



Crystal River Nuclear Plant  
15760 W. Power Line Street  
Crystal River, FL 34428  
Docket 50-302  
Docket 72-1035  
Operating License No. DPR-72

10 CFR 72.4  
10 CFR 72.30(b)

May 15, 2017  
3F0517-01

Attn: Document Control Desk  
Director, Division of Spent Fuel Management,  
Office of Nuclear Material Safety and Safeguards,  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Subject: Crystal River Unit 3 Decommissioning Funding Plan for Independent Spent Fuel Storage Installations (ISFSIs)

References: 1. Letter from Mark Lombard (U. S. NRC), dated August 21, 2013, "Clarification Regarding the Timing of Submittal of a Decommissioning Funding Plan per Title 10 of the *Code of Federal Regulations* Section 72.30(b) for Future Independent Spent Fuel Storage Installations"

Dear Sir:

In accordance with 10 CFR 72.30, Financial Assurance and Recordkeeping for Decommissioning, Duke Energy Florida, LLC (DEF) is submitting the Crystal River Nuclear Plant (CR-3) decommissioning funding plan for the Independent Spent Fuel Installation (ISFSI). 10 CFR 72.30(b) requires that "each holder of, or applicant for, a license under this part must submit for NRC review and approval a decommissioning funding plan ...."

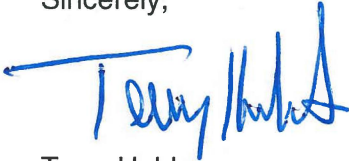
In accordance with 10 CFR 72.13, Applicability, the requirement in 10 CFR 72.30(b) is applicable to both specific and general licensed ISFSIs. Furthermore, in a letter from the NRC dated August 21, 2013 (Reference 1), the NRC clarified the timing of the 10 CFR 72.30(b) for future ISFSIs. It states, "For 10 CFR Part 72 general licensees, there is no associated license application. Rather, under 10 CFR 72.210, a general license is issued for the storage of spent fuel in an ISFSI at power reactor sites to persons authorized to possess or operate a reactor under 10 CFR Part 50 or Part 52. Also, 10 CFR 72.30(b) does not include a submission date by which future Part 72 general licensees (i.e., licensees whose Part 72 general license commences after December 17, 2012, the effective date of the Decommissioning Planning Final Rule) must submit a decommissioning funding plan. Therefore, consistent with the general license commencement date in 10 CFR 72.212(a)(3), general licensees should submit a decommissioning funding plan to the NRC no later than the date that the general licensee first uses a spent fuel storage cask to store spent fuel."

The CR-3 ISFSI decommissioning funding plan is provided in Enclosure 1 in advance of the date that the first spent fuel storage cask is used to store spent fuel per 10 CFR 72.212(a)(3), consistent with the foregoing clarification.

No new regulatory commitments have been made in this letter.

If you have any questions regarding this submittal, please contact Mr. Mark Van Sicklen, Crystal River Licensing Lead, Nuclear Regulatory Affairs, at (352) 563-4795.

Sincerely,

A handwritten signature in blue ink, appearing to read "Terry Hobbs". The signature is written in a cursive style with a long horizontal stroke at the beginning.

Terry Hobbs  
General Manager, Decommissioning

TDH/mvs

Enclosure 1: Crystal River Unit 3 ISFSI Decommissioning Funding Plan

xc: NMSS Project Manager  
Regional Administrator, Region I

**DUKE ENERGY FLORIDA, LLC**

**DOCKET NUMBER 50 - 302 / LICENSE NUMBER DPR - 72**

**ENCLOSURE 1**

**CRYSTAL RIVER UNIT 3  
ISFSI DECOMMISSIONING FUNDING PLAN**

## Crystal River Unit 3 ISFSI Decommissioning Funding Plan

In accordance with 72.30(b), each holder of, or applicant for, a license under this part must submit for NRC review and approval a decommissioning funding plan that must contain:

**1. Information on how reasonable assurance will be provided that funds will be available to decommission the ISFSI or MRS.**

10 CFR 72.30(c) requires a decommissioning funding plan be provided at least every three years and at the time of license renewal. Compliance with this part, together with the method of assuring funds described in Part 4 below, will provide reasonable assurance that funds will be available to decommission the CR-3 ISFSI.

