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First Energy Nuclear Operating Company

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August 22, 2019
L-19-159

10 CFR 50.54(bb)
10 CFR 72.218

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

SUBJECT:
Beaver Valley Power Station, Unit Nos. 1 and 2
Docket No. 50-334, License No. DPR-66
Docket No. 50-412, License No. NPF-73
Beaver Valley Power Station, Unit Nos. 1 and 2, ISFSI
Docket No. 72-1043

Davis-Besse Nuclear Power Station, Unit No. 1
Docket No. 50-346, License No. NPF-3
Davis-Besse Nuclear Power Station, Unit No. 1 ISFSI
Docket No. 72-14

Perry Nuclear Power Plant, Unit No. 1
Docket No. 50-440, License No. NPF-58
Perry Nuclear Power Plant, Unit No. 1 ISFSI
Docket No. 72-69
Irradiated Fuel Management Plans

By letter dated April 25, 2018 (Accession No. ML18115A007) FirstEnergy Nuclear Operating Company (FENOC), acting as agent for FirstEnergy Nuclear Generation, LLC (FENGen), notified the Nuclear Regulatory Commission (NRC) of the intention of FirstEnergy Solution Corp. (FES, and parent of FENGen) to permanently cease operation of the four FENGen reactors over the next three years.

As a result, by letter dated March 15, 2019 (Accession No. ML19074A244), FENOC submitted the Irradiated Fuel Management Plans (IFMPs) for the aforementioned FENGen facilities to the NRC for review and preliminary approval.

By letter dated July 26, 2019 (Accession No. ML19207A097) the "Certification of Permanent Cessation of Power Operations" for the Ohio-located FENGen facilities of DBNPS and PNPP was withdrawn. As a result, the IFMPs for DBNPS and PNPP are no longer required. FENOC, acting on behalf of FENGen, hereby withdraws the IFMPs for those two units that were provided in the March 15, 2019 letter.

Since BVPS-1 and BVPS-2 remain scheduled to shutdown in 2021, the IFMPs for those two facilities are still required. As described in the March 15, 2019 letter, the funding plan of the IFMPs for the four FENGen facilities were consolidated. Enclosed are revisions to the BVPS-1 and BVPS-2 IFMPs that eliminate funding associated with DBNPS and PNPP. Additionally, both IFMPs have been updated to reflect minor changes in the number of fuel assemblies to be disposed assumed in the site-specific decommissioning cost estimates, along with other minor changes. Therefore, the attached BVPS-1 and BVPS-2 IFMPs supersede the BVPS-1 and BVPS-2 IFMPs contained in the March 15, 2019 letter.

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

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

Attachments:
1. Beaver Valley Power Station, Unit No. 1 Irradiated Fuel Management Plan
2. Beaver Valley Power Station, Unit No. 2 Irradiated Fuel Management Plan

cc: NRC Region I Administrator
NRC Region III Administrator
NRC Project Manager - FENOC Fleet
NRC Resident Inspector - Beaver Valley Power Station
NRC Resident Inspector - Davis-Besse Nuclear Power Station
NRC Resident Inspector - Perry Nuclear Power Plant
Director BRP/DEP
Site Representative BRP/DEP
Branch Chief, Ohio Emergency Management Agency, State of Ohio (NRC Liaison)
Utility Radiological Safety Board

Attachment 1
L-19-159

Beaver Valley Power Station, Unit No. 1
Irradiated Fuel Management Plan
(Eleven pages follow)

Beaver Valley Power Station, Unit No. 1
Irradiated Fuel Management Plan

Background

10 CFR Part 50.54(bb) requires licensees to establish a program to manage and provide funding for the management of spent fuel at the reactor site until title and possession of the fuel is transferred to the United States Department of Energy (DOE) for ultimate disposal. The Beaver Valley Power Station, Unit No. 1 Irradiated Fuel Management Plan (IFMP), described herein, is based, in part, on a decommissioning cost estimate (DCE) that was prepared in 2018 for Beaver Valley Power Station, Unit Nos. 1 and 2 (BVPS-1, BVPS-2, or collectively, BVPS), which includes elements associated with spent fuel management. The DCE identifies the details, schedules, and costs associated with spent fuel management activities described in the BVPS-1 IFMP, along with license termination and site restoration activities and costs.

Pursuant to 10 CFR 50.75(f)(1) on March 15, 2019, FirstEnergy Nuclear Operating Company (FENOC) submitted its decommissioning trust financial status report for the four FENOC-operated nuclear facilities. Enclosure A of that report is a copy of the BVPS DCE. The DCE describes the bases for the assumptions regarding DOE acceptance of spent fuel from the industry and from BVPS.

As stated in the DCE (and subject to the assumptions, qualifications, and reservations stated therein), this IFMP is based on the assumption that BVPS-1 shuts down by May 31, 2021. This IFMP presumes the DOE will commence acceptance of BVPS-1 spent fuel in 2029 and complete removal of spent fuel from the site by 2060 consistent with the most recent DOE spent fuel management and acceptance strategy[1] described below.

