



10 CFR 72.30(b)

LR-N15-0241  
December 17, 2015

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

Salem and Hope Creek Independent Spent Fuel Storage Installation  
NRC Docket No. 72-0048

Peach Bottom Independent Spent Fuel Storage Installation  
NRC Docket No. 72-0029

**Subject: Decommissioning Funding Plan for Independent Spent Fuel Storage Installations**

PSEG Nuclear LLC (PSEG) is submitting the enclosed Decommissioning Funding Plan for the Salem and Hope Creek and Peach Bottom Independent Spent Fuel Storage Installations (ISFSIs) in accordance with 10 CFR 72.30(b). Enclosure 1 addresses each of the six criteria contained in 10 CFR 72.30(b) and references Enclosure 2, which provides the detailed decommissioning cost estimate.

PSEG Nuclear's ISFSI was required due to the United States Department of Energy's (DOE's) failure to remove nuclear fuel from the Salem and Hope Creek stations in a timely manner consistent with their contractual obligations. PSEG Nuclear entered into a settlement agreement which permits recovery of costs associated with the ISFSI. Since the ISFSI would have been unnecessary at PSEG Nuclear absent DOE's contract breach, PSEG Nuclear anticipates recovering ISFSI decommissioning costs from DOE. Until such time as the costs can be recovered from the DOE attributable to the DOE's failure to perform its spent fuel removal obligations, PSEG plans to use the funds in the respective decommissioning trust funds to terminate ISFSI licenses and release the facilities for unrestricted use.

There are no regulatory commitments contained in this letter. If you have any questions or require additional information, please do not hesitate to contact me at (856) 339-1466.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul R. Duke, Jr.", written over a printed name and title.

Paul R. Duke, Jr.  
Licensing Manager

Enclosure 1: Decommissioning Funding Plan for ISFSIs  
Enclosure 2: Decommissioning Cost Estimate for ISFSIs

cc: Mr. D. Dorman, Administrator, Region I, NRC  
Ms. C. Parker, Project Manager, NRC – Salem, Hope Creek  
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Mr. P. Mulligan, Chief, NJBNE  
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Mr. T. MacEwen, Hope Creek Commitment Tracking Coordinator

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**Enclosure 1**

**Decommissioning Funding Plan**

**for**

**Independent Spent Fuel Storage Installations**

**PSEG Nuclear Decommissioning Funding Plan for the Salem, Hope Creek, and Peach Bottom Independent Spent Fuel Storage Installations (ISFSIs)**

10 CFR 72.30(c) requires the Decommissioning Funding Plan (DFP) to be adjusted as necessary and resubmitted at intervals not exceeding 3 years. PSEG Nuclear LLC (PSEG) provides the following information required by 10 CFR 72.30(b) to be included in the DFP:

**Requirement 1:**

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

**Information for Requirement 1:**

Pursuant to 10 CFR 72.30(e)(5), since Salem, Hope Creek and Peach Bottom Atomic Power Station (PBAPS) are power reactor licensees under 10 CFR 50, PSEG utilizes the methods of 10 CFR 50.75(b), (e), and (h) to provide financial assurance associated with its ownership shares of the PSEG ISFSI and the PBAPS ISFSI (operated by the Exelon Generation company).

**Requirement 2:**

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

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

**Information for Requirement 2:**

The detailed cost estimates (DCEs) for Salem, Hope Creek, and Peach Bottom are included in Enclosure 2.

**Requirement 3:**

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

**Information for Requirement 3:**

The key assumptions and justifications for Salem, Hope Creek, and Peach Bottom DCEs are described in Enclosure 2, section 4.0.

**Requirement 4:**

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

**Information for Requirement 4:**

As indicated in the information for Requirement 1, PSEG utilizes the methods of 10 CFR 50.75(b), (e), and (h) to provide financial assurance associated with its ownership share of the ISFSIs. The decommissioning cost estimate will be reported every three years, as required by 10 CFR 72.30(c). PSEG is also required to annually adjust its share of the amount of financial assurance required by 10 CFR 50.75(b), paragraph (2). The amounts of surplus in the Part 50 external sinking funds are more than sufficient to fund PSEG's shares of the estimated decommissioning costs.