**2. A detailed cost estimate for decommissioning, in an amount reflecting:**

- **The cost of an independent contractor to perform all decommissioning activities;**
- **An adequate contingency factor; and**
- **The cost of meeting the § 20.1402 of this chapter criteria for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the provisions of § 20.1403 of this chapter, the cost estimate may be based on meeting the § 20.1403 criteria.**

The design and capacity of the CR-3 ISFSI is based upon the NUHOMS-32PTH1 Type 2-W spent fuel storage systems. The systems consist of a stainless steel Dry Shielded Canister (DSC), and a concrete Horizontal Storage Module (HSM), which houses the DSC during storage. The ISFSI consists of 40 HSM's with NUHOMS-32PTH1 Type 2-W DSCs that can house up to 32 spent fuel assemblies each. All CR-3 spent fuel is projected to be fully removed from the site in 2036.

Details of the NUHOMS spent fuel storage system, including physical dimensions, can be found in the proprietary version of the Final Safety Analysis Report for the Transnuclear NUHOMS, Docket Number 72-1004.

The methodology used to develop this detailed cost estimate follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates."<sup>1</sup> The methodology includes elements for estimating distributed and undistributed costs. Distributed costs are activity specific and include planning and preparation costs as well as the decontamination, packaging, disposal and removal of components. Undistributed costs are typically time-dependent costs such as utility and decommissioning general contractor staff, property taxes, insurance, regulatory fees and permits, energy costs, and security staff. The methodology also uses a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal (\$/cubic yard), steel removal (\$/ton), and cutting costs (\$/inch) are developed using local labor rates.

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<sup>1</sup> Atomic Industrial Forum, Inc., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986. This document is referenced in NRC's NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors."

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In this detailed cost estimate, contingency fulfills this role. Specifically, contingency is added to all costs at a constant 25% rate, consistent with the contingency evaluation criteria referenced by the NRC in NUREG-1757<sup>2</sup>.

In addition, the detailed cost estimate is based on or includes the following:

- the expected ISFSI configuration after all spent fuel and some Greater-than-Class-C (GTCC) material has been removed from the site;
- the ISFSI pads not being contaminated, with only verification surveys to be performed;
- the costs necessary to terminate the ISFSI's NRC license and meet the §20.1402 criteria for unrestricted use;
- no remediation of contaminated (radiological) soil being required in order to terminate the site operating license;
- no expected interior or exterior radioactive surface contamination of the HSMs; and
- an allowance for module remediation of 6 modules that are assumed to have some level of neutron-induced activation after approximately 20 years of storage (i.e., to levels exceeding free-release limits). Controlled disposal costs are included for this allowance of concrete and steel.

The cost to dispose of residual radioactivity, and verify that the remaining facility and surrounding environs meet the NRC's radiological limits established for unrestricted use, forms the basis of this cost estimate. Disposition of released material and structures is assumed to be outside the scope of this cost estimate.

A detailed breakdown of the cost to decommission the CR-3 ISFSI is provided in the table below. These costs were developed in conjunction with the 2013 Decommissioning Cost Analysis for the CR-3 prepared by TLG Service, Inc. Costs were escalated using the 2014, 2015, 2016 and first quarter 2017 Consumer Price Index inflation factors of 1.7%, 0.1%, 1.3% and 1.6%, respectively.

Activity costs for ISFSI decommissioning are divided into 3 phases. The first phase covers initial planning during which the empty casks, ISFSI pads, and surrounding environs are characterized and the activity specifications and work procedures for the decontamination are developed. The next phase includes the cost of removal, packaging, transportation and disposal of the activated components, including supporting equipment, materials and supplies. The final phase includes the cost for the license termination survey, the verification survey, and the associated equipment and laboratory support. The cost estimate also includes costs for the NRC and NRC contractor reviews, CR-3's oversight staff, site security (industrial), and other site operating costs. The contents of the ISFSI are expected to be removed and transferred to the Department of Energy at the end of 2036; however, the ISFSI will not be promptly decommissioned. Instead, the decommissioning of the ISFSI and the power block structures will be synchronized. ISFSI decommissioning is expected to begin in 2073 and is estimated to occur in 120 days.

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<sup>2</sup>

"Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. Nuclear Regulatory Commission's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Volume 3, Revision 1, February 2012.

The methodology employed by TLG Services, Inc., does not assume that all decommissioning activities will be performed by an independent contractor. Because it would be impractical to identify the activities in the cost estimate that are assumed to be performed by an independent contractor, Duke has, as a conservative measure, applied a 20% markup to all costs in the estimate in order to determine the cost of an independent contractor to perform all decommissioning activities. This markup accounts for profit margin (15%) and risk premium (5%) in amounts consistent with what is applied in Duke Energy's Asset Retirement Obligation. This markup can be seen in the table below and is deemed appropriate because it is conservatively applied to all activity costs even though certain costs already account for performance by an independent contractor or are not activity costs (e.g., property taxes, insurance).

