

**Brian D. Boles**  
Vice President - Nuclear

419-321-7676  
Fax: 419-321-7582

March 21, 2016  
L-16-024

10 CFR 50.54(bb)  
10 CFR 50.75(f)(1)  
10 CFR 72.30(c)

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

SUBJECT:  
Davis-Besse Nuclear Power Station, Unit No. 1  
Docket No. 50-346, License No. NPF-3  
Activities Associated with the Renewed Operating License

By letter dated April 24, 2014 (Accession No. ML14115A301), FirstEnergy Nuclear Operating Company (FENOC) submitted the Program for Management of Irradiated Fuel for the Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS) pursuant to 10 CFR 50.54(bb). The letter stated the program would be withdrawn upon receipt of a renewed operating license for DBNPS. On December 8, 2015, the Nuclear Regulatory Commission (NRC) issued a renewed operating license for DBNPS. Therefore, FENOC withdraws the DBNPS Program for Management of Irradiated Fuel.

The aforementioned letter contained a commitment that the FirstEnergy Nuclear Generation, LLC would deposit \$123 million into the DBNPS decommissioning trust fund by December 31, 2025. As a result of the withdrawal of the DBNPS Program for Management of Irradiated Fuel, the commitment is cancelled.

10 CFR 50.75(f)(1) states that each power reactor licensee is required to report on the status of decommissioning funds biennially. The regulation also states that for licensees within five years of the projected end of operation, the report is required annually. Since the DBNPS operating license was originally going to expire in 2017, FENOC has been reporting the status of the DBNPS decommissioning fund annually. The most recent DBNPS decommissioning funding status report was submitted by letter dated March 31, 2015 (Accession No. ML15090A447). As a result of the issuance of the renewed DBNPS operating license, FENOC will recommence reporting on the status of decommissioning funds biennially, which will be submitted in 2017.

10 CFR 72.30(c) states that each holder of a license for an independent spent fuel storage installation (ISFSI) is required to submit an ISFSI decommissioning funding plan at the time of license renewal and at intervals not to exceed three years. FENOC submitted a triennial ISFSI decommissioning funding plan for DBNPS by letter dated December 9, 2015 (Accession No. ML15343A350). In this letter, FENOC stated that a revised ISFSI decommissioning funding plan for the renewed operating license period would be submitted by the end of first quarter 2016. FENOC had a revised DBNPS decommissioning cost analysis, which included information on the decommissioning of the ISFSI, performed to account for license renewal. The revised ISFSI decommissioning funding plan for the renewed DBNPS operating license is attached. The next triennial ISFSI decommissioning funding plan for DBNPS will be submitted in 2018 to maintain alignment with the triennial ISFSI funding plans associated with the other FENOC ISFSIs located at Beaver Valley Power Station, Unit Nos. 1 and 2, and Perry Nuclear Power Plant.

There are no regulatory commitments contained in this letter. If there are any questions, or if additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at (330) 315-6810.

Sincerely,



Brian D. Boles

Attachment:

Decommissioning Funding Plan for Davis-Besse Nuclear Power Station, Unit No. 1 Independent Spent Fuel Storage Installation

Enclosure:

Davis-Besse Nuclear Power Station ISFSI, 10 CFR 72.30 ISFSI  
Decommissioning Cost Estimate Following 60 Years of Operation

cc: NRC Region III Administrator  
NRC Resident Inspector  
NRC Project Manager  
Utility Radiological Safety Board

Decommissioning Funding Plan for  
Davis-Besse Nuclear Power Station, Unit No. 1  
Independent Spent Fuel Storage Installation  
Page 1 of 3

Pursuant to 10 CFR 72.30(c), each licensee of an independent spent fuel storage installation (ISFSI) is required to submit a decommissioning funding plan for the ISFSI upon license renewal and triennially. FirstEnergy Nuclear Operating Company (FENOC) hereby provides the updated decommissioning funding plan for the Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS) ISFSI with respect to license renewal.

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

The response to number 4 below discusses the appropriate method of financial assurance contemplated under 10 CFR 72.30(e).

**2. A detailed cost estimate for decommissioning:**

In a report dated March 2, 2016, TLG Services, Inc. provided the DBNPS ISFSI decommissioning cost estimate for the license renewal period to FENOC. This report is enclosed. The report revises the decommissioning cost estimate included in the ISFSI decommissioning funding plan submitted to the NRC by FENOC letter dated December 9, 2015 (Accession No. ML15343A350). The revised cost estimate, like the previous cost estimate, assumes that an independent contractor will perform the decommissioning activities and includes the cost of meeting 10 CFR 20.1402 for license termination for unrestricted use. The revised estimate assumes a contingency factor of 25%. The total decommissioning cost with contingency is \$5,493,000 (2014 dollars).

