

SAFETY EVALUATION REPORT BY THE  
OFFICE OF NUCLEAR SECURITY AND INCIDENT RESPONSE  
RELATED TO CRYSTAL RIVER UNIT 3 NUCLEAR PLANT  
PERMANENTLY DEFUELED EMERGENCY PLAN LICENSE AMENDMENT  
DOCKET NO. 50-302

## 1.0 INTRODUCTION

The Crystal River Unit 3 Nuclear Plant (CR-3) is a decommissioning power reactor located at Red Level, Florida in Citrus County, about 5 miles south of Levy County. The site is 7.5 miles northwest of Crystal River, Florida, and 90 miles north of St. Petersburg, Florida. CR-3 is situated on the Gulf of Mexico, within the Crystal River Energy Complex. The licensee, Duke Energy Florida, Inc. (DEF), is the holder of the CR-3 Operating License No. DPR-72, issued pursuant to the Atomic Energy Act of 1954, as amended, and Part 50, "Domestic Licensing of Production and Utilization Facilities," of Title 10 of the *Code of Federal Regulations* (10 CFR).

By letter dated August 27, 2015 (Reference 1), and as supplemented in letters dated March 2, 2016 (Reference 2) and July 14, 2016 (Reference 3), DEF requested a license amendment to revise the CR-3 Permanently Defueled Emergency Plan (PDEP) and Permanently Defueled Emergency Action Levels (EAL) Bases Manual. The changes that DEF is requesting are a revision to the PDEP and EAL Bases Manual to reflect the planned use of a dry cask independent spent fuel storage installation (ISFSI). These proposed changes to the PDEP and EAL Bases manual will address spent fuel stored in both the spent fuel pool (SFP) and the ISFSI storage facility until the complete transfer of spent fuel to the ISFSI has been accomplished. The request also proposes the elimination of the augmented staff position, Emergency Response Organization (ERO) Communicator.

The supplements dated March 2, 2016 and July 14, 2016 provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the Nuclear Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on November 10, 2015 (80 FR 69711).

## 2.0 REGULATORY EVALUATION

This safety evaluation addresses the impact of the proposed changes on the existing CR-3 PDEP and EAL Bases Manual. The regulatory requirements and guidance on which the NRC staff based its acceptance are as follows:

### 2.1 Regulations

- 10 CFR 50.47(b)(1) states, in part: "... each principal response organization has staff to respond and to augment its initial response on a continuous basis;"

- 10 CFR 50.47(b)(2) states: “On-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available and the interfaces among various onsite response activities and offsite support and response activities are specified. 10 CFR 50.47(b)(4) states, in part: “A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee...;”
- 10 CFR 50.47(b)(5) states, in part: “Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations...”
- 10 CFR 50.47(b)(6) states: “Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public.”
- 10 CFR Part 50, Appendix E, Section IV.A, states, in part: “The organization for coping with radiological emergencies shall be described, including definition of authorities, responsibilities, and duties of individuals assigned to the licensee’s emergency organization...;”

## 2.2 Guidance

- Revision 1 to NUREG-0654/FEMA-REP-1, “Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants” (Reference 4), provides a common reference and guidance source for nuclear facility operators to develop radiological emergency response plans.
- Interim Staff Guidance (ISG) document NSIR/DPR-ISG-02, “Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants” (Reference 5), provides review guidance for permanently defueled emergency plans for power reactor site undergoing decommissioning.
- Spent Fuel Storage and Transportation (SFST) document SFST-ISG-16, “Emergency Planning” (Reference 6), provides emergency plan review guidance applicable to facilities licensed pursuant to the regulatory requirements found at 10 CFR Part 72.
- Nuclear Energy Institute (NEI) document NEI 99-01, Revision 6, “Development of Emergency Action Levels for Non-Passive Reactors” (Reference 7), endorsed by the NRC in a letter dated March 28, 2013 (Reference 8), as generic (non-plant-specific) EAL scheme development guidance.

## 3.0 TECHNICAL EVALUATION

The NRC staff has reviewed the licensee’s regulatory and technical analyses in support of its proposed emergency plan changes, as described in DEF’s application. The staff’s technical evaluation is detailed below.

### 3.1 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. By letter dated February 20, 2013 (Reference 9), DEF submitted a certification to the NRC of permanent cessation of power operations and permanent removal of fuel from the reactor vessel, pursuant to 10 CFR 50.82(a)(1)(i) and (ii). CR-3's Part 50 license authorizes CR-3 to possess and store irradiated nuclear fuel. Spent fuel is currently stored onsite in a SFP.