**Requirement 5:**

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

**Information for Requirement 5:**

There is no known subsurface material containing residual radioactivity in the proximity of the ISFSIs that will require remediation to meet the criteria for license termination.

**Requirement 6:**

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

**Information for Requirement 6:**

PSEG has provided financial assurance for decommissioning the ISFSI sites in an amount that meets or exceeds its ownership share of the cost estimate for decommissioning.

**Enclosure 2**

**Decommissioning Cost Estimate**

**for**

**Independent Spent Fuel Storage Installations**

## **1.0 OVERVIEW**

The following information is extracted from TLG Services, Inc. decommissioning estimates for Salem Units 1 and 2, Hope Creek, and Peach Bottom Units 2 and 3. The information provided is typical with the exception of those statements which are attributed specifically.

### **1.1 ISFSI OPERATIONS AND DECOMMISSIONING**

Assuming the Department of Energy (DOE) starts accepting fuel from Hope Creek in 2041 and Salem in 2038, transfer of spent fuel from the ISFSI is anticipated to continue through the year 2088. Similarly, transfer of spent fuel from Peach Bottom is anticipated to begin in 2051 and continue through 2056.

Salem and Hope Creek spent fuel is stored on the ISFSI in Holtec multi-purpose canisters, each with a concrete overpack. The Transnuclear TN-68 vertical storage system is currently used for the storage of Peach Bottom spent fuel. The steel cask has no concrete shielding. The Holtec HI-STORM FW system is expected to be used for future campaigns.

In the case of spent fuel that is stored on the ISFSIs in Holtec canisters, it is assumed that once the inner canisters containing the spent fuel assemblies have been removed, any required decontamination performed on the storage overpack (some minor neutron-induced activation is assumed), and the license for the facility terminated, the concrete overpacks can be dismantled using conventional techniques for the demolition of reinforced concrete. The concrete storage pad is then removed and the area re-graded.

The decommissioning estimates for Salem, Hope Creek, and Peach Bottom assume that the site will be remediated to a residual level of radioactivity consistent with the NRC-prescribed level for unrestricted use. Decommissioning estimates for Salem and Hope Creek also assume that the site will be remediated to a residual level consistent with the State of New Jersey's remedial action levels for radioactive material.

At the conclusion of the spent fuel transfer process, the ISFSI will be decommissioned. The Commission will terminate the §50 license if it determines that the remediation of the ISFSI has been performed in accordance with an ISFSI license termination plan and that the final radiation survey and associated documentation demonstrate that the facility is suitable for release. Once the requirements are satisfied, the NRC can terminate the license for the ISFSI. In the case of Salem and Hope Creek, costs for demolishing the ISFSI are shared.

## **2.0 COST ESTIMATES**

The cost estimates prepared for decommissioning Hope Creek, Salem, and Peach Bottom consider the unique features of the site, including the NSSS, power generation systems, support services, site buildings, and ancillary facilities. The basis of the estimates, including the sources of information relied upon, the estimating methodology employed, site-specific considerations, and other pertinent assumptions, is described in this section.

## 2.1 BASIS OF ESTIMATES

### 2.1.1 Salem and Hope Creek

The estimates were developed using the site-specific, technical information from the 2012 analysis. This information was reviewed for the current analysis. The review confirmed that there were no substantive changes over the three year period to the configuration of the plant or site facilities that would impact decommissioning. The site-specific considerations and assumptions used in the previous evaluation were also revisited. Modifications were incorporated where experience from ongoing decommissioning programs provided viable alternatives or improved processes.

### 2.1.2 Peach Bottom

The estimates were developed using the site-specific, technical information from the 2012 analysis with the exception of the plant systems inventory. The plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, were reviewed for this analysis. Review of structural information confirmed that there were no substantive changes over the five year period to the configuration of the plant or site facilities that would impact decommissioning. The site-specific considerations and assumptions used in the previous evaluation were also revisited. Modifications were incorporated where experience from ongoing decommissioning programs provided viable alternatives or improved processes.