Below is the effect of the following on the detailed cost estimate since the previous report:

1. Spills of radioactive material producing additional residual radioactivity in onsite subsurface material: None
2. Facility modifications: None
3. Changes in authorized possession limits: None
4. Actual remediation costs that exceed the previous cost estimate: None

**3. Identification of and justification for using the key assumptions contained in the decommissioning cost estimate:**

The key assumptions and justifications are contained in the enclosed ISFSI decommissioning cost estimate.

**4. A description of the method of assuring funds for decommissioning from 10 CFR 72.30(e), including means for adjusting cost estimates and associated funding levels periodically over the life of the facility:**

Financial assurance in the amount of \$6,000,000 for the decommissioning of the DBNPS ISFSI is provided through a parent guarantee totaling \$20.5 million (Accession No. ML15181A323) that support the ISFSIs located at Beaver Valley Power Station, DBNPS, and Perry Nuclear Power Plant. The guarantee will be payable to the existing nuclear decommissioning trust funds established for DBNPS pursuant to the nuclear decommissioning master trust agreements. The guarantees will provide for the ISFSI decommissioning amounts to be deposited into a separate subaccount to be maintained by the Trustee.

10 CFR 30, Appendix A, "Criteria Relating to Use of Financial Tests and Parent Company Guarantees for Providing Reasonable Assurance of Funds for Decommissioning," provides guidance for establishing parent guarantees to provide assurance for decommissioning funding. The test includes the current cost estimate for decommissioning and the amount to be guaranteed. The regulation requires the test to be performed annually. The performance of the test, with the current decommissioning cost estimate, provides information such that the values of the parent guarantees can be adjusted to ensure that adequate funding will be available to decommission the ISFSI.

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

DBNPS uses the Transnuclear NUHOMS system for spent fuel storage. The NUHOMS system has been designed to be a no effluent system. As a result, FENOC assumes the volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination to be zero.

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

The submission of this report in conjunction with the parent guarantee totaling \$20.5 million (Accession No. ML15181A323) serves as certification that financial assurance has been provided in the amount of the cost estimate for ISFSI decommissioning.

Enclosure  
L-16-024

Davis-Besse Nuclear Power Station ISFSI, 10 CFR 72.30 ISFSI  
Decommissioning Cost Estimate Following 60 Years of Operation  
(Six Pages Follow)

**10 CFR 72.30 ISFSI Decommissioning Cost Estimate  
Following 60 Years of Operation**

**1. Background and Introduction**

The Nuclear Regulatory Commission (NRC) issued its final rule on Decommissioning Planning on June 17, 2011,<sup>[1]</sup> with the rule becoming effective on December 17, 2012. Subpart 72.30, "Financial assurance and recordkeeping for decommissioning," requires that each holder of, or applicant for, a license under this part must submit for NRC review and approval a decommissioning funding plan that contains information on how reasonable assurance will be provided that funds will be available to decommission the Independent Spent Fuel Storage Installation (ISFSI).

In accordance with the rule, this letter provides a detailed cost estimate for decommissioning the ISFSI at Davis-Besse Nuclear Power Station (Davis-Besse) in an amount reflecting:

1. The work is performed by an independent contractor;
2. An adequate contingency factor; and
3. Release of the facility and dry storage systems for unrestricted use, as specified in 10 CFR Part 20.1402

This letter also provides:

1. Identification of the key assumptions contained in the cost estimate; and
2. The volume of onsite subsurface material containing residual radioactivity, if any, that will require remediation to meet the criteria for license termination.

**2. Spent Fuel Management Strategy**

The original operating license for Davis-Besse was issued on April 22, 1977. The application for license renewal was approved by the NRC on 8 December 2015, with a new license expiration date of April 22, 2037. Currently, 2,252 spent fuel assemblies are projected to be discharged over the operating life of the unit. If the Department of Energy (DOE) is able to initiate acceptance of commercial spent fuel in 2025, the first spent fuel assemblies from Davis-Besse are projected to be shipped by 2030. For the purpose of this analysis; 821 assemblies are projected to be shipped directly from the Davis-Besse spent fuel pool to the DOE over the years 2030 through 2043. The balance of 1,431 assemblies would be placed in dry storage at an on-site ISFSI. This ISFSI would continue to operate (under a Part 50 General License in accordance with 10 CFR 72 Subpart K) until the

---

<sup>1</sup> U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70 and 72 "Decommissioning Planning," Nuclear Regulatory Commission, Federal Register Volume 76, Number 117 (p 35512 et seq.), June 17, 2011.

transfer of spent fuel to the DOE is completed. At that time, the ISFSI could be decommissioned.

