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

10 CFR 50.75  
10 CFR 72.30

**SUSQUEHANNA STEAM ELECTRIC STATION (SUSQUEHANNA)  
INDEPENDENT SPENT FUEL STORAGE  
INSTALLATION (ISFSI) DECOMMISSIONING FUNDING PLAN, UPDATED**      **Docket Nos. 50-387, 50-388  
and 72-28**

Allegheny Electric Cooperative, Inc. (Allegheny) is submitting the enclosed updated Decommissioning Funding Plan for Allegheny's 10 percent proportionate share of the Susquehanna Steam Electric Station, (Susquehanna), Independent Spent Fuel Storage Installation (ISFSI) 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 details concerning the ISFSI decommissioning cost estimate that was prepared by TLG Services, Inc. This update is required under 10 CFR 72.30(c) for the ISFSI Decommissioning Cost Estimate.

There are no new regulatory commitments associated with this response.

If you have any questions or require additional information, please contact Mr. Edward L. Stevens (717) 920-1111.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: 1/8/16

Sincerely,

Edward L. Stevens

- Enclosures:    1. Decommissioning Funding Plan  
                  2. 10 CFR 72.30 ISFSI Decommissioning Cost Estimate

Copy:    NRC Region I  
          Mr. J. E. Greives, NRC Sr. Resident Inspector  
          Mr. J. A. Whited, NRC Project Manager

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**Enclosure 1**

**Decommissioning Funding Plan**

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## **Decommissioning Funding Plan**

10 CFR 72.30(b) requires each holder of, or applicant for, a license under Part 72 to submit for NRC review and approval a decommissioning funding plan (DFP). Allegheny Electric Cooperative, Inc. provides the following information required by 10 CFR 72.30(b) to be included in the DFP:

### **Requirement 1:**

*“(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), Allegheny Electric Cooperative, Inc. is a power reactor licensee under 10 CFR 50, the methods of 10 CFR 50.75(b), (e), and (h) are utilized to provide financial assurance associated with its 10 percent ownership of the Independent Spent Fuel Storage Installation (ISFSI) of the Susquehanna Steam Electric Station plant. As shown below, the prepaid funds in Allegheny’s decommissioning trusts for Susquehanna Units 1 and 2 exceed, with credited earnings, the 10% ownership proportionate amount required by the NRC for radiological decommissioning of the Units and the ISFSI decommissioning cost estimate combined.

### **Requirement 2:**

*(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:**

This information is included in the report in Enclosure 2.

### **Requirement 3:**

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

**Information for Requirement 3:**

This information is included in the report in Enclosure 2.

**Requirement 4:**

*(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:**

Allegheny Electric Cooperative, Inc. uses the prepayment method of assuring funds for its 10% proportionate share of decommissioning both Susquehanna units. As reported in the most recent Decommissioning Funding Status Report,<sup>1</sup> the market value of the decommissioning trusts as of December 31, 2014 were \$56,924,380 for each of Susquehanna Units 1 and 2 respectively, or a combined total of \$113,848,760. When 2 percent real earnings are credited up to the times of permanent termination of operations, along with a pro-rata credit during a dismantlement period, as permitted by 10 C.F.R. § 50.75(e)(1)(i), these amounts have a credited value of \$105,172,848 and \$108,885,449 respectively, or a combined total of \$214,058,297. As reported in the Decommissioning Funding Status Report, the minimum amount of decommissioning funds required by 10 C.F.R. § 50.75(b) & (c) as of December 31, 2014 was \$69,363,000 for each unit or \$138,726,000 combined. The amount of surplus in these trusts (\$75,332,297 combined) is more than sufficient to fund the estimated ISFSI decommissioning cost (\$14.833 million at 100% of plant or \$1,483,300 at 10% proportionate ownership).

The decommissioning cost estimate will be adjusted as necessary every three years, as required by 10 CFR 72.30(c). Allegheny Electric Cooperative, Inc. annually adjusts its 10 percent share of the amount of financial assurance required by 10 CFR 50.75(b) in accordance with paragraph (2) of that section, and further adjustment is required by 10 CFR 50.75(f)(3) and (5) at or about five years prior to the projected end of reactor operations.

**Requirement 5:**

*(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:**

This information is included in the report in Enclosure 2.

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<sup>1</sup> Allegheny, Susquehanna Steam Electric Station, NRC Decommissioning Funding Status Report (Mar. 25, 2015).

**Requirement 6:**

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

**Information for Requirement 6:**

Allegheny Electric Cooperative, Inc., hereby certifies that financial assurance for the estimated cost of decommissioning the Susquehanna ISFSI has been provided as discussed above.