[1] DOE currently has no plans, program, or schedule in place for acceptance of utility spent fuel. However, for these purposes, certain simplifying assumptions must be made regarding the schedule and rate of DOE performance. Therefore, while DOE's Standard Contract governing the acceptance of spent fuel allows for alternative removal schedules, including priority for shutdown reactors and exchanges of allocations, for purposes of this estimate DOE acceptance is assumed to commence in 2029 from BVPS-1 and in accordance with spent fuel shipment schedules that are based upon published historic acceptance priority rankings by DOE. Nothing herein should be interpreted as a concession or admission of any kind for purposes other than for this submission. Such other purposes would include, but are not limited to, disputes regarding DOE's legal or contractual acceptance obligations, or damages claims for recovery of incurred costs.

Spent Fuel Management Strategy

FENOC assumes that, as stated in the DOE's "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Waste," dated January 2013, the DOE will start accepting spent fuel for storage from the nation's commercial nuclear plants beginning in 2025 for placement in a consolidated interim storage facility (CISF) that starts operation in 2025. The DCE assumes that BVPS-1 will shutdown and cease operations in 2021 and that BVPS-1 spent fuel will be accepted for placement in the CISF. Using the rankings for spent fuel receipt, as delineated in the Office of Civilian Radioactive Waste Management reports, "Annual Capacity Report," dated June 1987, and "Acceptance Priority Ranking & Annual Capacity Report," dated July 2004, BVPS-1 fuel would be accepted at the DOE storage facility starting in 2029.

The spent fuel pool will contain discharged fuel from the previous refueling cycles, as well as the final reactor core at shutdown. Immediately after shutdown, spent fuel will be located in the spent fuel pool and in canisters located on an independent spent fuel storage installation (ISFSI). During the five-year period after the shutdown, the spent fuel from the spent fuel pool would be packaged into canisters and transferred to the ISFSI for interim storage. This period provides the necessary cooling time for the spent fuel to meet the decay heat requirements for placement in dry storage.

The current BVPS dry fuel storage system consists of a Transnuclear Standardized 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. A Holtec HI-STORM FW system, with a 37-fuel assembly capacity Multi-Purpose Canister (MPC) and concrete shield overpack is expected to be used following shutdown. The DSCs and MPCs are assumed to be transferred directly to the DOE.

FENOC has constructed an ISFSI at BVPS to support BVPS-1 and BVPS-2 operations. The ISFSI operates under a general license pursuant to 10 CFR 72.210. The current size of the ISFSI pad is approximately 300 feet by 90 feet. The ISFSI will require expansion once plant operations cease in order to support spent fuel management activities. The pad expansion will be 120 feet by 90 feet. Total capacity of the consolidated pad is expected to be 88 DSCs and MPCs holding spent fuel and 6 MPCs holding greater than Class C waste. The ISFSI will continue to operate until such time that the transfer of spent fuel to the DOE can be completed. The DCE assumes that the BVPS spent fuel will be transferred to the DOE by 2060.

Table 1 provides a listing of the location of the spent fuel from 2019 until the spent fuel has been accepted by the DOE.

Table 1 – Spent Fuel Management Schedule
(BVPS-1 Fuel Assembly Location)[1]

Year	BVPS-1 Pool Inventory	BVPS-1 ISFSI Inventory	DOE Acceptance of BVPS-1 Fuel
2019	1,252	370	0
2020	1,252	370	0
2021	1,409	370	0
2022	1,409	370	0
2023	1,409	370	0
2024	1,409	370	0
2025	706	1,073	0
2026	0	1,779	0
2027	0	1,779	0
2028	0	1,779	0
2029	0	1,763	16
2030	0	1,710	53
2031	0	1,657	53
2032	0	1,512	145
2033	0	1,439	73
2034	0	1,369	70
2035	0	1,369	0
2036	0	1,324	45
2037	0	1,263	61
2038	0	1,190	73
2039	0	1,117	73
2040	0	1,054	63
2041	0	1,054	0
2042	0	985	69
2043	0	924	61
2044	0	846	78
2045	0	789	57
2046	0	728	61
2047	0	659	69
2048	0	659	0
2049	0	554	105
2050	0	534	20
2051	0	469	65
2052	0	412	57
2053	0	355	57
2054	0	298	57
2055	0	241	57

Table 1 (continued)

Year	BVPS-1 Pool Inventory	BVPS-1 ISFSI Inventory	DOE Acceptance of BVPS-1 Fuel
2056	0	184	57
2057	0	127	57
2058	0	70	57
2059	0	13	57
2060	0	0	13
Total	-	-	1,779

Note:

1. Fuel location is as of the date of the submittal. It is assumed that no fuel is transferred from the spent fuel pool to the ISFSI until 2025.