Completion of the ISFSI decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site. DOE's repository program assumes that spent fuel allocations will be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor.<sup>[2]</sup> FirstEnergy Corp. current spent fuel management plan for the Davis-Besse spent fuel is based in general upon completion of spent fuel receipt by no later than the year 2066.

### **3. ISFSI Decommissioning Strategy**

At the conclusion of the spent fuel transfer process the ISFSI can be decommissioned by removing and disposing of residual radioactivity and verifying that remaining materials satisfy NRC release criteria.

For purposes of providing an estimate for a funding plan, financial assurance is expected to be provided on the basis of a prompt ISFSI decommissioning scenario. In this estimate the ISFSI decommissioning is considered an independent project, regardless of the decommissioning alternative identified for the nuclear power plant.

### **4. ISFSI Description**

The dry fuel storage system consists of a Transnuclear NUHOMS multi-purpose (storage and transport) dry shielded storage canister (DSC) and a horizontal storage module (HSM). The Davis-Besse ISFSI expects to use three different versions of the system. There are three modules currently on the ISFSI pad with 24-assembly capacity DSCs. A scheduled 2017 campaign will load four 32-assembly capacity DSCs. All subsequent spent fuel DSC loadings are planned using a 37-fuel assembly capacity DSC. The DSCs are assumed to be transferred directly to the DOE and not returned to the station. Some of the remaining HSMs are assumed to have residual radioactivity due to some minor level of neutron-induced activation as a result of the long-term storage of the spent fuel. 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, form the basis of the ISFSI decommissioning estimate.

In addition to the spent fuel modules located on the ISFSI pad after shutdown there may be additional HSMs used for Greater-than-Class-C (GTCC) storage. The HSMs used to store the GTCC canisters (estimated quantity of 4) are not expected to have any interior

---

<sup>2</sup> U.S. Code of Federal Regulations, Title 10, Part 961.11, Article IV – Responsibilities of the Parties, B. DOE Responsibilities, 5.(a) "... DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository. This priority ranking shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such materials from the civilian nuclear power reactor. The oldest fuel or waste will have the highest priority for acceptance, except as ..."



contamination or residual activation and can be reused or disposed of by conventional means after a final status survey.

Table 1 provides the significant quantities and physical dimensions used as the basis in developing the ISFSI decommissioning estimate.

## **5. Key Assumptions / Estimating Approach**

The decommissioning estimate is based on the configuration of the ISFSI at the cessation of plant operations (operating until 2037), and the assumptions associated with DOE's spent fuel acceptance, as previously described.

The nominal size of the ISFSI pad to store the projected amount of spent fuel is expected to be approximately 88 feet in width, and 344 feet in length.

To support an application for License Termination, the estimate assumes that a Final Status Survey will be performed; this will include a 100% survey of the concrete HSM surfaces, and a significant fraction of the ISFSI pad and the immediate area surrounding the pad, and the other ISFSI structures.

It is not expected that the HSMs will have any interior or exterior radioactive surface contamination. It is expected that this assumption would be confirmed as a result of good radiological practice of surveying potentially impacted areas after each spent fuel transfer campaign. Any neutron activation of the steel and concrete is expected to be extremely small. To validate this assumption, the estimate accounts for further characterization of 10% of the HSMs; it is likely that some of this characterization will take place well before the last of the fuel is removed from the ISFSI in order to establish a more definitive decommissioning scope.

The decommissioning estimate conservatively assumes that 5 HSMs (equivalent to the number of HSMs to store the final full core offload) will contain low levels of neutron-induced residual radioactivity that would necessitate remediation at the time of decommissioning. For purposes of this estimate, these HSMs are designated for controlled disposal as low-level radioactive waste.

It is not expected that there will be any residual contamination left on the concrete ISFSI pad once the HSMs are removed, the transfer cask and transporter, or other facilities at the Davis-Besse ISFSI. It is expected that these assumptions would be confirmed as a result of good radiological practice of surveying potentially impacted areas after each spent fuel transfer campaign. As such, only verification surveys are included for the other facilities in the decommissioning estimate.

A review of drawing and pictures taken during the pad construction identified no piping running under the pad. A duct bank going East-West under the pad can be identified. The area of the pad plus five feet on each side was excavated down to undisturbed soil

and then refilled with an engineered backfill prior to pouring the pad. At this time there is no reason to believe the soil under the pad has been contaminated. As such, the decommissioning estimate assumes that no soil remediation is required <sup>[3]</sup>, to meet the unrestricted use criteria of 10 CFR 20.1402.

