



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 19, 2014

Mr. Terry D. Hobbs
General Manager, Decommissioning
Crystal River Nuclear Plant (NA2C)
15760 W. Power Line Street
Crystal River, FL 34428-6708

SUBJECT: CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT – REVIEW OF
SPENT FUEL MANAGEMENT PROGRAM AND THE PRELIMINARY
DECOMMISSIONING COST ESTIMATE (TAC NO. ME7831)

Dear Mr. Hobbs:

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.54(bb), nuclear power plants that are within 5 years of expiration of their operating license must submit a spent fuel management and funding program to the U.S. Nuclear Regulatory Commission (NRC) for review and preliminary approval. The program should discuss the means by which the licensee intends to manage and provide funding for the management of spent fuel until the fuel is transferred to the Department of Energy for permanent disposal.

By letter dated November 29, 2011, Florida Power Corporation, doing business as Progress Energy Florida, Inc., submitted "Crystal River, Unit 3 – Submittal of Program for Maintenance of Irradiated Fuel and Preliminary Decommissioning Cost Analysis in accordance with 10 CFR 50.54(bb) and 10 CFR 50.75(f)(3)." By letter dated September 28, 2012, the NRC documented its approval of the plan.

Pursuant to 10 CFR 50.54(bb), licensees are required to notify the NRC of any significant changes in the proposed Irradiated Fuel Management Program. By letter dated December 3, 2013, Duke Energy Florida, Inc. (DEF) submitted an updated Irradiated Fuel Management Program for Crystal River Unit 3 (CR-3) because of changes in the timing of decommissioning during Safe Storage.

Based on the safety evaluation contained herein, the NRC staff finds that DEF's updated program for irradiated fuel management at CR-3 is adequate and provides sufficient details associated with the funding mechanisms. The NRC staff, therefore, concludes that the program updates discussed in the attached evaluation did not alter the staff's original determination that the program complies with 10 CFR 50.54(bb).

However, if there are changes in the Decommissioning Trust Fund balance that materially impact the licensee's cost analysis, or if new disposal rates are significantly higher, the licensee would be obligated under 10 CFR 50.9 to update any significant changes in projected costs or available funds.

T. Hobbs

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If you have any questions, please contact me at 301-415-3229 or via e-mail at michael.orenak@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael D. Orenak". The signature is written in a cursive, flowing style.

Michael D. Orenak, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-302

Enclosure:
Staff Evaluation

cc w/encl: Distribution via Listserv



UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE UPDATED IRRADIATED FUEL MANAGEMENT PROGRAM

DUKE ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT

DOCKET NO. 50-302

1.0 INTRODUCTION

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.54(bb), nuclear power plants that are within 5 years of expiration of their operating license must submit a spent fuel management and funding program to the U.S. Nuclear Regulatory Commission (NRC) for review and preliminary approval. The program should discuss the means by which the licensee intends to manage and provide funding for the management of spent fuel until the fuel is transferred to the Department of Energy (DOE) for permanent disposal.

By letter dated November 29, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML113390139), Florida Power Corporation, doing business as Progress Energy Florida, Inc., submitted "Crystal River, Unit 3 – Submittal of Program for Maintenance of Irradiated Fuel and Preliminary Decommissioning Cost Analysis in accordance with 10 CFR 50.54(bb) and 10 CFR 50.75(f)(3)." By letter dated September 28, 2012, the NRC staff approved of the plan (ADAMS Accession No. ML12262A245).

Pursuant to 10 CFR 50.54(bb), licensees are required to notify the NRC of any significant changes in the proposed Irradiated Fuel Management Program. By letter dated December 3, 2013, Duke Energy Florida, Inc. (DEF) submitted an updated Irradiated Fuel Management Program for Crystal River Unit 3 Nuclear Generating Plant (CR-3) because of changes in the timing of decommissioning during Safe Storage (SAFSTOR) (ADAMS Accession No. ML13340A008).

2.0 BACKGROUND

CR-3 is located at the Crystal River Energy Complex (CREC), on the Gulf of Mexico in Citrus County, Florida. The City of Crystal River is about 7.5 miles northwest of the site. The City of Tampa Bay is approximately 70 miles south of the site. CR-3 is located on the 1062 acre developed portion of the 4738 acre CREC site.