Schedule

Table 2 provides a summary of the spent fuel management activities described in the DCE. The table provides the decommissioning period associated with the spent fuel management activity, its cost, and the approximate duration of the activity. The table does not consider ISFSI decommissioning, as this is an activity undertaken after spent fuel has been accepted by the DOE and removed from the site.

Table 2 – Spent Fuel Management Activities

Decommissioning Period	Costs (thousands, 2018 dollars)[1]	Start Date	Stop Date	Approximate Duration (years)
1 - Preparations	3,848	May 2021	December 2022	1.5
2a - Dormancy with Wet Fuel Storage	128,368	December 2022	August 2026	3.7
2b - Dormancy with Dry Fuel Storage	106,125	August 2026	January 2061	34.4
Total	238,341	-	-	-

Notes:

1. The values were updated to reflect minor changes in the number of fuel assemblies to be disposed. The values were reported in 2014 dollars. A composite escalation factor was applied to convert the values into 2018 dollars. These values differ from those in Table 3 due to the way the values in both tables were escalated.

Decommissioning Period 1 - Preparations

During this period, the facility is placed in a condition that allows the spent fuel to be safely stored and the facility to be maintained in a condition to be subsequently decontaminated to levels that permit release for unrestricted use. The facility is left essentially intact with structures maintained in a sound condition. The process of placing the plant in safe-storage includes, but is not limited to, isolating the spent fuel storage services and fuel handling systems so that the spent fuel can be safely transferred from the spent fuel storage pool to the ISFSI for interim storage.

Decommissioning Period 2a – Dormancy with Wet Fuel Storage

During this period, the facility is in the dormancy period of SAFSTOR decommissioning. During this phase, spent fuel will remain in the spent fuel pool until it meets the criteria for transfer to dry storage. FENOC expects to construct an ISFSI pad expansion during this period. FENOC plans to begin transferring the remaining BVPS-1 spent fuel from the spent fuel pool to dry storage in 2025 and to complete the transfer of fuel to the consolidated ISFSI in 2026.

Decommissioning Period 2b – Dormancy with Dry Fuel Storage

During this period, spent fuel will remain stored on the ISFSI until DOE accepts the fuel and removes it from the site. As discussed above and in the BVPS DCE, the IFMP assumes that the DOE will begin removing fuel from BVPS-1 in 2029 and will complete the removal of spent fuel from the site in 2060, according to the schedule set forth in Table 1. During this period, programs and procedures required to support safe operation of the ISFSI will be maintained in accordance with applicable requirements. Maintenance, monitoring, and inspection of equipment, including fuel handling and shipping equipment, will be performed as required. BVPS-1 will also maintain a security force, which will safeguard the spent fuel for as long as it remains on site. Security barriers, sensors, alarms, and other surveillance equipment will be maintained as required to provide security for the ISFSI and spent fuel.

Cost Estimate

The BVPS DCE provides the basis for the costs associated with spent fuel management.

The DCE includes the cost of operating and maintaining the spent fuel pool and the ISFSI. Pool operations are expected to continue approximately five years after the cessation of plant operations. ISFSI operating costs are based upon an approximately 39-year period of operation following plant shutdown. The cost for the labor and equipment to load and transfer each spent fuel canister to the ISFSI from the spent fuel pool is also included. Costs for transferring the fuel from the ISFSI into the DOE transport cask are also included in the DCE.

Operation and maintenance costs for the spent fuel pool and the ISFSI are included within the DCE and address the cost for staffing the facility, as well as security, insurance, and licensing fees. Costs are also provided within the DCE for the decommissioning of the spent fuel pool, and the ISFSI after the fuel transfer to the DOE from the ISFSI is complete.

Table 3 provides an expenditure summary for the BVPS-1 IFMP in 2018 dollars.

Table 3 – IFMP Expenditure Summary[1]

Year	Expenditure (thousands, 2018 dollars)
2021	1,838
2022	4,788
2023	33,479
2024	33,571
2025	33,479
2026	21,422
2027	2,487
2028	7,110
2029	2,788
2030	3,389
2031	3,389
2032	3,696
2033	3,088
2034	2,487
2035	3,088
2036	3,095
2037	3,088
2038	3,088
2039	3,389
2040	2,794
2041	3,088
2042	3,088
2043	2,788
2044	2,794
2045	2,788
2046	2,788
2047	2,788
2048	2,794
2049	2,788
2050	2,788
2051	2,788
2052	2,794
2053	2,788
2054	2,788
2055	2,788
2056	2,794
2057	2,788

Table 3 (continued)

Year	Expenditure (thousands, 2018 dollars)
2058	3,088
2059	2,788
2060	3,095
Total	232,538

Note:

1. The values were updated to reflect the minor changes in the number of fuel assemblies to be disposed.

Funding

The BVPS funding mechanisms take into account the need to fund spent fuel management for both BVPS-1 and BVPS-2.

