technical Specification Changes

The licensee has proposed to delete PDTS Section 1.0, "Use and Application," which includes: "Definitions," "Logical Connectors," "Completion Times," and "Frequency." As will be discussed later in this safety evaluation, all the PDTS that use or refer to the definition of actions, logical connectors, completion times, or frequency are to be deleted. As a result of the deletion of any reference to actions, logical connectors, completion times, or frequency, they need not be defined in the PDTS. Therefore the proposed deletion of the definitions of actions, logical connectors, completion times, or frequency is administrative in nature and acceptable.

The licensee has proposed to delete PDTS Section 3.0, which includes: "Limited Conditions for Operation (LCO) Applicability," and "Surveillance Requirement (SR) Applicability." As will be discussed later in this safety evaluation, all the PDTS that use or refer to LCOs or SRs are to be deleted. Without any reference to LCOs or SRs there is no need for them to be defined in the PDTS. The proposed deletion is administrative and acceptable.

The licensee has proposed to delete PDTS Section 3.7, "Plant Systems," which includes: PDTS 3.7.13, "Spent Fuel Pool Water Level," 3.7.14 "Spent Fuel Pool Boron Concentration," and 3.7.15 "Spent Fuel Assembly Storage." PDTS 3.7.13 specifies the minimum water level in the spent fuel pool during movement of irradiated fuel assemblies in the spent fuel pool and provides surveillance and action requirements for not meeting the specification. PDTS 3.7.14, specifies the minimum boron concentration in the spent fuel pool during movement or storage of fuel assemblies in the spent fuel pool and provides surveillance and action requirements for not meeting the specification. PDTS 3.7.15, specifies restrictions on the placement of fuel assemblies within the spent fuel pool, to ensure the reactivity ( $k_{\text{eff}}$ ) of the spent fuel pools will always remain  $< 0.95$ , assuming the pools to be flooded with unborated water, and provides surveillance and action requirements for not meeting the specification. Following the transfer of all spent fuel to the ISFSI, the spent fuel pool will no longer be used for spent fuel storage. Additionally, as discussed below, the licensee is adding a limitation in the PDTS which prohibits storage of spent fuel in the spent fuel pool. With spent fuel storage no longer allowed in the spent fuel pool the specifications included in PDTS 3.7 are no longer needed, so the proposed deletion is acceptable.

The licensee has proposed the deletion of the current contents of PDTS Section 4.3, "Fuel Storage," which includes PDTS 4.3.1, "Criticality," PDTS 4.3.2, "Drainage," and PDTS 4.3.3, "Capacity." PDTS 4.3.1, specifies fuel enrichment,  $K_{\text{eff}}$  [ $K_{\text{eff}}$  effective is the average number of neutrons from one fission that cause another fission], rack design, and pool storage location requirements to ensure that fuel stored in the pool is protected from accidental criticality. PDTS 4.3.2, specifies fuel pool design requirements to prevent drainage. PDTS 4.3.3, specifies storage capacity limits for fuel assemblies in the spent fuel pool. The license has also proposed

the replacement of the contents of PDTS 4.3, with the statement: "Spent fuel shall not be stored in the spent fuel pool." Following the transfer of all spent fuel to the ISFSI, the spent fuel pool will no longer be used for spent fuel storage. The licensee is adding a limitation in the PDTS which prohibits storage of spent fuel in the spent fuel pool. With spent fuel storage no longer allowed in the spent fuel pool the specifications currently included in PDTS 4.3 are no longer needed, therefore the proposed deletion is acceptable. The proposed revision to PDTS 4.3, provides a prohibition against the storage of spent fuel in the spent fuel pool, which supports the licensee's other proposed changes and ensures that fuel will not be placed in a spent fuel pool that has regulatory controls removed, and is therefore acceptable.

The licensee has proposed to relocate PDTS 5.1, "Responsibility," to the Quality Assurance Program Description (QAPD) except for PDTS 5.1.2, which specifies that the shift supervisor is responsible for the shift command function. The transfer of the administrative controls in PDTS 5.1 is consistent with the guidance in AL 95-06, is an administrative change that does not modify any of the administrative controls, and therefore, is acceptable. The position of shift supervisor described in PDTS 5.1.2, is a holdover from the control room function of supervising multiple functions of an operating nuclear power plant. With the limited requirements for supervision of the passive fuel storage at the ISFSI or with respect to the decommissioning of the former power generation facility, that position is no longer required and the proposed deletion of PDTS 5.1.1 is acceptable.

The licensee has proposed to revise PDTS 5.2, "Organization," by relocating to the QAPD PDTS 5.2.1, except for the portion of PDTS 5.2.1.c, related to individuals who train Certified Fuel Handlers, which will be deleted, and by deleting PDTS 5.2.2. The transfer of the administrative controls in PDTS 5.2.1, is consistent with the guidance in AL 95-06, is an administrative change that does not modify any of the administrative controls, and therefore, is acceptable. The portion of PDTS 5.2.1 to be deleted specifies requirements for individuals who train Certified Fuel Handlers. Following the transfer of all spent fuel to the ISFSI, and the new prohibition from placing fuel in the spent fuel pool, there will no longer be a need for Certified Fuel Handlers; therefore this proposed deletion is acceptable. PDTS 5.2.2, "Unit Staff," currently specifies the organizations and positions for activities affecting the safe storage of irradiated fuel in the spent fuel pool. The licensee's QAPD addresses any necessary organizational requirements for the fuel in the ISFSI. Therefore, the deletion of PDTS 5.2.2, after the fuel has been moved will have no impact given the organizational requirements set forth in the licensee's QAPD and is acceptable.