Decommissioning is assumed to be performed by an independent contractor. As such, essentially all labor, equipment, and material costs are based on national averages, i.e., costs from national publications such as R.S. Means' Building Construction Cost Data (adjusted for regional variations), and laboratory service costs are based on vendor price lists. Those craft labor positions are expected to be provided locally. FirstEnergy Corp., as licensee, will oversee the site activities; the estimate includes FirstEnergy Corp. labor and overhead costs.

Low-level radioactive waste packaging and transport costs are based on industry data. Disposal costs are based on FirstEnergy Corp. existing contracted disposal rates.

Costs are reported in 2014 dollars.

Contingency has been added at an overall rate of 25%. This is consistent with the contingency evaluation criteria referenced by the NRC in NUREG-1757.<sup>[4]</sup>

The estimate is limited to costs necessary to terminate the ISFSI's NRC license and meet the §20.1402 criteria for unrestricted use. Disposition of released material and structures is outside the scope of the estimate.

## **6. Cost Estimate**

The estimated cost to decommission the ISFSI and release the facility for unrestricted use is provided in Table 2. The cost has been organized into three phases, including:

- An initial planning phase - empty HSMs are characterized and the specifications and work procedures for the decontamination (heat shields and rails) developed.
- The remediation phase - residual radioactivity is removed, packaged in certified waste containers, transported to the low-level waste site, and disposed of as low-level waste.
- The final phase - license termination surveys, independent surveys are completed, and an application for license termination submitted.

In addition to the direct costs associated with a contractor providing the decommissioning services, the estimate also contains costs for the NRC (and NRC contractor), FirstEnergy Corp's oversight staff, site security (industrial), and other site operating costs.

For estimating purposes it should be conservatively assumed that all expenditures will be incurred in the year 2067, the year following the last of the spent fuel removal.

---

<sup>3</sup> Email Matt Minniti to Francis Seymore, February 25, 2015.

<sup>4</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.

**Table 1**  
**Significant Quantities and Physical Dimensions**

**ISFSI Pad**

Item	Length (ft)	Width (ft)	Residual Radioactivity
ISFSI Pad (dimensions are for current pad)	229	88	No
ISFSI Pad Expansion (dimensions are for expansion)	115	88	No

**ISFSI Horizontal Storage Modules**

Item	Value	Notes (all dimensions are nominal)
Overall Length (inches)	248	HSM dimensions based upon
Overall Width (inches)	116	Transnuclear HSM-H design
Overall Height (inches)	222	
Quantity (total)	45	41 spent fuel + 4 GTCC
Quantity (with residual radioactivity)	5	Equivalent to the number of HSMs needed to store the last core offload from Davis-Besse
Total Surface Area of HSM interior with Residual Radioactivity (square feet)	3,750	
Low-Level Radioactive Waste (cubic feet)	11,356	
Low-Level Radioactive Waste (packaged density)	155	Most weight shipped as concrete slabs

**Other Potentially Impacted Items**

Item	Value	Notes
Cask Transporter	1	No residual radioactivity
ISFSI Equipment Storage Building	1	No residual radioactivity
Number of HSMs used for GTCC storage	4	No residual radioactivity

**Table 2**  
**ISFSI Decommissioning Costs<sup>1</sup> and Waste Volumes**

		(Thousands, 2014 dollars)							Person-Hours	
	Decon	Removal	Packaging	Transport	Disposal	Other	Total	Waste Volume (ft3)	Craft	Oversight and Contractor
Decommissioning Contractor										
Planning (characterization, specs and procedures)		-	-	-	-	186	186	-	-	1,024
Remediation (activated HSMs)		217	3	516	1,142	563	2,441	11,356	1,880	-
License Termination (radiological surveys)		-	-	-	-	805	805	-	6,434	-
Subtotal		217	3	516	1,142	1,554	3,432	11,356	8,313	1,024
Supporting Costs										
NRC and NRC Contractor Fees and Costs		-	-	-	-	384	384	-	-	776
Insurance		-	-	-	-	65	65	-	-	-
Property taxes		-	-	-	-	62	62	-	-	-
Corporate A&G		-	-	-	-	44	44	-	-	-
Security (industrial)		-	-	-	-	148	148	-	-	5,013
FirstEnergy Corp. Oversight Staff		-	-	-	-	259	259	-	-	3,803
Subtotal		-	-	-	-	962	962	-	-	9,592
Total (w/o contingency)		217	3	516	1,142	2,516	4,395	11,356	8,313	10,616
Total (w/25% contingency)							5,493			

Note 1: For funding planning purposes decommissioning costs can be assumed to be incurred in year 2067