## 2.2 METHODOLOGY

The methodology used to develop the estimates follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," and the DOE "Decommissioning Handbook." These documents present a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal (\$/cubic yard), steel removal (\$/ton), and cutting costs (\$/inch) were developed using local labor rates. The activity-dependent costs were estimated with the item quantities (cubic yards and tons), developed from plant drawings and inventory documents. Removal rates and material costs for the conventional disposition of components and structures relied upon information available in the industry publication, 2015 "Building Construction Cost Data," published by R.S. Means.

### 2.2.1 Work Difficulty Factors

Work difficulty adjustment factors (WDFs) have been applied to account for the inefficiencies in working in a power plant environment. WDFs were assigned to each unique set of unit factors, commensurate with the inefficiencies associated with working in confined, hazardous environments. The ranges used for the WDFs are as follows:

- Access Factor 10% to 20%
- Respiratory Protection Factor 10% to 50%
- Radiation/ALARA Factor 10% to 40%
- Protective Clothing Factor 10% to 30%
- Work Break Factor 8.33%



The factors and their associated range of values were developed in conjunction with the AIF/NESP-036 study. The application of the factors is discussed in more detail in that publication.

### 2.2.2 Scheduling Program Durations

The unit factors, adjusted by the WDFs as described above, are applied against the inventory of materials to be removed in the radiologically controlled areas. The resulting man-hours, or crew-hours, are used in the development of the decommissioning program schedule, using resource loading and event sequencing considerations. The scheduling of conventional removal and dismantling activities are based upon productivity information available from the R.S. Means "Building Construction Cost Data" publication.

An activity duration critical path is used to determine the total decommissioning program schedule. The schedule is relied upon in calculating the carrying costs, which include program management, administration, field engineering, equipment rental, and support services such as quality control and security. This systematic approach for assembling decommissioning estimates ensures a high degree of confidence in the reliability of the resulting cost estimate.

## 2.3 FINANCIAL COMPONENTS OF THE COST MODEL

A proprietary decommissioning cost model, DECCER, produces a number of distinct cost elements. These direct expenditures, however, do not comprise the total cost to accomplish the project goal, i.e., license termination and site restoration.

### 2.3.1 Contingency

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In the cost model, contingency fulfills this role. Contingency is added to each line item to account for costs that are difficult or impossible to develop analytically. Such costs are historically inevitable over the duration of a job of this magnitude; therefore, this cost analysis includes funds to cover these types of expenses.

It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

Appendix A, the ISFSI decommissioning calculation, uses a flat 25% contingency added at the end of the calculation.

## **3.0 SITE-SPECIFIC CONSIDERATIONS**

There are a number of site-specific considerations that affect the method for dismantling and removal of equipment from the site and the degree of restoration required. The cost impacts of the considerations identified below are included in this cost study.

### 3.1 ISFSI DECOMMISSIONING

In accordance with 10 CFR 72.30, licensees must have a proposed decommissioning plan for the ISFSI site and facilities that includes a cost estimate for the plan. The plan should contain sufficient information on the proposed practices and procedures for the decontamination of the ISFSI and for the disposal of residual radioactive materials after all spent fuel, high-level radioactive waste, and reactor-related GTCC waste have been removed.

A multi-purpose (storage and transport) dry shielded storage canister with a vertical, reinforced concrete storage overpack is used as a basis for the cost analyses. The overpack liners are assumed to have some level of neutron-induced activation, as a result of the long-term storage of the fuel, i.e., to levels exceeding free-release limits. As an allowance, 18 overpacks are assumed to require remediation for Peach Bottom, 12 for Salem and 12 for Hope Creek; equivalent to the number of overpacks required to accommodate the final core offload. The cost of the disposition of this material, as well as the demolition of the ISFSI facility, is included in the estimates.

In accordance with the specific requirements of 10 CFR 72.30 for the ISFSI work scope, the cost estimate for decommissioning the ISFSI reflects: 1) the cost of an independent contractor performing the decommissioning activities; 2) an adequate contingency factor; and 3) the cost of meeting the criteria for unrestricted use. The cost summaries for decommissioning the ISFSIs are presented in Appendix A.