The licensee has proposed the relocation of PDTS 5.3, "Unit Staff Qualifications," to the QAPD except for the portion related to the Certified Fuel Handler training program. The transfer of the administrative controls in PDTS 5.3 is consistent with the guidance in AL 95-06, is an administrative change that that does not modify those portions of PDTS 5.3 being relocated, and therefore, is acceptable. Section 5.3.2, specifies: "A training and retraining program for the Certified Fuel Handler positions shall be maintained under the direction of the General Manager Decommissioning." Following the transfer of all spent fuel to the ISFSI, and the new PDTS 4.3 prohibition from storing spent fuel in the spent fuel pools, there will no longer be a need for Certified Fuel Handlers, which obviates the need for the associated training program. Therefore, this proposed deletion is acceptable.

The licensee has proposed the relocation of PDTS 5.6, "Procedures, Programs and Manuals," to the QAPD or Compliance Procedure CP-0500, "SPECIAL ACTIONS AND REPORTING REQUIREMENTS (CP-0500), except for PDTS 5.6.2.17, "Technical Specification (TS) Bases Control Program," which is to be deleted. The transfer of the administrative controls in PDTS 5.6 is consistent with the guidance in AL 95-06, is an administrative change that that does not modify those portions of PDTS 5.6 being relocated, and therefore, is acceptable. PDTS 5.6.2.17, specifies the process for changes to the TS Bases. Currently the TS Bases are all related to storage of spent fuel in the spent fuel pool, specifically the requirements in PDTS 3.7, which the licensee would delete as described above. Following the transfer of all spent fuel to the ISFSI, the spent fuel pool will no longer be used for spent fuel storage. Therefore the bases for now deleted TS requirements are no longer needed, and the proposed deletion of PDTS 5.6.2.17, is acceptable.

The license has proposed to relocate TS 5.7, "Reporting Requirements," to CP-0500 in its entirety. CP-0500 is part of the FSAR and therefore subject to the requirements of 10 CFR 50.59. Maintaining these relocated requirements in accordance with 10 CFR 50.59 provides adequate control based on the ISFSI-only status of the facility. The transfer of the administrative controls in TS 5.7 is consistent with the guidance in AL 95-06, is an administrative change that that does not modify TS 5.7, and therefore, is acceptable.

The licensee has proposed the deletion of the Permanently Defueled Technical Specification Bases in its entirety. Currently the TS Bases are all related to storage of spent fuel in the spent fuel pool, specifically the requirements in PDTS 3.0, and PDTS 3.74.2, which the licensee would delete as described above. Following the transfer of all spent fuel to the ISFSI, the spent fuel pool will no longer be used for spent fuel storage. Therefore the bases for now deleted TS requirements would no longer be needed, and the proposed deletion of the Bases is acceptable.

Other editorial changes were proposed by the licensee to facilitate the transfer of the TS requirements to the QAPD and to delete section numbers which were deleted by prior amendments. These changes are administrative in nature and are acceptable.

## 5.0 ENVIRONMENTAL CONSIDERATION

The amendment includes changes to requirements with respect to installation or use of a facility component located within the protected area and changes to recordkeeping, reporting, or administrative procedures or requirements. NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration (81 FR 73432; October 25, 2016), and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusions set forth in 10 CFR 51.22(c)(9) and 10 CFR 51.22(c)(10)(ii). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.



## 6.0 STATE CONSULTATION

On February 2, 2017, the State of Florida was notified of the proposed change to the DEF license and TSs to reflect the transfer of the spent fuel from the spent fuel pool to the ISFSI. The State had no comments.

## 7.0 CONCLUSION

The changes proposed by this license amendment request will delete requirements that are rendered not applicable following the transfer of spent nuclear fuel to the ISFSI and relocate administrative controls consistent with NRC Administrative Letter 95-06. On the basis of its review, NRC staff concluded that the licensee's request will adequately address the regulatory safety requirements for a permanently shut-down nuclear power facility with the spent nuclear fuel transferred to dry cask storage in an ISFSI. The staff, therefore, concludes that the license amendment request is acceptable.

The staff has concluded, based on the considerations discussed above, that: 1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; and 2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security nor to the health and safety of the public.

## 8.0 REFERENCES

1. Letter from Duke Energy Florida to U.S. Nuclear Regulatory Commission, "Crystal River Unit 3 -Certification of Permanent Cessation of Power Operations and that Fuel Has Been Permanently Removed from the Reactor," dated February 20, 2013, (ADAMS Accession No. ML13056A005).
2. Letter from U.S. Nuclear Regulatory Commission to Jon A. Franke, Crystal River Nuclear Plant, "Crystal River Unit 3 Nuclear Generating Plant Certification of Permanent Cessation of Operation and Permanent Removal of Fuel from the Reactor," dated March 13, 2013, (ADAMS Accession No. ML 13058A380).
3. Letter from Duke Energy Florida to U.S. Nuclear Regulatory Commission, "Crystal River Unit 3 – License Amendment Request #323, Revision 0, Permanently Defueled Technical Specifications for the Independent Spent Fuel Storage Installation to Reflect Permanent Removal of Spent Fuel from the Spent Fuel Pools," dated August 31, 2016, (ADAMS Accession No. ML16243A249).
4. Direct Final Rule, "List of Approved Spent Fuel Storage Casks: AREVA Inc., Standardized NUHOMS® Cask System, Certificate of Compliance No. 1004, Amendment No. 14, and Revision 1 of the Initial Certificate, Amendment Nos. 1 Through 11, and Amendment No. 13," January 25, 2017, (82 FR 8353)

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