The majority owner of CR-3 is DEF with minority ownership held by the City of Alachua, the City of Bushnell, the City of Gainesville, the City of Kissimmee, the City of Leesburg, the City of Ocala, the Orlando Utilities Commission and the City of Orlando, the Seminole Electric Cooperative, and the City of New Smyrna Beach and the Utilities Commission, City of New Smyrna Beach.

Enclosure

CR-3 is a single unit site surrounded by four fossil fuel power plants at the CREC site. The reactor coolant system is a two-loop pressurized water reactor design supplied by Babcock & Wilcox Company housed in a dry, ambient pressure, steel-lined primary containment vessel surrounded by a concrete secondary containment building. The reactor was originally licensed to operate to a maximum power output of 2452 megawatts-thermal (MWt). NRC has approved three power uprates in 1981, 2002, and 2007, for a maximum power output level of 2609 MWt.

CR-3 does not currently have an onsite Independent Spent Fuel Storage Installation (ISFSI). In the Updated Irradiated Fuel Management Program, DEF stated it plans to construct an onsite ISFSI. Once the construction of the ISFSI is completed, the licensee plans to transfer all of the irradiated fuel in the spent fuel pool to the onsite ISFSI. The spent fuel will then be stored in the ISFSI until possession is transferred to DOE.

By the letter dated February 20, 2013, DEF certified to the NRC that it has permanently ceased power operation and permanently removed fuel from the reactor of CR-3 (ADAMS Accession No. ML13056A005). CR-3 has been shut down since September 26, 2009, due to issues with the repair of the containment. The licensee completed the removal of fuel from the reactor vessel on May 28, 2011. As required by 10 CFR 50.54(bb), on December 3, 2013, DEF submitted its Updated Irradiated Fuel Management Plan.

3.0 REGULATORY REQUIREMENTS AND CRITERIA

3.1 Regulatory Requirement (10 CFR 50.54(bb))

Section 10 CFR 50.54(bb) states, in part:

For nuclear power reactors licensed by the NRC, the licensee shall, within 2 years following permanent cessation of operation of the reactor or 5 years before expiration of the reactor operating license, whichever occurs first, submit written notification to the Commission for its review and preliminary approval of the program by which the licensee intends to manage and provide funding for the management of all irradiated fuel at the reactor following permanent cessation of the operation of the reactor until title to the irradiated fuel and possession of the fuel is transferred to the Secretary of Energy for its ultimate disposal in a repository.

Further, 10 CFR 50.54(bb) states "the licensee shall notify the NRC of any significant changes in the proposed waste management program as described in the initial notification."

3.1.1 Criteria to Support the 10 CFR 50.54(bb) Review

For the NRC staff to evaluate and provide approval of the spent fuel management and funding program, the submittal should include:

- Estimated cost to isolate the spent fuel pool and fuel handling systems. For the decontamination (DECON) option, the cost to isolate the spent fuel pool and fuel handling systems may be considered part of the preparation for DECON;
- Estimated cost to construct an ISFSI or a combination of wet/dry storage;
- Estimated annual cost for the operation of the selected option (wet or dry storage or a combination of the two) until the DOE takes possession of the fuel;
- Estimated cost for the preparation, packaging, and shipping of the fuel to the DOE;
- Estimated cost to decommission the spent fuel storage facility; and
- Brief discussion of the selected storage method or methods, and the estimated time for these activities.

4.0 EVALUATION

4.1 Evaluation of the Program to Manage and Provide Funding of all Irradiated Fuel

As required by 10 CFR 50.54(bb), DEF (formerly Progress Energy) estimated the cost associated with the long-term management of spent fuel at \$265.6 million (note: all dollar values identified in this evaluation are indicated in 2013 dollars). The long-term management of the spent fuel for CR-3 is divided between three periods. The first, planning and preparations, consists of activities to support the decommissioning plan, design and installation of an alternate spent fuel cooling system, isolation of the spent fuel pools and fuel handling systems, initiation of construction of the ISFSI pad, and shipment of 76 unused fuel assemblies to other sites. This phase will be completed in 2015. The second phase, dormancy with wet fuel storage, includes completion of the ISFSI, loading the irradiated fuel assemblies into dry shielded canisters and transferring the canisters to horizontal storage modules. The second phase will be completed in 2019. The third phase, dormancy with dry fuel storage, consists of a security force, preventive and corrective maintenance, routine radiological inspections, and environmental and radiation monitoring. DEF predicts that DOE will begin transferring fuel off of the CR-3 site in 2035, and expects that process to finish in 2036. The timing of fuel transfer activities are from an internal probability assessment, which was characterized in a Response to a Request for Additional Information dated June 17, 2014 (ADAMS Accession No. ML14178B285).

