FENOC
First Energy Nuclear Operating Company

341 White Pond Dr.
Akron, Ohio 44320

December 17, 2018
L-18-169

10 CFR 72.30(c)

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:
Beaver Valley Power Station, Unit Nos. 1 and 2 ISFSI
Docket No. 72-1043
Davis-Besse Nuclear Power Station, Unit No. 1 ISFSI
Docket No. 72-14
Perry Nuclear Power Plant, Unit No. 1 ISFSI
Docket No. 72-69
Triennial ISFSI Decommissioning Funding Plans

Pursuant to the requirements of 10 CFR 72.30(c), FirstEnergy Nuclear Operating Company (FENOC) is submitting the triennial Decommissioning Funding Plans for the Beaver Valley Power Station, Unit Nos. 1 and 2 (BVPS) Independent Spent Fuel Storage Installation (ISFSI); the Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS) ISFSI; and the Perry Nuclear Power Plant, Unit No. 1 (PNPP) ISFSI (Attachments 1 through 3, respectively). Enclosures A through C contain the ISFSI decommissioning cost estimates for BVPS, DBNPS, and PNPP, respectively.

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 – Nuclear Licensing and Regulatory Affairs, at 330-315-6810.

Sincerely,

Darin M. Benyak
Vice President, Nuclear Support and Regulatory Affairs

Attachments:
1. Decommissioning Funding Plan for Beaver Valley Power Station, Unit Nos. 1 and 2 Independent Spent Fuel Storage Installation
2. Decommissioning Funding Plan for Davis-Besse Nuclear Power Station, Unit No. 1 Independent Spent Fuel Storage Installation
3. Decommissioning Funding Plan for Perry Nuclear Power Plant, Unit No. 1 Independent Spent Fuel Storage Installation

Enclosures:
A. Beaver Valley Power Station, Unit Nos. 1 and 2 Independent Spent Fuel Storage Installation Decommissioning Cost Estimate
B. Davis-Besse Nuclear Power Station, Unit No. 1 Independent Spent Fuel Storage Installation Decommissioning Cost Estimate
C. Perry Nuclear Power Plant, Unit No. 1 Independent Spent Fuel Storage Installation Decommissioning Cost Estimate

cc: NRC Region I Administrator
NRC Region III Administrator
NRC Resident Inspector (Beaver Valley Power Station, Unit Nos. 1 and 2)
NRC Resident Inspector (Davis-Besse Nuclear Power Station, Unit No. 1)
NRC Resident Inspector (Perry Nuclear Power Plant, Unit No. 1)
NRC Project Manager (FENOC Fleet)
Director BRP/DEP
Site BRP/DEP Representative
Utility Radiological Safety Board

Decommissioning Funding Plan for
Beaver Valley Power Station, Unit Nos. 1 and 2
Independent Spent Fuel Storage Installation

Pursuant to 10 CFR 72.30(c), each licensee of an independent spent fuel storage installation (ISFSI) is required to triennially submit a decommissioning funding plan for the ISFSI. FirstEnergy Nuclear Operating Company (FENOC) hereby provides the updated decommissioning funding plan for the Beaver Valley Power Station, Unit Nos. 1 and 2 (BVPS) ISFSI.

The previous BVPS ISFSI funding plan was submitted to the Nuclear Regulatory Commission on December 9, 2015 (Accession No. ML15343A350).

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

The response to Item 4 below provides the method of financial assurance pursuant to 10 CFR 72.30(e).

2. A detailed cost estimate for decommissioning:

In a report dated December 7, 2018, TLG Services, Inc. (TLG) prepared a detailed plant-specific decommissioning cost estimate for the BVPS ISFSI. For ease of review, the BVPS ISFSI decommissioning cost estimate is provided in Enclosure A. The cost estimate assumes that an independent contractor will perform the decommissioning activities, assumes a contingency factor of 25 percent, and includes the cost of meeting 10 CFR 20.1402 for license termination for unrestricted use. The total decommissioning cost with contingency is $10,396,000 (2018 dollars).