### 3.2 LOW-LEVEL RADIOACTIVE WASTE DISPOSAL

Disposal fees are calculated using current disposal agreements.

### 3.3 SITE CONDITIONS FOLLOWING DECOMMISSIONING

The NRC will amend or terminate the site license if it determines that site remediation has been performed in accordance with the license termination plan, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release. The NRC's involvement in the decommissioning process will end at this point. Building codes and environmental regulations will dictate the next step in the decommissioning process, as well as owner's own future plans for the site, e.g., the electrical switchyard will remain in support of the electrical transmission and distribution system.

The estimate does not assume the remediation of any significant volume of contaminated soil. This assumption may be affected by continued plant operations.

## 4.0 ASSUMPTIONS

The following are the major assumptions made in the development of the estimates for decommissioning the site.

### 4.1 ESTIMATING BASIS

The study follows the principles of ALARA (As Low As Reasonably Achievable) through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and

protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

## 4.2 LABOR COSTS

For purposes of this analysis, it is assumed that the site owners will hire a Decommissioning Operations Contractor (DOC) to manage the decommissioning. The owners will provide site security, radiological health and safety, quality assurance and overall site administration during the decommissioning and demolition phases. Contract personnel will provide engineering services (e.g., for preparing the activity specifications, work procedures, neutron activation, and structural analyses) under the direction of the owners.

Utility labor costs were provided by the site owners. Average costs were provided by department or work group and included payroll overheads. DOC labor costs were based on utility labor costs with modified markups to account for employee benefits, DOC overhead and profit.

The craft labor required to decontaminate and dismantle the nuclear unit will be acquired through standard site contracting practices. Craft labor costs were based upon information from the site owners. Craft labor costs include applicable overheads and profit.

Staffing levels are assigned for each unit by sub-period and functional area. The types of positions and staffing levels are adjusted based upon the type of activity occurring in each sub-period.

Security, while reduced from operating levels, is maintained throughout the decommissioning for access control, material control, and to safeguard the spent fuel (in accordance with the requirements of 10 CFR Part 37, Part 72, and Part 73). Once the fuel has been transferred to the DOE, the security organization will be reduced to Part 37 requirements.

## 4.3 SCRAP AND SALVAGE

The concrete debris resulting from demolition activities is crushed on site to reduce the size of the debris. The resulting crushed concrete is used to backfill below grade voids. The rebar removed from the concrete crushing process is disposed of as scrap steel in a similar fashion as other scrap metal as discussed previously.

## 4.4 ENERGY

Replacement power costs are used for the cost of energy consumption during decommissioning for tooling, lighting, ventilation, and essential services.

## 4.5 INSURANCE

Costs for continuing coverage (nuclear liability and property insurance) following cessation of plant operations and during decommissioning are included and based upon current operating premiums. Reductions in premiums, throughout the decommissioning process, are based upon the guidance provided in SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant

Decommissioning.” The NRC’s financial protection requirements are based on various reactor (and spent fuel) configurations.

#### 4.6 TAXES

Property taxes are included for all decommissioning periods.

#### 4.7 SITE MODIFICATIONS

The perimeter fence and in-plant security barriers will be moved, as appropriate, to conform to the Site Security Plan in force during the various stages of the project.

**Appendix A**  
**Salem Generating Station, Units 1 and 2**  
**ISFSI Decommissioning Cost Estimate**  
**DECON and SAFSTOR Decommissioning Alternatives**  
 (thousands of 2015 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours
<b>Decommissioning Contractor</b>									
Planning (characterization, specs and procedures)	-	-	-	-	457	457	-	-	1,288
Decontamination (activated HSM disposition)	251	101	226	1,760	-	2,338	29,111	2,570	-
License Termination (radiological surveys)	-	-	-	-	2,294	2,294	-	18,055	-
<b>Subtotal</b>	<b>251</b>	<b>101</b>	<b>226</b>	<b>1,760</b>	<b>2,752</b>	<b>5,090</b>	<b>29,111</b>	<b>20,625</b>	<b>1,288</b>
<b>Supporting Costs</b>									
NRC and NRC Contractor Fees and Costs	-	-	-	-	390	390	-	-	776
Insurance	-	-	-	-	97	97	-	-	-
Property Taxes	-	-	-	-	16	16	-	-	-
Security Staff Cost	-	-	-	-	154	154	-	-	2,910
Oversight Staff Cost	-	-	-	-	200	200	-	-	2,277
<b>Subtotal</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>857</b>	<b>857</b>	<b>-</b>	<b>-</b>	<b>5,963</b>
<b>Total (w/o contingency)</b>	<b>251</b>	<b>101</b>	<b>226</b>	<b>1,760</b>	<b>3,609</b>	<b>5,947</b>	<b>29,111</b>	<b>20,625</b>	<b>7,251</b>
<b>Total (w/25% contingency)</b>						<b>7,435</b>			