The funding for BVPS-1 spent fuel management follows the schedule described above. Funding for Periods 1 and 2a extends from 2021 to 2026. This correlates with preparation activities and transferring the spent fuel to the ISFSI pad. Period 2b funding covers the period from 2027 to 2060. This correlates to long-term storage of spent fuel on the ISFSI pad until the fuel is transferred to the DOE.

Periods 1 and 2a Funding

The total FENGen obligation for Periods 1 and 2a funding, which includes ISFSI activities and the transfer of spent fuel from the spent fuel pools to the ISFSI, for BVPS-1 is approximately $128.5 million dollars. FENGen intends to fund this obligation through a cash deposit of $267 million paid into a provisional trust. FENGen expects to recover the majority of its costs for Periods 1 and 2a by making claims for damages resulting from the DOE's breach of the Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste (Standard Contract) for BVPS-1. It also expects that by no later than January 1, 2027, it will be able to obtain a settlement agreement to recover Period 2b costs annually. Therefore, FENGen has focused on planning to fund the expected costs through 2026 (that is, Periods 1 and 2a).

Upon emergence from bankruptcy, New Holdco[2] and subsidiaries are projected to have approximately $2 billion of current assets, including cash and cash equivalents. FENGen anticipates that such assets would be able to fund Periods 1 and 2a spent fuel management activities for FENGen's two units by placement of $267 million into a provisional trust by the end of 2021. The provisional trust will enable use of the funds for spent fuel management activities occurring during Periods 1 and 2a. Upon the completion of the spent fuel activities in Periods 1 and 2a, the terms of the provisional trust will provide that it can be terminated, and its balance released back to FENGen.

FENGen will withdraw money from the $267 million provisional trust to pay the BVPS-1 Periods 1 and 2a spent fuel expenditures. Table 4 provides a summary of the FENGen use of the $267 million provisional trust. The expenditures came from the BVPS site-specific DCE that was developed in 2018.

Table 4 – Periods 1 and 2a Spent Fuel Expenditures
(thousands, 2018 dollars)

Year	BVPS-1 Payments	BVPS-2 Payments	Total FENGen Payments	Trust Value
Initial Value				267,000
2021	1,838	530	2,368	264,632
2022	4,788	2,843	7,631	257,001
2023	33,479	24,672	58,151	198,850
2024	33,571	36,556	70,127	128,723
2025	33,479	36,456	69,935	58,788
2026	21,422	36,456	57,878	910
Totals	128,577	137,513	266,090	910

Therefore, BVPS-1 Periods 1 and 2a costs will be fully paid for by funds withdrawn from the $267 million provisional trust.

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[2] March 31, 2018, FirstEnergy Solutions Corp. (FES), together with FENOC, FirstEnergy Nuclear Generation, LLC (FENGen), and FES's other subsidiaries, filed voluntary petitions for bankruptcy protection under Chapter 11 of the United States Bankruptcy Code.

Under the Plan of Reorganization, if confirmed, at emergence from bankruptcy, a new privately-held holding company will be formed with shares initially held by certain current creditors of one or more of FES, FENOC, FENGen, or FirstEnergy Generation, LLC (FG) (a sister company of FENGen holding fossil fuel generation assets), and management of the new holding company. The name of the new holding company is yet to be determined, therefore, it will be described using the generic name, "New HoldCo." Both reorganized FENOC and reorganized FENGen will become wholly-owned subsidiaries of New HoldCo.

Period 2b Funding

As described in the BVPS DCE, it is anticipated that the spent fuel will be entirely located on the ISFSI pad by 2026. The spent fuel is assumed to remain on the ISFSI pad between 2027 and 2060, when the last of the spent fuel is transferred to the DOE. There are annual costs associated with maintaining the spent fuel on the ISFSI pad during this period. FENGen generally expects to recover those costs for spent fuel management during Period 2b, through reimbursements from the DOE due to its partial breach of the DOE Standard Contract.

FENGen has an existing settlement agreement with the DOE to recover spent fuel expenditures for its four facilities. Between 2012 and 2017, FENGen has recovered more than $193 million from the DOE. However, this settlement expires December 31, 2019, and FENGen may need to litigate with the DOE in order to obtain reimbursement of Period 1 and 2a spent fuel expenditures after that date if the current settlement agreement is not extended. Other licensees with plants in premature shutdown have litigated with DOE to obtain recovery of Period 2b dry fuel storage costs and then obtained a settlement agreement. Thus, FENGen expects to obtain a settlement agreement for the Period 2b expenses and potentially some of the Periods 1 and 2a expenses.

As FENGen recovers its damages from the DOE, adequate funds will be retained in a segregated account to fund future annual expenses. Depending upon when litigation is resolved or a settlement is reached, this may include funding for parts of Periods 1 and 2a. Once the provisional trust is terminated, FENGen will rely upon the funds set aside in the segregated account.