Changes in the responses to the four criteria listed in 10 CFR 72.30(c) for the period between the previous plan submittal and this submittal are as follows:

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 ISFSI decommissioning cost estimate key assumptions and justifications are provided in Enclosure A.

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:

FirstEnergy Nuclear Generation, LLC (FENGen) uses the prepayment method of assuring funds for ISFSI decommissioning. In 2016, FENGen established a Provisional Trust with an initial funding amount of $10,000,000 to provide funding to decommission the FENGen ISFSIs. The exclusive purpose of the Provisional Trust is to accumulate and hold funds for the decommissioning of the ISFSIs. As of November 30, 2018, the value of the Provisional Trust was $10,205,540.

Financial assurance for the decommissioning of the BVPS ISFSI is provided through the Provisional Trust. It has been determined that a Provisional Trust value of $3,045,479 (2018 dollars), combined with growth in the Provisional Trust up to a 2 percent annual real rate of return until the time the ISFSI is decommissioned, is adequate to cover the ISFSI decommissioning cost with contingency of $10,396,000 that is identified in the response to Question 2, above. Note the growth in the Provisional Trust assumes 59 years' worth of earnings, based upon the ISFSI decommissioning expense being incurred in the last year of a 60-year SAFSTOR period.

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

BVPS currently uses the Transnuclear NUHOMS system for spent fuel storage. The NUHOMS system has been designed, fabricated, and tested to be leak tight. 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 Provisional Trust (Accession No. ML16356A094) serves as certification that financial assurance has been provided in the amount of the cost estimate for ISFSI decommissioning.

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

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

The previous DBNPS ISFSI funding plan was submitted to the Nuclear Regulatory Commission on December 9, 2015 (Accession No. ML15343A350).

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

   The response to Item 4 below provides the method of financial assurance pursuant to 10 CFR 72.30(e).

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

   In a report dated December 7, 2018, TLG Services, Inc. (TLG) prepared a detailed plant-specific decommissioning cost estimate for the DBNPS ISFSI. For ease of review, the DBNPS ISFSI decommissioning cost estimate is provided in Enclosure B. The cost estimate assumes that an independent contractor will perform the decommissioning activities, assumes a contingency factor of 25 percent, and includes the cost of meeting 10 CFR 20.1402 for license termination for unrestricted use. The total decommissioning cost with contingency is $6,072,000 (2018 dollars).

   Changes in the responses to the four criteria listed in 10 CFR 72.30(c) for the period between the previous plan submittal and this submittal are as follows:

   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 ISFSI decommissioning cost estimate key assumptions and justifications are provided in Enclosure B.

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:

FirstEnergy Nuclear Generation, LLC (FENGen) uses the prepayment method of assuring funds for ISFSI decommissioning. In 2016, FENGen established a Provisional Trust with an initial funding amount of $10,000,000 to provide funding to decommission the FENGen ISFSIs. The exclusive purpose of the Provisional Trust is to accumulate and hold funds for the decommissioning of the ISFSIs. As of November 30, 2018, the value of the Provisional Trust was $10,205,540.

Financial assurance for the decommissioning of the DBNPS ISFSI is provided through the Provisional Trust. It has been determined that a Provisional Trust value of $1,814,351 (2018 dollars), combined with growth in the Provisional Trust up to a 2 percent annual real rate of return until the time the ISFSI is decommissioned, is adequate to cover the ISFSI decommissioning cost with contingency of $6,072,000 that is identified in the response to Question 2, above. Note the growth in the Provisional Trust assumes 59 years' worth of earnings, based upon the ISFSI decommissioning expense being incurred in the last year of a 60-year SAFSTOR period.

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

DBNPS currently 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 Provisional Trust (Accession No. ML16356A094) serves as certification that financial assurance has been provided in the amount of the cost estimate for ISFSI decommissioning.

Decommissioning Funding Plan for
Perry Nuclear Power Plant, Unit No. 1
Independent Spent Fuel Storage Installation

Pursuant to 10 CFR 72.30(c), each licensee of an independent spent fuel storage installation (ISFSI) is required to triennially submit a decommissioning funding plan for the ISFSI. FirstEnergy Nuclear Operating Company (FENOC) hereby provides the updated decommissioning funding plan for the Perry Nuclear Power Plant, Unit No. 1 (PNPP) ISFSI.