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)

**Appendix A**  
**Hope Creek Generating Station**  
**ISFSI Decommissioning Cost Estimate**  
**DECON and SAFSTOR Decommissioning Alternatives**  
 (thousands of 2015 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours
<b>Decommissioning Contractor</b>									
Planning (characterization, specs and procedures)	-	-	-	-	377	377	-	-	1,192
Decontamination (activated HSM disposition)	232	88	195	1,525	-	2,040	25,080	2,797	-
License Termination (radiological surveys)	-	-	-	-	1,936	1,936	-	15,283	-
<b>Subtotal</b>	<b>232</b>	<b>88</b>	<b>195</b>	<b>1,525</b>	<b>2,313</b>	<b>4,354</b>	<b>25,080</b>	<b>18,080</b>	<b>1,192</b>
<b>Supporting Costs</b>									
NRC and NRC Contractor Fees and Costs	-	-	-	-	390	390	-	-	776
Insurance	-	-	-	-	82	82	-	-	-
Property Taxes	-	-	-	-	11	11	-	-	-
Security Staff Cost	-	-	-	-	107	107	-	-	1,968
Oversight Staff Cost	-	-	-	-	339	339	-	-	1,968
<b>Subtotal</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>930</b>	<b>930</b>	<b>-</b>	<b>-</b>	<b>4,712</b>
<b>Total (w/o contingency)</b>	<b>232</b>	<b>88</b>	<b>195</b>	<b>1,525</b>	<b>3,244</b>	<b>5,284</b>	<b>25,080</b>	<b>18,080</b>	<b>5,904</b>
<b>Total (w/25% contingency)</b>						<b>6,606</b>			

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)

**Appendix A**  
**Peach Bottom Atomic Power Station, Units 2 and 3**  
**ISFSI Decommissioning Cost Estimate**  
**DECON and SAFSTOR Decommissioning Alternatives**  
 (thousands of 2015 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours
<b>Decommissioning Contractor</b>									
Planning (characterization, specs and procedures)	-	-	-	-	362	362	-	-	1,192
Decontamination (activated HSM disposition)	250	135	972	2,357	-	3,714	35,613	2,692	-
License Termination (radiological surveys)	-	-	-	-	1,745	1,745	-	14,799	-
<b>Subtotal</b>	<b>250</b>	<b>135</b>	<b>972</b>	<b>2,357</b>	<b>2,107</b>	<b>5,821</b>	<b>35,613</b>	<b>17,491</b>	<b>1,192</b>
<b>Supporting Costs</b>									
NRC and NRC Contractor Fees and Costs	-	-	-	-	420	420	-	-	776
Insurance	-	-	-	-	61	61	-	-	-
Property Taxes	-	-	-	-	331	331	-	-	-
Site O&M	-	-	-	-	112	112	-	-	-
Security Staff Cost	-	-	-	-	220	220	-	-	1,729
Oversight Staff Cost	-	-	-	-	318	318	-	-	1,901
<b>Subtotal</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1,462</b>	<b>1,462</b>	<b>-</b>	<b>-</b>	<b>4,406</b>
<b>Total (w/o contingency)</b>	<b>250</b>	<b>135</b>	<b>972</b>	<b>2,357</b>	<b>3,569</b>	<b>7,283</b>	<b>35,613</b>	<b>17,491</b>	<b>5,598</b>
<b>Total (w/25% contingency)</b>						<b>9,103</b>			

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)