The plan for BVPS-1 Period 2b funding process is to retain approximately $9.3 million in the segregated account for BVPS-1. The intent is to pay for the annual ISFSI activities, then apply for recovery of the expenses from the DOE, as needed. If FENGen is unable to obtain a settlement with DOE by the end of 2026, FENGen will obtain a performance bond for approximately $9.3 million (approximately 1.3 times the highest one-year value of ISFSI maintenance expenses). If needed, the bond will be in place by the end of 2026. The bond will be renewed annually and remain in-place until such time that a settlement with the DOE is obtained.

ISFSI Decommissioning Funding

Once the ISFSI pad is no longer needed, ISFSI decommissioning can occur. The ISFSI decommissioning is expected to be completed by 2083. ISFSI decommissioning costs will be paid from an existing provisional ISFSI trust that was established for that purpose. FENOC letter to the NRC dated December 17, 2018 (Accession No. ML18351A161) states that sufficient funding is available for ISFSI

decommissioning. Due to the changes in the assumptions in the BVPS DCE regarding the disposal of additional fuel assemblies for BVPS-1 and BVPS-2, the BVPS ISFSI was reviewed. It was determined that there was no significant impact upon the BVPS ISFSI DCE.

Adjustments to Funding

Pursuant to 10 CFR 50.75(f)(1), and 10 CFR 50.82(a)(8)(v) and (vi), FENOC is currently required to annually report to the NRC the status of the FENGen facility NDTs. Pursuant to 10 CFR 50.54(bb), FENOC is required to report to the NRC any significant changes to the IFMP. Since this IFMP includes a description of funding mechanisms and values, significant changes to the funding mechanisms and values will be reported. FENOC will make any adjustments, as needed, to ensure the adequacy of the facility NDT or the FENGen provisional trust used to support the IFMP.

Attachment 2
L-19-159

Beaver Valley Power Station, Unit No. 2
Irradiated Fuel Management Plan
(Eleven pages follow)

Background

10 CFR Part 50.54(bb) requires licensees to establish a program to manage and provide funding for the management of spent fuel at the reactor site until title and possession of the fuel is transferred to the United States Department of Energy (DOE) for ultimate disposal. The Beaver Valley Power Station, Unit No. 2 Irradiated Fuel Management Plan (IFMP), described herein, is based, in part, on a decommissioning cost estimate (DCE) that was prepared in 2018 for Beaver Valley Power Station, Unit Nos. 1 and 2 (BVPS-1, BVPS-2, or collectively, BVPS), which includes elements associated with spent fuel management. The DCE identifies the details, schedules, and costs associated with spent fuel management activities described in the BVPS-2 IFMP, along with license termination and site restoration activities and costs.

Pursuant to 10 CFR 50.75(f)(1) on March 15, 2019, FirstEnergy Nuclear Operating Company (FENOC) submitted its decommissioning trust financial status report for the four FENOC-operated nuclear facilities. Enclosure A of that report is a copy of the BVPS DCE. The DCE describes the bases for the assumptions regarding DOE acceptance of spent fuel from the industry and from BVPS.

As stated in the DCE (and subject to the assumptions, qualifications, and reservations stated therein), the IFMP is based on the assumption that BVPS-2 shuts down by October 31, 2021. This IFMP presumes the DOE will commence acceptance of BVPS-2's spent fuel in 2034 and completes removal of spent fuel from the site by 2060 consistent with the most recent DOE spent fuel management and acceptance strategy[1] described below.

[1] DOE currently has no plans, program, or schedule in place for acceptance of utility spent fuel. However, for these purposes, certain simplifying assumptions must be made regarding the schedule and rate of DOE performance. Therefore, while DOE's Standard Contract governing the acceptance of spent fuel allows for alternative removal schedules, including priority for shutdown reactors and exchanges of allocations, for purposes of this estimate DOE acceptance is assumed to commence in 2034 from BVPS-2 and in accordance with spent fuel shipment schedules that are based upon published historic acceptance priority rankings by DOE. Nothing herein should be interpreted as a concession or admission of any kind for purposes other than for this submission. Such other purposes would include, but are not limited to, disputes regarding DOE's legal or contractual acceptance obligations, or damages claims for recovery of incurred costs.

Spent Fuel Management Strategy

FENOC assumes that, as stated in the DOE's "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Waste," dated January 2013, the DOE will start accepting spent fuel for storage from the nation's commercial nuclear plants beginning in 2025 for placement in a consolidated interim storage facility (CISF) that starts operation in 2025. The DCE assumes that BVPS-2 will shutdown and cease operations in 2021 and that BVPS-2 spent fuel will be accepted for placement in the CISF. Using the rankings for spent fuel receipt, as delineated in the Office of Civilian Radioactive Waste Management reports, "Annual Capacity Report," dated June 1987, and "Acceptance Priority Ranking & Annual Capacity Report," dated July 2004, BVPS-2 fuel would be accepted at the DOE storage facility starting in 2034.