By letter dated September 26, 2013 (Reference 10), DEF requested exemptions for CR-3 from certain planning standards in 10 CFR 50.47(b) regarding onsite and offsite radiological emergency plans for nuclear power reactors; from certain requirements in 10 CFR 50.47(c)(2) that require establishment of plume exposure and ingestion pathway emergency planning zones for nuclear power reactors; and from certain requirements in 10 CFR Part 50, Appendix E, Section IV, which establishes the elements that make up the content of emergency plans. By letter dated March 30, 2015 (Reference 11), the NRC approved the exemptions requested in DEF's September 26, 2013 letter, supplemented by letters dated March 28, 2014 (Reference 12), May 7, 2014 (Reference 13), May 23, 2014 (Reference 14) and August 28, 2014 (Reference 15).

By letter dated March 31, 2015 (Reference 16), the NRC issued Amendment No. 246 for the CR-3 PDEP and EAL scheme based on the requirements of 10 CFR 50.47 and Appendix E to 10 CFR Part 50, as exempted. Changes to the CR-3 Emergency Plan and EAL scheme to reflect exemptions granted, are contained in DEF letter dated September 26, 2013, as supplemented by letters dated March 28, 2014, May 23, 2014, and October 6, 2014 (Reference 17). The PDEP and EAL scheme were fully implemented on April 7, 2015, in accordance with License Amendment No. 246.

### 3.2 Proposed Changes

By letter dated August 27, 2015 (Reference 1), DEF requested that the NRC review and approve Revision 2 to the PDEP and Revision 1 to the EAL Bases Manual to reflect the planned dry cask storage of spent fuel in an ISFSI. As such, spent fuel will be stored near term in both the SFP and ISFSI storage facility. The major changes that DEF is requesting are: adding the responsibilities for emergency planning functions of the ISFSI to the Shift Supervisor/Certified Fuel Handler (SS/CFH); the elimination of an augmented ERO Communicator position, and the addition of an Unusual Event initiating condition (E-HU1) for damage to a loaded dry shielded canister confinement boundary.

In a letter dated February 4, 2016 (Reference 18), the NRC requested additional information regarding DEF's license amendment request. DEF's response to the NRC information request, dated March 2, 2016 (Reference 2), included clarification to the emergency plan as originally submitted.

### 3.3 Evaluation

#### *Shift Supervisor/Certified Fuel Handler (SS/CFH) Duties*

The proposed Revision 2 to the CR-3 PDEP adds the responsibility for an ISFSI facility to the Emergency Coordinator (EC) tasks for emergency response. This includes responsibility for all emergencies related to transfer to and storage of spent fuel in the ISFSI facility.

The SS/CFH is the senior management position responsible for implementing the emergency plan. If an EAL threshold for an Initiating Condition (IC) is met, the SS/CFH assumes the position of Emergency Coordinator and activates the emergency plan. Upon activation of the emergency plan, the SS/CFH, as the Emergency Coordinator, is responsible for implementation of the following actions: event classification; notification of site staff; notification to Federal and State authorities; implementation of assessment of onsite protective measures; notification to advisory personnel; augmentation of onsite ERO (if needed), and coordination of emergency response activities related to the ISFSI.

The proposed change reflects the storage of the spent fuel in both the SFP and the ISFSI by adding to the EC's tasks the responsibility for emergency response at the ISFSI. This additional responsibility for the emergency response at the ISFSI during the time period when there will be spent fuel stored in both the SFP and ISFSI will not affect the implementation of the CR-3 PDEP during an emergency because the limited applicable design-basis accidents of spent fuel stored in the ISFSI. The robust nature and high integrity of the spent fuel storage system selected for use at the CR-3 ISFSI is designed to prevent the release of radioactivity in the event of an accident, including environmental phenomena (e.g., earthquake and flooding). As a result of the high integrity dry shielded canister's design and the substantial protection afforded the canisters by the horizontal storage modules, leakage of fission products from a canister is not considered to be a credible event. As such, the proposed change to relocate the spent fuel to the ISFSI will not affect the timing or performance of the existing emergency response duties of the Emergency Coordinator.

Based on the staff's review of the proposed Revision 2 CR-3 PDEP as described above, the staff concludes that the planning standard of 10 CFR 50.47(b)(2), pertaining to on-shift facility licensee responsibilities for emergency response, is addressed in an acceptable manner in the PDEP, considering the permanently shutdown and defueled status of the facility and the proposed installation of the ISFSI.