The previous PNPP ISFSI funding plan was submitted to the Nuclear Regulatory Commission on December 9, 2015 (Accession No. ML15343A350).

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

   The response to Item 4 below provides the method of financial assurance pursuant to 10 CFR 72.30(e).

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

   In a report dated December 7, 2018, TLG Services, Inc. (TLG) prepared a detailed plant-specific decommissioning cost estimate for the PNPP ISFSI. For ease of review, the PNPP ISFSI decommissioning cost estimate is provided in Enclosure C. The cost estimate assumes that an independent contractor will perform the decommissioning activities, assumes a contingency factor of 25 percent, and includes the cost of meeting 10 CFR 20.1402 for license termination for unrestricted use. The total decommissioning cost with contingency is $10,237,000 (2018 dollars).

   Changes in the responses to the four criteria listed in 10 CFR 72.30(c) for the period between the previous plan submittal and this submittal are as follows:

   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 ISFSI decommissioning cost estimate key assumptions and justifications are provided in Enclosure C.

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:

FirstEnergy Nuclear Generation, LLC (FENGen) uses the prepayment method of assuring funds for ISFSI decommissioning. In 2016, FENGen established a Provisional Trust with an initial funding amount of $10,000,000 to provide funding to decommission the FENGen ISFSIs. The exclusive purpose of the Provisional Trust is to accumulate and hold funds for the decommissioning of the ISFSIs. As of November 30, 2018, the value of the Provisional Trust was $10,205,540.

Financial assurance for the decommissioning of the PNPP ISFSI is provided through the Provisional Trust. It has been determined that a Provisional Trust value of $2,998,900 (2018 dollars), combined with growth in the Provisional Trust up to a 2 percent annual real rate of return until the time the ISFSI is decommissioned, is adequate to cover the ISFSI decommissioning cost with contingency of $10,237,000 that is identified in the response to Question 2, above. Note the growth in the Provisional Trust assumes 59 years' worth of earnings, based upon the ISFSI decommissioning expense being incurred in the last year of a 60-year SAFSTOR period.

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

PNPP currently uses the Holtec International HI-STORM system for spent fuel storage. The HI-STORM cask has been designed to assure that there is no release of radioactive materials to the environment. 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 Provisional Trust (Accession No. ML16356A094) serves as certification that financial assurance has been provided in the amount of the cost estimate for ISFSI decommissioning.

Enclosure A
L-18-169

Beaver Valley Power Station, Unit Nos. 1 and 2 Independent Spent Fuel Storage Installation Decommissioning Cost Estimate
(Seven Pages Follow)

10 CFR 72.30 ISFSI Decommissioning Cost Estimate

1. Background and Introduction

The Nuclear Regulatory Commission (NRC) issued its final rule on Decommissioning Planning on June 17, 2011,[1] 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 Beaver Valley Power Station (Beaver Valley) 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

FirstEnergy Solutions has notified the NRC of their intent to cease operations at Beaver Valley Unit 1 as of May 31, 2021, and at Unit 2 as of October 31, 2021 [2]. As of Unit 2 final shutdown, 3,248 spent fuel assemblies are projected to be discharged over the operating life of the units. For the purpose of this analysis, all of the 3,248 assemblies would be placed in dry storage at an on-site ISFSI. The ISFSI would operate (under a Part 50 General License in accordance with 10 CFR 72 Subpart K) until the transfer of spent fuel to the DOE is completed. At that time, the ISFSI could be decommissioned.

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1 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.

2 Certification of Permanent Cessation of Power Operations for Beaver Valley Power Station. Unit Nos. 1 and 2. Davis-Besse Nuclear Power Station. Unit No. 1. and Perry Nuclear Power Plant. Unit No. 1, ML18115A007

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.[3] FirstEnergy Nuclear Operating Company, the licensed operator for Beaver Valley, current spent fuel management plan is based in general upon completion of spent fuel receipt by the DOE in the year 2060.