The spent fuel pool will contain discharged fuel from the previous refueling cycles, as well as the final reactor core at shutdown. Immediately after shutdown, spent fuel will be located in the spent fuel pool and in canisters located on an independent spent fuel storage installation (ISFSI). During the five-year period after the shutdown, the spent fuel from the spent fuel pool would be packaged into canisters and transferred to the ISFSI for interim storage. This period provides the necessary cooling time for the spent fuel to meet the decay heat requirements for placement in dry storage.

The current BVPS dry fuel storage system consists of a Transnuclear Standardized 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. A Holtec HI-STORM FW system, with a 37-fuel assembly capacity Multi-Purpose Canister (MPC) and concrete shield overpack, is expected to be used following shutdown. The DSCs and MPCs are assumed to be transferred directly to the DOE.

FENOC has constructed an ISFSI at BVPS to support BVPS-1 and BVPS-2 operations. The ISFSI operates under a general license pursuant to 10 CFR 72.210. The current size of the ISFSI pad is approximately 300 feet by 90 feet. The ISFSI will require expansion once plant operations cease in order to support spent fuel management activities. The pad expansion will be 120 feet by 90 feet. Total capacity of the consolidated pad is expected to be 88 DSCs and MPCs holding spent fuel and 6 MPCs holding greater than Class C waste. The ISFSI will continue to operate until such time that the transfer of spent fuel to the DOE can be completed. The DCE assumes that the BVPS spent fuel will be transferred to the DOE by 2060.

Table 1 provides a listing of the location of the spent fuel from 2019 until the spent fuel has been accepted by the DOE.

Table 1 – Spent Fuel Management Schedule
(BVPS-2 Fuel Assembly Location)[1, 2]

Year	BVPS-2 Pool Inventory	BVPS-2 ISFSI Inventory	DOE Acceptance of BVPS-2 Fuel
2019	1,257	0	0
2020	1,321	0	0
2021	1,478	0	0
2022	1,478	0	0
2023	1,478	0	0
2024	1,478	0	0
2025	1,108	370	0
2026	0	1,478	0
2027	0	1,478	0
2028	0	1,478	0
2029	0	1,478	0
2030	0	1,478	0
2031	0	1,478	0
2032	0	1,478	0
2033	0	1,478	0
2034	0	1,425	53
2035	0	1,356	69
2036	0	1,291	65
2037	0	1,220	71
2038	0	1,151	69
2039	0	1,089	62
2040	0	1,089	0
2041	0	1,025	64
2042	0	964	61
2043	0	899	65
2044	0	838	61
2045	0	838	0
2046	0	777	61
2047	0	717	60
2048	0	659	58
2049	0	598	61
2050	0	533	65
2051	0	476	57
2052	0	419	57
2053	0	362	57
2054	0	305	57
2055	0	248	57
2056	0	191	57

Table 1 (continued)

Year	BVPS-2 Pool Inventory	BVPS-2 ISFSI Inventory	DOE Acceptance of BVPS- Fuel
2057	0	134	57
2058	0	77	57
2059	0	20	57
2060	0	20	20
Total	-	-	1,478

Notes:

1. Fuel location is as of the date of the submittal. It is assumed that no fuel is transferred from the spent fuel pool to the ISFSI until 2025.
2. The values were updated to reflect minor changes in the number of fuel assemblies to be disposed.

Schedule

Table 2 provides a summary of the spent fuel management activities described in the DCE. The table provides the decommissioning period associated with the spent fuel program activity, its cost, and the approximate duration of the activity. The table does not consider ISFSI decommissioning, as this is an activity undertaken after spent fuel has been accepted by the DOE and removed from the site.

Table 2 – Spent Fuel Management Activities

Decommissioning Period	Costs (thousands, 2018 dollars)[1, 2]	Start Date	Stop Date	Approximate Duration (years)
1 - Preparations	3,846	October 2021	May 2023	1.5
2a - Dormancy with Wet Fuel Storage	139,932	May 2023	January 2027	3.7
2b - Dormancy with Dry Fuel Storage	100,157	January 2027	January 2061	34
Total	243,935	-	-	-

Notes:

1. The values were obtained from the BVPS DCE, which were reported in 2014 dollars. A composite escalation factor was applied to convert the values into 2018 dollars. These values differ from those in Table 3 due to the way the values in both tables were escalated.
2. The change in the number of fuel assemblies to be disposed was determined not to affect the costs.

Decommissioning Period 1 - Preparations

During this period, the facility is placed in a condition that allows the spent fuel to be safely stored and the facility to be maintained in a condition to be subsequently decontaminated to levels that permit release for unrestricted use. The facility is left essentially intact with structures maintained in a sound condition. The process of placing the plant in safe-storage includes, but is not limited to, isolating the spent fuel storage services and fuel handling systems so that the spent fuel can be safely transferred from the spent fuel storage pool to the ISFSI for interim storage.