**3. Identification of and justification for using the key assumptions contained in the DCE.**

The assumptions and justification for those assumptions included in the CR-3 ISFSI decommissioning cost estimate are presented in the Section 2 above.

**4. A description of the method of assuring funds for decommissioning from paragraph (e) of this section, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility.**

ISFSI decommissioning is included as a cost in the CR3 site-specific cost estimate submitted with the PSDAR on December 2, 2013 (ML13340A009). Therefore, funding assurance for ISFSI decommissioning is provided by the Annual Decommissioning and Irradiated Fuel Management Financial Status Report, submitted in accordance with 10 CFR 50.75(f)(1), 10 CFR 50.82(a)(8)(v), 10 CFR 50.82(a)(8)(vi) and 10 CFR 50.82(a)(8)(vii) and last submitted on March 28, 2017 (ML17087A256). The PSDAR does not include the costs associated with an independent contractor performing the work, as required by 10 CFR 72.30(b)(2)(i). The amount of surplus identified in the financial assurance demonstration is more than sufficient to fund the assumed additional third party markup costs.

In addition, Duke Energy is an electric utility and, as such, can rely solely on the external sinking fund in accordance with 10 CFR 72.30(e)(5). Cost estimates will be adjusted at least every three years and plans submitted to NRC as required by 10 CFR 72.30(c). Funding levels can be periodically adjusted through rate recovery.

**5. The volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination.**

There is currently no known subsurface material containing residual radioactivity that will require remediation at decommissioning.

**6. A certification that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning.**

DEF hereby certifies that financial assurance for decommissioning the CR-3 ISFSI has been provided in the amount of the cost estimate for decommissioning using the methodology described in Part 4 above.

**Crystal River Unit 3 Nuclear Generating Plant  
ISFSI Decommissioning Cost Estimate  
(thousands of 2017 dollars)**

<b>Activity Description</b>	<b>Removal Costs</b>	<b>Packaging Costs</b>	<b>Transport Costs</b>	<b>LLRW Disposal Costs</b>	<b>Other Costs</b>	<b>Total Costs</b>	<b>Burial Volume Class A (cubic feet)</b>	<b>Craft Manhours</b>	<b>Oversight and Contractor Manhours</b>
<b>Decommissioning Contractor</b>									
Planning (characterization, specs and procedures)	-	-	-	-	153.6	153.6	-		1,024
Decontamination (activated HSM disposition)	48.4	3.7	699.3	309.7	-	1,061.1	1,682	475	
License Termination (radiological surveys)	-	-	-	-	844.4	844.4	-	7,034	-
<b>Subtotal</b>	<b>48.4</b>	<b>3.7</b>	<b>699.3</b>	<b>309.7</b>	<b>998.0</b>	<b>2,059.0</b>	<b>1,682</b>	<b>7,509</b>	<b>1,024</b>
<b>Supporting Costs</b>									
NRC and NRC Contractor Fees and Costs	-	-	-	-	417.3	417.3		-	776
Insurance	-	-	-	-	75.8	75.8			
Property taxes	-	-	-	-	-	-			
Heavy equipment rental	236.0	-	-	-	-	236.0			
Plant energy budget	-	-	-	-	33.3	33.3			
Corporate A&G	-	-	-	-	-	-			
Site O&M	-	-	-	-	-	-			
Security Staff Cost	-	-	-	-	181.6	181.6			11,520
Oversight Staff Cost	-	-	-	-	300.9	300.9			3,771
<b>Subtotal</b>	<b>236.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1,008.9</b>	<b>1,244.8</b>	<b>-</b>	<b>-</b>	<b>16,067</b>
<b>Total (w/o contingency)</b>	<b>284.4</b>	<b>3.7</b>	<b>699.3</b>	<b>309.7</b>	<b>2,006.9</b>	<b>3,303.9</b>	<b>1,682</b>	<b>7,509</b>	<b>17,091</b>
<b>Total (w/25% contingency)</b>	<b>355.4</b>	<b>4.6</b>	<b>874.1</b>	<b>387.1</b>	<b>2,508.6</b>	<b>4,129.8</b>			
<b>Total (w/20% 3rd party markup)</b>	<b>426.5</b>	<b>5.5</b>	<b>1,048.9</b>	<b>464.6</b>	<b>3,010.3</b>	<b>4,955.8</b>			