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 current dry fuel storage system consists of a Transnuclear Advanced NUHOMS multi-purpose (storage and transport) dry shielded storage canister (DSC) and a horizontal storage module (HSM). There are ten modules currently on the ISFSI pad with 37-assembly capacity DSCs. There is uncertainty regarding the type of dry fuel storage system that will be used at Beaver Valley following final shutdown. For purposes of this cost estimate, it is assumed that a Holtec HI-STORM FW system, with a 37-fuel assembly capacity Multi-Purpose Canister (MPC) and concrete shield overpack will be used. The DSCs and MPCs are assumed to be transferred directly to the DOE and not returned to the station. Some of the Holtec overpacks 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 casks located on the ISFSI pad after shutdown there may be additional casks used for Greater-than-Class-C (GTCC) waste storage. The overpacks used to store the GTCC canisters (estimated quantity of 6) are not expected to have any

[3] 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 …"

interior 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 2021), and the assumptions associated with DOE's spent fuel acceptance, as previously described.

The expanded size of the ISFSI pad to store the projected amount of spent fuel is expected to be approximately 90 feet in width, and 420 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 and overpack 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 overpacks will have any interior or exterior radioactive surface contamination (excepted as noted in Section 4 above regarding neutron activation of a limited number of Holtec overpacks). It is expected that this assumption would result from a 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 overpacks; 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 10 overpacks (equivalent to the number of casks to store the final full core offloads for both units) will contain low levels of neutron-induced residual radioactivity that would necessitate remediation at the time of decommissioning. For purposes of this estimate, these overpacks 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 overpacks are removed, the cask transporter, or other facilities at the Beaver Valley 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.

The ISFSI was constructed upon part of the property that was released as a result of the decommissioning of the Shippingport Atomic Power Station by the U.S. Department of

Energy in 1989. The pad area was excavated down approximately 15 feet, and backfilled with clean engineered fill. The surrounding ISFSI areas were not disturbed, and remain as left by the DOE, other than a topcoat of gravel. As such, the decommissioning estimate assumes that no soil remediation is required [4], 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 RSMeans 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 Nuclear Operating Company as agent for FirstEnergy Nuclear Generation, LLC., as licensee, will oversee the site activities; the estimate includes FirstEnergy Nuclear Operating Company labor and overhead costs.

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

Costs are reported in 2018 dollars. Where 2018 dollars were not available, the prior (2015) ISFSI DCE values were escalated using U.S. Bureau of Labor escalation indices for Consumer Price Index, Services.

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.[5]

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.

The effects, if any, since the last submittal of the ISFSI decommissioning funding plan of the following events listed in 10 CFR 72.30 (c) (1)- (4) have been specifically considered in the decommissioning cost estimate:

(1) Spills of radioactive material producing additional residual radioactivity in onsite subsurface material: There have been no spills at the ISFSI.

(2) Facility modifications: There have been no facility modifications in the past three years that affect the decommissioning cost estimate.

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4 Email Matt Minniti to Francis Seymore, November 18, 2014.

5 "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.

(3) Changes in authorized possession limits: There are no changes in authorized possession limits that affect the decommissioning cost estimate.

(4) Actual remediation costs that exceed the previous cost estimate: No actual remediation costs have been incurred, so no actual remediation costs exceed the previous cost 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 and overpacks are characterized and the specifications and work procedures for the decontamination (including steel liner removal if applicable) 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 Nuclear Operating Company oversight staff, site security (industrial), and other site operating costs.

For estimating purposes, it should be conservatively assumed that all expenditures would be incurred in the year 2061, the year following the last of the spent fuel removal.