Decommissioning Period 2a – Dormancy with Wet Fuel Storage

During this period, the facility is in the dormancy period of SAFSTOR decommissioning. During this phase, spent fuel will remain in the spent fuel pool until it meets the criteria for transfer to dry storage. FENOC expects to construct an ISFSI pad expansion during this period. FENOC plans to begin transferring the BVPS-2 spent fuel from the spent fuel pool to dry storage in 2025 and to complete the transfer of fuel to the consolidated ISFSI in 2026.

Decommissioning Period 2b – Dormancy with Dry Fuel Storage

During this period, spent fuel will remain stored on the ISFSI until DOE accepts the fuel and removes it from the site. As discussed above and in the BVPS DCE, the IFMP assumes that the DOE will begin removing fuel from BVPS-2 in 2034 and will complete the removal of spent fuel from the site in 2060, according to the schedule set forth in Table 1. During this period, programs and procedures required to support safe operation of the ISFSI will be maintained in accordance with applicable requirements. Maintenance, monitoring, and inspection of equipment, including fuel handling and shipping equipment, will be performed as required. BVPS-2 will also maintain a security force, which will safeguard the spent fuel for as long as it remains on site. Security barriers, sensors, alarms, and other surveillance equipment will be maintained as required to provide security for the ISFSI and spent fuel.

Cost Estimate

The BVPS DCE provides the basis for the costs associated with spent fuel management.

The DCE includes the cost of operating and maintaining the spent fuel pool and the ISFSI. Pool operations are expected to continue approximately five years after the cessation of plant operations. ISFSI operating costs are based upon an approximately 39-year period of operation following plant shutdown. The cost for the labor and equipment to load and transfer each spent fuel canister to the ISFSI from the spent fuel pool is also included. Costs for transferring the fuel from the ISFSI into the DOE transport cask are also included in the DCE.

Operation and maintenance costs for the spent fuel pool and the ISFSI are included within the DCE and address the cost for staffing the facility, as well as security, insurance, and licensing fees. Costs are also provided within the DCE for the decommissioning of the spent fuel pool, and the ISFSI after the fuel transfer to the DOE from the ISFSI is complete.

Table 3 provides an expenditure summary for the BVPS-2 IFMP in 2018 dollars.

Table 3 – IFMP Expenditure Summary[1]

Year	Expenditure (thousands, 2018 dollars)
2021	530
2022	2,843
2023	24,672
2024	36,556
2025	36,456
2026	36,456
2027	3,592
2028	2,578
2029	2,571
2030	2,571
2031	2,571
2032	2,578
2033	2,571
2034	2,872
2035	3,172
2036	3,179
2037	3,172
2038	3,172
2039	3,172
2040	2,578
2041	3,172
2042	3,172
2043	3,172
2044	3,179
2045	2,872
2046	2,872
2047	2,872
2048	2,879
2049	2,872
2050	2,872
2051	2,872
2052	3,179
2053	2,872
2054	3,172
2055	2,872
2056	3,179

Table 3 (continued)

Year	Expenditure (thousands, 2018 dollars)
2057	2,872
2058	3,172
2059	2,872
2060	3,179
Total	238,037

Funding

The BVPS funding mechanisms take into account the need to fund spent fuel management for the BVPS-1 and BVPS-2.

The funding for BVPS-2 spent fuel management follows the schedule described above. Funding for Periods 1 and 2a extends from 2021 to 2026. This correlates with preparation activities and transferring the spent fuel to the ISFSI pad. Period 2b funding covers the period from 2027 to 2060. This correlates to long-term storage of spent fuel on the ISFSI pad until the fuel is transferred to the DOE.

Periods 1 and 2a Funding

The total FENGen obligation for Periods 1 and 2a funding, which includes ISFSI activities and the transfer of spent fuel from the spent fuel pools to the ISFSI, for BVPS-2 is approximately $137.5 million dollars. FENGen intends to fund this obligation through a cash deposit of $267 million paid into a provisional trust. FENGen expects to recover the majority of its costs for Periods 1 and 2a by making claims for damages resulting from the DOE's breach of the Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste (Standard Contract) for BVPS-2. It also expects that by no later than January 1, 2027, it will be able to obtain a settlement agreement to recover Period 2b costs annually. Therefore, FENGen has focused on planning to fund the expected costs through 2026 (that is, Periods 1 and 2a).

Upon emergence from bankruptcy, New Holdco[2] and subsidiaries are projected to have approximately $2 billion of current assets, including cash and cash equivalents. FENGen anticipates that such assets would be able to fund Periods 1 and 2a spent fuel management activities for FENGen's two units by placement of $267 million into a provisional trust by the end of 2021. The provisional trust will enable use of the funds for spent fuel management activities occurring during Periods 1 and 2a. Upon the completion of the spent fuel activities in Periods 1 and 2a, the terms of the provisional trust will provide that it can be terminated, and its balance released back to FENGen.

FENGen will withdraw money from the $267 million provisional trust to pay the BVPS-2 Periods 1 and 2a spent fuel expenditures. Table 4 provides a summary of the FENGen use of the $267 million provisional trust. The expenditures came from the BVPS site-specific DCE that was developed in 2018.