Costs in Phase 1 will total approximately \$33.6 million. These costs include \$16 million for security from 2013 to 2015 and \$17.6 million for spent fuel pool offload preparations. Phase 2 costs will be approximately \$147 million. These costs include \$86.7 million in security and utility staffing and site non-labor costs, \$442,000 in ISFSI operations and maintenance (O&M) costs, \$3.7 million in spent fuel pool costs, \$55.1 million in pool offload and dry shielded canister transfer costs, and approximately \$1 million in miscellaneous costs. Period 3 costs will total \$84.8 million. These costs include \$76.1 million in security and utility staffing and site non-labor costs, \$1.87 million in ISFSI O&M costs, \$55.1 million in ISFSI pool offload costs, \$4.8 million in spent fuel capital and transfer costs for shipping fuel to DOE, and approximately \$2 million in miscellaneous costs. DEF provided an annual cash flow analysis in the Irradiated Fuel Management Plan. The detailed cost analysis for each activity was provided in the Site-Specific Decommissioning Cost Estimate, prepared by TLG Services, Inc., in December 2013 (ADAMS Accession No. ML13343A178).

The ISFSI at CR-3 will utilize a Nutech Horizontal Modular Storage (NUHOMS) System. This system uses dry shielded canisters that hold 32 fuel assemblies. Once fuel is loaded into the canisters, they are transported from the spent fuel pool to the ISFSI in transfer casks, which are loaded into the horizontal storage modules. DEF expects the capital costs related to construction of the ISFSI pad and purchasing the NUHOMS components will cost \$93.8 million. These capital costs were not included in the \$265 million irradiated fuel management cost estimate. In its updated Irradiated Fuel Management Plan submittal, DEF indicates that ISFSI capital costs are not recoverable from the decommissioning trust fund (DTF). DEF indicated it would receive cost recovery from the Florida Public Services Commission for the capital costs related to the ISFSI and NUHOMS components and it may use excess monies from litigation from the DOE.

DEF states that it intends to fund expenditures for license termination from the DTF currently held by DEF as well as the nine minority owners. On March 28, 2014, DEF requested an exemption to use the DTF for irradiated fuel management expenses (ADAMS Accession No. ML14098A037). The licensee maintains that expenditures from the trust fund for the management of the spent fuel will not reduce the value of the DTF that is necessary to decommission the reactor, as defined in 10 CFR 50.2. For assurance, the licensee applied a real rate of return of 1.65 percent to its analysis and deducted the annual expenses associated with SAFSTOR, spent fuel management, and site restoration, which resulted in a surplus of approximately \$54.4 million in 2074. DEF acknowledged the need for an exemption pursuant to 10 CFR 50.12(a) to use the DTF for anything beyond the decommissioning activities defined in 10 CFR 50.2. NRC performed an independent cash flow analysis to verify the analysis performed by DEF. The NRC staff's analysis also resulted in a surplus in 2074.

In addition, DEF stated that it will also comply with applicable license termination requirements in accordance with 10 CFR 50.82 with respect to plant shutdown and post-shutdown activities including seeking such NRC approvals and on such schedules as necessary to satisfy these requirements consistent with the continued storage of irradiated fuel.

Therefore, the NRC staff finds the irradiated fuel management program cost estimates, and funding mechanisms, to be reasonable.

5.0 CONCLUSION

The NRC staff finds that DEF's updated program for irradiated fuel management at CR-3 is adequate and provides sufficient details associated with the funding mechanisms. The NRC staff, therefore, concludes that the program updates discussed above did not alter the staff's original determination that the program complies with 10 CFR 50.54(bb).

However, if there are changes in the DTF balance that materially impact the licensee's cost analysis, or if new disposal rates are significantly higher, the licensee would be obligated under 10 CFR 50.9 to update any significant changes in projected costs or available funds.

Principal Contributor: Michael D. Purdie

Date: December 19, 2014

T. Hobbs

- 2 -

If you have any questions, please contact me at 301-415-3229 or via e-mail at michael.orenak@nrc.gov.

Sincerely,

/RA/

Michael D. Orenak, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-302

Enclosure:
Staff Evaluation

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* Concurrence via memo

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