Table 1
Significant Quantities and Physical Dimensions

ISFSI Pad

Item	Length (ft)	Width (ft)	Residual Radioactivity
ISFSI Pad (dimensions are for current pad)	300	90	No
ISFSI Pad Expansion (dimensions are for expansion)	120	90	No

ISFSI Storage Overpack

Item	Value	Notes (all dimensions are nominal)
Overall Height (inches)	217.3	Dimensions based upon Holtec HI-STORM FW design
Outside Diameter (inches)	139.0	
Inside Diameter (inches)	81.0	
Inner Liner Thickness (inches)	0.75	
HI-STORM FW storage systems	78	
HSM storage systems	10	
Quantity (total)	94	88 spent fuel + 6 GTCC
Quantity (with residual radioactivity)	10	Equivalent to the number of Overpacks needed to store each units last core offload from Beaver Valley
Total Surface Area of Overpack Liner with Residual Radioactivity (square feet)	3,042	
Low-Level Radioactive Waste (cubic feet)	25,840	
Low-Level Radioactive Waste (packaged density)	127	Average weight density

Other Potentially Impacted Items

Item	Value	Notes
Cask Transporter	1	No residual radioactivity
Transfer Cask	1	Controlled disposal
ISFSI Equipment Storage Building	1	No residual radioactivity
Number of Overpacks used for GTCC storage	6	No residual radioactivity

Table 2
ISFSI Decommissioning Costs[1] and Waste Volumes

	(Thousands, 2018 dollars)							Person-Hours	
	Removal	Packaging	Transport	Disposal	Other	Total	Waste Volume (ft3)	Craft	Oversight and Contractor
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	321	321	-	-	1,120
Remediation (activated overpacks)	251	235	1,568	3,010	-	5,064	25,840	2,740	-
License Termination (radiological surveys)	-	-	-	-	1,499	1,499	-	11,448	-
Subtotal	**251**	**235**	**1,568**	**3,010**	**1,819**	**6,883**	**25,840**	**14,188**	**1,120**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	485	485	-	-	1,153
Insurance	-	-	-	-	220	220	-	-	-
Property taxes	-	-	-	-	184	184	-	-	-
Corporate A&G	-	-	-	-	91	91	-	-	-
Security (industrial)	-	-	-	-	165	165	-	-	5,020
FirstEnergy Nuclear Operating Company Oversight Staff	-	-	-	-	288	288	-	-	3,803
Subtotal	-	-	-	-	1,434	1,434	-	-	9,976
Total (w/o contingency)	**251**	**235**	**1,568**	**3,010**	**3,253**	**8,317**	**25,840**	**14,188**	**11,096**
Total (w/25% contingency)	**314**	**294**	**1,959**	**3,763**	**4,066**	**10,396**	**-**	**-**	**-**

Note 1: For funding planning purposes decommissioning costs can be assumed to be incurred in year 2061

Enclosure B
L-18-169

Davis-Besse Nuclear Power Station, Unit No. 1 Independent Spent Fuel Storage Installation Decommissioning Cost Estimate
(Seven Pages Follow)

10 CFR 72.30 ISFSI Decommissioning Cost Estimate

1. Background and Introduction

The Nuclear Regulatory Commission (NRC) issued its final rule on Decommissioning Planning on June 17, 2011,[1] 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

FirstEnergy Solutions has notified the NRC of their intent to cease operations at Davis-Besse as of May 31, 2020 [2]. As of that date, 1,529 spent fuel assemblies are projected to be discharged over the operating life of the unit. For the purpose of this analysis, all of the 1,529 assemblies would be placed in dry storage at an on-site ISFSI. The ISFSI would operate (under a Part 50 General License in accordance with 10 CFR 72 Subpart K) until the transfer of spent fuel to the DOE is completed. At that time, the ISFSI could be decommissioned.

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1 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.

2 Certification of Permanent Cessation of Power Operations for Beaver Valley Power Station. Unit Nos. 1 and 2. Davis-Besse Nuclear Power Station. Unit No. 1. and Perry Nuclear Power Plant. Unit No. 1, ML18115A007

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.[3] FirstEnergy Nuclear Operating Company, the licensed operator for Davis-Besse, current spent fuel management plan is based in general upon completion of spent fuel receipt by the DOE in the year 2059.