Table 4 – Periods 1 and 2a Spent Fuel Expenditures
(thousands, 2018 dollars)

Year	BVPS-1 Payments	BVPS-2 Payments	Total FENGen Payments	Trust Value
Initial Value				267,000
2021	1,838	530	2,368	264,632
2022	4,788	2,843	7,631	257,001
2023	33,479	24,672	58,151	198,850
2024	33,571	36,556	70,127	128,723
2025	33,479	36,456	69,935	58,788
2026	21,422	36,456	57,878	910
Totals	128,577	137,513	266,090	910

Therefore, BVPS-2 Periods 1 and 2a costs will be fully paid for by funds withdrawn from the $267 million provisional trust.

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[2] March 31, 2018, FirstEnergy Solutions Corp. (FES), together with FENOC, FirstEnergy Nuclear Generation, LLC (FENGen), and FES's other subsidiaries, filed voluntary petitions for bankruptcy protection under Chapter 11 of the United States Bankruptcy Code.

Under the Plan of Reorganization, if confirmed, at emergence from bankruptcy, a new privately-held holding company will be formed with shares initially held by certain current creditors of one or more of FES, FENOC, FENGen, or FirstEnergy Generation, LLC (FG) (a sister company of FENGen holding fossil fuel generation assets), and management of the new holding company. The name of the new holding company is yet to be determined, therefore, it will be described using the generic name, "New HoldCo." Both reorganized FENOC and reorganized FENGen will become wholly-owned subsidiaries of New HoldCo.

Period 2b Funding

As described in the BVPS DCE, it is anticipated that the spent fuel will be entirely located on the ISFSI pad by 2026. The spent fuel is assumed to remain on the ISFSI pad between 2027 and 2060, when the last of the spent fuel is transferred to the DOE. There are annual costs associated with maintaining the spent fuel on the ISFSI pad during this period. FENGen generally expects to recover those costs for spent fuel management during Period 2b, through reimbursements from the DOE due to its partial breach of the DOE Standard Contract.

FENGen has an existing settlement agreement with the DOE to recover spent fuel expenditures for its four facilities. Between 2012 and 2017, FENGen has recovered more than $193 million from the DOE. However, this settlement expires December 31, 2019, and FENGen may need to litigate with the DOE in order to obtain reimbursement of Period 1 and 2a spent fuel expenditures after that date if the current settlement agreement is not extended. Other licensees with plants in premature shutdown have litigated with DOE to obtain recovery of Period 2b dry fuel storage costs and then obtained a settlement agreement. Thus, FENGen expects to obtain a settlement agreement for the Period 2b expenses and potentially some of the Period 1 and 2a expenses.

As FENGen recovers its damages from the DOE, adequate funds will be retained in a segregated account to fund future annual expenses. Depending upon when litigation is resolved or a settlement is reached, this may include funding for parts of Periods 1 and 2a. Once the provisional trust is terminated, FENGen will rely upon the funds set aside in the segregated account.

The plan for BVPS-2 Period 2b funding process is to retain approximately $4.7 million in the segregated account for BVPS-2. The intent is to pay for the annual ISFSI activities, then apply for recovery of the expenses from the DOE, as needed. If FENGen is unable to obtain a settlement with DOE by the end of 2026, FENGen will obtain a performance bond for approximately $4.7 million (approximately 1.3 times the highest one-year value of ISFSI maintenance expenses). If needed, the bond will be in place by the end of 2026. The bond will be renewed annually and remain in-place until such time that a settlement with the DOE is obtained.

ISFSI Decommissioning Funding

Once the ISFSI pad is no longer needed, ISFSI decommissioning can occur. The ISFSI decommissioning is expected to be completed by 2083. ISFSI decommissioning costs will be paid from an existing provisional ISFSI trust that was established for that purpose. FENOC letter to the NRC dated December 17, 2018 (Accession No. ML18351A161) states that sufficient funding is available for ISFSI

decommissioning. Due to the changes in the assumptions in the BVPS DCE regarding the disposal of additional fuel assemblies for BVPS-1[3] and BVPS-2, the BVPS ISFSI was reviewed. It was determined that there was no significant impact upon the BVPS ISFSI DCE

Adjustments to Funding

Pursuant to 10 CFR 50.75(f)(1), and 10 CFR 50.82(a)(8)(v) and (vi), FENOC is currently required to annually report to the NRC the status of the FENGen facility NDTs. Pursuant to 10 CFR 50.54(bb), FENOC is required to report to the NRC any significant changes to the IFMP. Since this IFMP includes a description of funding mechanisms and values, significant changes to the funding mechanisms and values will be reported. FENOC will make any adjustments, as needed, to ensure the adequacy of the facility NDT or the FENGen provisional trust used to support the IFMP.

[3]A change to an assumption in the BVPS DCE added an additional four fuel assemblies to BVPS-1 that require disposal.