#### *Elimination of On-Call ERO Communicator augmented staff position*

The proposed Revision 2 to the CR-3 PDEP requests the elimination of an augmented staff position of ERO Communicator. This position was originally included in the ERO staff under Revision 1 to the CR-3 PDEP to assist the Emergency Coordinator and the Emergency Support Center (ESC) staff in the development and delivery of emergency notification messages to the State of Florida and the NRC.

While the Emergency Coordinator retains the responsibility to notify Federal, State and local authorities, he can delegate this action to the augmenting Emergency Mitigation Coordinator, the augmenting Radiation Controls Coordinator, or Certified Fuel Handlers at any time, in

accordance with Section 9.2 of the CR-3 PDEP. DEF provided that drill observations have shown that there were no time challenges for the Emergency Coordinator to perform notifications to the State and the NRC. Additionally, no conflicting EP functions were identified that would prevent the Emergency Coordinator from the timely completion of all required notifications. The proposed elimination of ERO Communicator position does not impact the notification timing or message content previously approved by the NRC in Revision 1 to the CR-3 PDEP.

Based on the staff's review of the proposed change to the CR-3 PDEP, as described above, the staff concludes that the planning standards of 10 CFR 50.47(b)(2), 10 CFR 50.47(b)(5) and 10 CFR 50.47(b)(6), are addressed in an acceptable manner in the PDEP considering the permanently shutdown and defueled status of the facility and the proposed installation of the ISFSI.

#### *Addition of Spent Fuel Pool IC and EAL for ISFSI Storage Facility*

The proposed CR-3 PDEP and EAL Bases Manual revisions reflect the planned use of an ISFSI located in the protected area. The CR-3 site spent fuel assemblies will be loaded into dry shielded canisters and placed in the ISFSI facility for storage. NEI 99-01, Revision 6, IC E-HU1 for an Unusual Event was added to the proposed EAL Bases Manual to cover the spectrum of credible natural and man-made events included within the scope of an ISFSI design. In addition, DEF proposes to incorporate into the EAL scheme appropriate aspects of IC HU1 and IC HA1 to address a HOSTILE ACTION directed against an ISFSI. The proposed EAL scheme also adds an EAL for spent fuel dry shielded canisters in transit or stored in the horizontal storage modules at the ISFSI facility.

Based on the staff's review of the CR-3 PDEP and EAL Bases Manual as described above, the NRC staff concludes the planning standard of 10 CFR 50.47(b)(4), requiring each applicable licensee to use a standard scheme of emergency classification and action levels, is addressed in an acceptable manner in the PDEP considering the permanently shutdown and defueled status of the facility and the proposed installation of the ISFSI.

#### **4.0 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 (80 FR 69711; November 10, 2015), and there has been no public comment on such finding. The March 2, 2016, and July 14, 2016, supplements provided clarifying information and did not change the scope of the application. 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.

## 5.0 STATE CONSULTATION

On September 28, 2016, the staff consulted with the Florida State official, Ms. Cindy Becker, regarding the proposed change to the Permanently Defueled Emergency Plan and Permanently Defueled Emergency Action Level Bases Manual to reflect the planned use of a dry cask independent spent fuel storage installation (ISFSI). The state official commented that the change was a good safety step.

## 6.0 CONCLUSION

Based on the staff's review of the proposed CR-3 PDEP and EAL Bases Manual, as described above, the staff finds that the proposed changes meet the applicable standards in 10 CFR 50.47(b) and requirements in Appendix E of 10 CFR Part 50 and provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the facility. Therefore, the NRC staff concludes that the licensee's proposed changes to the CR-3 PDEP and EAL Bases Document in its application dated August 27, 2015, and as supplemented by the letters dated March 2, 2016, and July 14, 2016, are acceptable.