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 current 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). There are a total of eight HSMs on the ISFSI pad, consisting of three DSCs each storing 24-assemblies and four DSCs each storing 32-assemblies (the eighth HSM was never used to store fuel). There is uncertainty regarding the type of dry fuel storage system that will be used at Davis-Besse following final shutdown. For purposes of this cost estimate, it is conservatively assumed that a Holtec HI-STORM FW system, with a 37-fuel assembly capacity Multi-Purpose Canister (MPC) and concrete shield overpack will be used. The DSCs and MPCs are assumed to be transferred directly to the DOE and not returned to the station. Some of the Holtec overpacks are assumed to have residual radioactivity due to some minor level of neutron-induced activation because 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 casks located on the ISFSI pad after shutdown there may be additional casks used for Greater-than-Class-C (GTCC) waste storage. The overpacks

[3] 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 …"

used to store the GTCC canisters (estimated quantity of 4) are not expected to have any interior 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 2020), and the assumptions associated with DOE's spent fuel acceptance, as previously described.

The expanded size of the ISFSI pad to store the projected amount of spent fuel is expected to be approximately 88 feet in width, and 260 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 overpack 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 overpacks will have any interior or exterior radioactive surface contamination (excepted as noted in Section 4 above regarding neutron activation of a limited number of Holtec overpacks).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 overpacks; 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 overpacks (equivalent to the number of casks to store the final full core offload of 177 assemblies) will contain low levels of neutron-induced residual radioactivity that would necessitate remediation at the time of decommissioning. For purposes of this estimate, these overpacks 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 overpacks are removed, the cask 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 [4], 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 RSMeans 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 Nuclear Operating Company as agent for FirstEnergy Nuclear Generation, LLC., as licensee, will oversee the site activities; the estimate includes FirstEnergy Nuclear Operating Company labor and overhead costs.

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

Costs are reported in 2018 dollars. Where 2018 dollars were not available, the prior (2015) ISFSI DCE values were escalated using U.S. Bureau of Labor escalation indices for Consumer Price Index, Services.

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.[5]

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.

The effects, if any, since the last submittal of the ISFSI decommissioning funding plan of the following events listed in 10 CFR 72.30 (c) (1)- (4) have been specifically considered in the decommissioning cost estimate:

(1) Spills of radioactive material producing additional residual radioactivity in onsite subsurface material: There have been no spills at the ISFSI.

(2) Facility modifications: There have been no facility modifications in the past three years that affect the decommissioning cost estimate.

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4 Email Matt Minniti to Francis Seymore, February 25, 2015.

5 "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.

(3) Changes in authorized possession limits: There are no changes in authorized possession limits that affect the decommissioning cost estimate.

(4) Actual remediation costs that exceed the previous cost estimate: No actual remediation costs have been incurred, so no actual remediation costs exceed the previous cost 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 overpacks are characterized and the specifications and work procedures for the decontamination (steel liner removal) 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 Nuclear Operating Company 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 2060, the year following the last of the spent fuel removal.

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)	31	88	No

ISFSI Storage Overpack

Item	Value	Notes (all dimensions are nominal)
Overall Height (inches)	217.3	
Outside Diameter (inches)	139.0	
Inside Diameter (inches)	81.0	
Inner Liner Thickness (inches)	0.75	
HI-STORM FW storage systems	35	
HSM storage systems	8	
Quantity (total)	47	43 spent fuel + 4 GTCC
Quantity (with residual radioactivity)	5	Equivalent to the number of Overpacks needed to store the last core offload from Davis-Besse
Total Surface Area of Overpack Liner with Residual Radioactivity (square feet)	1,521	
Low-Level Radioactive Waste (cubic feet)	13,340	
Low-Level Radioactive Waste (packaged density)	130	Average weight density

Other Potentially Impacted Items

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

Table 2
ISFSI Decommissioning Costs[1] and Waste Volumes

	(Thousands, 2018 dollars)							Person-Hours	
	Removal	Packaging	Transport	Disposal	Other	Total	Waste Volume (ft3)	Craft	Oversight and Contractor
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	243	243	-	-	1,024
Remediation (activated overpacks)	120	114	772	1,506	-	2,512	13,340	1,429	-
License Termination (radiological surveys)	-	-		-	981	981	-	7,266	-
Subtotal	**120**	**114**	**772**	**1,506**	**1,223**	**3,735**	**13,340**	**8,695**	**1,024**
Supporting Costs									
NRC and NRC Contractor Fees and Costs					479	479	-	-	1,153
Insurance					73	73	-	-	-
Property taxes					69	69	-	-	-
Corporate A&G					49	49	-	-	-
Security (industrial)					165	165	-	-	5,013
FirstEnergy Nuclear Operating Company Oversight Staff					288	288	-	-	3,803
Subtotal	-	-		-	1,122	1,122	-	-	9,969
Total (w/o contingency)	**120**	**114**	**772**	**1,506**	**2,346**	**4,858**	**13,340**	**8,695**	**10,993**
Total (w/25% contingency)	**150**	**142**	**965**	**1,882**	**2,932**	**6,072**			

Note 1: For funding planning purposes decommissioning costs can be assumed to be incurred in year 2060

Enclosure C
L-18-169

Perry Nuclear Power Plant, Unit No. 1 Independent Spent Fuel Storage Installation
Decommissioning Cost Estimate
(Seven Pages Follow)

10 CFR 72.30 ISFSI Decommissioning Cost Estimate

1. Background and Introduction

The Nuclear Regulatory Commission (NRC) issued its final rule on Decommissioning Planning on June 17, 2011,[1] 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 Perry Nuclear Power Plant (Perry) 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

FirstEnergy Solutions has notified the NRC of their intent to cease operations at Perry as of May 31, 2021 [2]. As of that date, 5,393 spent fuel assemblies are projected to be discharged over the operating life of the unit. For the purpose of this analysis, all of the 5,393 assemblies would be placed in dry storage at an on-site ISFSI. The ISFSI would operate (under a Part 50 General License in accordance with 10 CFR 72 Subpart K) until the transfer of spent fuel to the DOE is completed. At that time, the ISFSI could be decommissioned.

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1 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.

2 Certification of Permanent Cessation of Power Operations for Beaver Valley Power Station. Unit Nos. 1 and 2. Davis-Besse Nuclear Power Station. Unit No. 1. and Perry Nuclear Power Plant. Unit No. 1, ML18115A007

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.[3] FirstEnergy Nuclear Operating Company, the licensed operator for Perry, current spent fuel management plan is based in general upon completion of spent fuel receipt by the DOE in the year 2060.

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 Holtec International HI-STORM 100S System (with a 68-fuel assembly capacity). The system consists of a multi-purpose (storage and transport) canister (MPC) and a concrete shield (overpack). The MPCs are assumed to be transferred directly to the DOE and not returned to the station. Some of the remaining concrete overpacks 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 casks located on the ISFSI pad after shutdown there may be additional casks used for Greater-than-Class-C (GTCC) waste storage. The overpacks used to store the GTCC canisters (estimated quantity of 5) are not expected to have any interior 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.

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[3] 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 …"

5. Key Assumptions / Estimating Approach

The decommissioning estimate is based on the configuration of the ISFSI at the cessation of plant operations (operating until 2021), and the assumptions associated with DOE's spent fuel acceptance, as previously described.

The expanded size of the ISFSI pad to store the projected amount of spent fuel is expected to be approximately 75 feet in width, and 387 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 overpack 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 overpacks will have any interior or exterior radioactive surface contamination (excepted as noted in Section 4 above regarding neutron activation of a limited number of overpacks). 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 overpacks; 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 11 overpacks (equivalent to the number of casks to store the final full core offload of 748 assemblies) will contain low levels of neutron-induced residual radioactivity that would necessitate remediation at the time of decommissioning. For purposes of this estimate, these overpacks 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 overpacks are removed, the cask transporter, or other facilities at the Perry 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.