## 7.0 REFERENCES

1. Letter from Duke Energy Florida, Inc. to U.S. Nuclear Regulatory Commission, "Crystal River Unit 3 – License Amendment Request #318, Revision 0, Permanently Defueled Emergency Plan, Revision 2, and Permanently Defueled Emergency Action Level Bases Manual, Revision 1, for the independent Spent Fuel Storage Installation," dated August 27, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15246A231).
2. Letter from Duke Energy Florida, Inc. to U.S. Nuclear Regulatory Commission, "Crystal River Unit 3 – License Amendment Request #318, Revision 0, Permanently Defueled Emergency Plan, Revision 2, and Emergency Action Level Scheme, Revision 1, for the Independent Spent Fuel Storage Installation Response to Request for Additional Information," dated March 2, 2016 (ADAMS Accession No. ML16063A240).
3. Letter from Duke Energy Florida, Inc. to U.S. Nuclear Regulatory Commission, "Crystal River, Unit 3 - LAR No. 318, Revision 0, Supplement 1, Permanently Defueled Emergency Plan, and Permanently Defueled Emergency Action Level Bases Manual, for the Independent Spent Fuel Storage Installation," dated July 14, 2016 (ADAMS Accession No. ML16196A090).
4. U.S. Nuclear Regulatory Commission and Federal Emergency Management Agency, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," NUREG-0654/FEMA-REP-1, Rev.1 dated November 1980 (ADAMS Accession No. ML040420012).
5. NSIR/DRP-ISG-2, "Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants," dated May 11, 2015 (ADAMS Accession No. ML14106A057).
6. SFST-ISG-16, "Emergency Planning," dated June 14, 2000 (ADAMS Accession No. ML003724570).

7. NEI 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors," dated November 2012 (ADAMS Accession No. ML12326A805).
8. Letter from U.S. Nuclear Regulatory Commission to NEI "Technical Evaluation for the Endorsement of NEI 99-01, Revision 6," dated March 28, 2013 (ADAMS Accession No. ML12346A463).
9. Letter from Duke Energy Florida, Inc. 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. ML 13056A005).
10. Letter from Duke Energy Florida, Inc. to U.S. Nuclear Regulatory Commission, "Crystal River Unit 3 - License Amendment Request #315, Revision 0, Permanently Defueled Emergency Plan and Emergency Action Level Scheme, and Request for Exemption to Certain Radiological Emergency Response Plan Requirements Defined by 10 CFR 50," dated September 26, 2013 (ADAMS Accession No. ML 13274A584).
11. Letter from U.S. Nuclear Regulatory Commission to Crystal River Nuclear Plant (CR-3), "Crystal River Unit 3 – Exemptions From Certain Emergency Planning Requirements and Related Safety Evaluation (TAC No. MF2981)," dated March 30, 2015 (ADAMS Accession No. ML 15058A906).
12. Letter from Duke Energy Florida, Inc. to U.S. Nuclear Regulatory Commission, "Crystal River Unit 3 - Exemptions to Radiological Emergency Response Plan Requirements Defined by 10 CFR 50.47 and Appendix E to Part 50, Revision 1, and Response to Request for Additional Information," dated March 28, 2014 (ADAMS Accession No. ML 14098A072).
13. Letter from John Elnitsky, Duke Energy, to U.S. Nuclear Regulatory Commission, "Crystal River Unit 3 - Response to Requests for Additional Information and Supplement 1 to License Amendment Request #316, Revision 0," dated May 7, 2014 (ADAMS Accession No. ML 14139A006).
14. Letter from Duke Energy Florida, Inc. to U.S. Nuclear Regulatory Commission, "Crystal River Unit 3 - Permanently Defueled Emergency Plan and Emergency Action Level Scheme, Revision 1, and Response to Request for Additional Information," dated May 23, 2014 (ADAMS Accession No. ML 14154A408).
15. Letter from R. R. Reising, Duke Energy, to U.S. Nuclear Regulatory Commission, "Crystal River Unit 3 - Exemptions to Radiological Emergency Response Plan Requirements Defined by 10 CFR 50.47 and Appendix E to Part 50, Supplement," dated August 28, 2014 (ADAMS Accession No. ML 14251A237).
16. Letter from U.S. Nuclear Regulatory Commission to Crystal River Nuclear Plant (CR-3), "Crystal River Unit 3- Issuance of Amendment Regarding Changes to the Emergency Plan and Emergency Action Levels (TAC No. MF3415)," dated March 31, 2015 (ADAMS Accession No. ML15027A209).

17. Letter from Duke Energy Florida, Inc. to U.S. Nuclear Regulatory Commission, "Crystal River Unit 3 - Permanently Defueled Emergency Plan, Revision 2 and Response to Request for Additional Information," dated October 6, 2014 (ADAMS Accession No. ML14288A122).
18. Letter from U.S. Nuclear Regulatory Commission to Duke Energy Florida, Inc., "Crystal River Unit 3 Nuclear Generating Plant - Request for Additional Information License Amendment Request for Emergency Plan Changes," dated February 4, 2016 (ADAMS Accession No. ML16032A177).

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