FENOC Chemistry reviewed the 10CFR50.75g files that it maintains and found no mention of any contaminated soil found as a result of building the ISFSI pad. As such, the decommissioning estimate assumes that no soil remediation is required [4], 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.,

[4] Email Matt Minniti to Francis Seymore, March 3, 2015.

costs from national publications such as RSMeans 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 Nuclear Operating Company as agent for FirstEnergy Nuclear Generation, LLC., as licensee, will oversee the site activities; the estimate includes FirstEnergy Nuclear Operating Company labor and overhead costs.

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

Costs are reported in 2018 dollars. Where 2018 dollars were not available, the prior (2015) ISFSI DCE values were escalated using U.S. Bureau of Labor escalation indices for Consumer Price Index, Services.

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.[5]

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.

The effects, if any, since the last submittal of the ISFSI decommissioning funding plan of the following events listed in 10 CFR 72.30 (c) (1)- (4) have been specifically considered in the decommissioning cost estimate:

(1) Spills of radioactive material producing additional residual radioactivity in onsite subsurface material: There have been no spills at the ISFSI.

(2) Facility modifications: There have been no facility modifications in the past three years that affect the decommissioning cost estimate.

(3) Changes in authorized possession limits: There are no changes in authorized possession limits that affect the decommissioning cost estimate.

(4) Actual remediation costs that exceed the previous cost estimate: No actual remediation costs have been incurred, so no actual remediation costs exceed the previous cost estimate.

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5 "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.

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 overpacks are characterized and the specifications and work procedures for the decontamination (steel liner removal) 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 Nuclear Operating Company 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 2061, the year following the last of the spent fuel removal.

Table 1
Significant Quantities and Physical Dimensions

ISFSI Pad

Item	Length (ft)	Width (ft)	Residual Radioactivity
ISFSI Pad (dimensions are for current pad)	347	75	No
ISFSI Pad Expansion (dimensions are for expansion)	40	75	No

ISFSI Storage Overpack

Item	Value	Notes (all dimensions are nominal)
Overall Height (inches)	218.0	
Outside Diameter (inches)	132.0	
Inside Diameter (inches)	73.5	
Inner Liner Thickness (inches)	1.25	
Quantity (total)	85	80 spent fuel + 5 GTCC
Quantity (with residual radioactivity)	11	Equivalent to the number of Overpacks needed to store the last core offload from Perry
Total Surface Area of Overpack Liner with Residual Radioactivity (square feet)	3,484	
Low-Level Radioactive Waste (cubic feet)	32,285	
Low-Level Radioactive Waste (packaged density)	95	Average weight density

Other Potentially Impacted Items

Item	Value	Notes
Cask Transporter	1	No residual radioactivity
Transfer Cask	1	Controlled disposal
ISFSI Equipment Storage Building	1	No residual radioactivity
Number of Overpacks used for GTCC storage	5	No residual radioactivity

Table 2
ISFSI Decommissioning Costs[1] and Waste Volumes

	(Thousands, 2018 dollars)							Person-Hours	
	Removal	Packaging	Transport	Disposal	Other	Total	Waste Volume (ft3)	Craft	Oversight and Contractor
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	300	300	-	-	1,096
Remediation (activated overpacks)	305	227	1,420	3,176	-	5,128	32,285	3,373	-
License Termination (radiological surveys)	-	-	-	-	1,302	1,302	-	9,948	-
Subtotal	**305**	**227**	**1,420**	**3,176**	**1,602**	**6,730**	**32,285**	**13,321**	**1,096**
Supporting Costs									
NRC and NRC Contractor Fees and Costs					484	484	-	-	1,153
Insurance					167	167	-	-	-
Property taxes					308	308	-	-	-
Corporate A&G					49	49	-	-	-
Security (industrial)					165	165	-	-	5,013
FirstEnergy Nuclear Operating Company Oversight Staff					288	288	-	-	3,803
Subtotal	-	-	-	-	1,460	1,460	-	-	9,969
Total (w/o contingency)	**305**	**227**	**1,420**	**3,176**	**3,062**	**8,190**	**32,285**	**13,321**	**11,065**
Total (w/25% contingency)	**381**	**283**	**1,775**	**3,970**	**3,828**	**10,237**			

Note 1: For funding planning purposes decommissioning costs can be assumed to be incurred in year 2061