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**Enclosure 2**

**10 CFR 72.30 ISFSI Decommissioning Cost Estimate**

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## 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,<sup>[2]</sup> with the rule becoming effective on December 17, 2012. Subpart 72.30, "Financial assurance and recordkeeping for decommissioning," requires that each holder of, or applicant for, a license under this part must submit for NRC review and approval a decommissioning funding plan that contains information on how reasonable assurance will be provided that funds will be available to decommission the Independent Spent Fuel Storage Installation (ISFSI).

The rule also requires resubmittal of the decommissioning funding plan at intervals not to exceed 3 years, with adjustments as necessary to account for changes in costs and the extent of contamination. This document is intended to update the funding plan previously submitted by Allegheny Electric Cooperative, Inc., in January of 2013.<sup>[3]</sup>

In accordance with the rule, this letter provides a detailed cost estimate for decommissioning the ISFSI at Susquehanna Steam Electric Station (Susquehanna) in an amount reflecting:

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

This letter also provides:

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

### 2. Spent Fuel Management Strategy

The operating licenses for the two Susquehanna units are currently set to expire on July 16, 2042 and March 22, 2044, respectively. Approximately 19,672 spent fuel assemblies are currently projected to be generated as a result of station operations through the license expiration dates. Because of the breach by the Department of Energy (DOE) of its contract to remove fuel from the site, an ISFSI has been constructed and spent fuel transferred to dry storage modules located on the ISFSI, to support continued station

<sup>2</sup> U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70 and 72 "Decommissioning Planning," Nuclear Regulatory Commission, Federal Register Volume 76, Number 117 (p 35512 et seq.), June 17, 2011

<sup>3</sup> "Susquehanna Steam Electric Station Decommissioning Funding Plan for the Independent Spent Fuel Storage Installation," dated January 18, 2013.

operations. It is likely, based upon the current projection of the DOE's ability to remove spent fuel from the site, that the current ISFSI will be expanded to support continued operations and decommissioning. The ISFSI is operated under a Part 50 General License (in accordance with 10 CFR 72, Subpart K<sup>[4]</sup>).

All spent fuel for the entire operating life of the station is expected to be packaged in dry storage containers (DSCs), including spent fuel assemblies in the spent fuel pools at the time of final shutdown. Transferring the spent fuel from the pools to the ISFSI will permit decontamination and dismantling of the spent fuel pool systems and fuel pool areas or result in reduced operating expenses should the station be placed into a SAFSTOR dormancy configuration.

Completion of the ISFSI decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site. However, with no progress by DOE in the removal of spent fuel from commercial generating sites, Allegheny's current spent fuel management plan, for purposes of this analysis, assumes "just-in-time" acceptance, i.e., the DOE will be able to complete the transfer of spent fuel so as not to impede a deferred decommissioning scenario (SAFSTOR) and the termination of the operating licenses within the required 60 year period (from the cessation of operations). To achieve this objective, based upon the oldest fuel receiving the highest priority,<sup>[5]</sup> and an annual maximum rate of transfer of 3,000 metric tons of uranium/year,<sup>[6]</sup> DOE would commence pickup of spent fuel from Susquehanna by 2082, with the completion of spent fuel receipt by year 2102.

Allegheny's position is that the DOE has a contractual obligation to accept the spent fuel earlier than the projections set out above consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim.

### 3. ISFSI Decommissioning Strategy

At the conclusion of the spent fuel transfer process to DOE the ISFSI will be promptly decommissioned (similar to the power reactor DECON alternative). In this estimate the ISFSI decommissioning is considered an independent project, regardless of the decommissioning alternative identified for the station.

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<sup>4</sup> U.S. Code of Federal Regulations, Title 10, Part 72, Subpart K, "General License for Storage of Spent Fuel at Power Reactor Sites."

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

<sup>6</sup> "Acceptance Priority Ranking & Annual Capacity Report," DOE/RW-0567, July 2004.



#### 4. ISFSI Description

The design and capacity of the Susquehanna ISFSI is based upon a NUHOMS® dry storage system. The NUHOMS® system is comprised of a dry storage canister (DSC), with either a 52 or 61 spent fuel assembly capacity, and a horizontal storage module (HSM), Model 102. The DSCs are assumed to be transferred directly to the DOE and not returned to the station. Some of the remaining HSMs are assumed to have residual radioactivity due to some minor level of neutron-induced activation of the steel components and adjacent concrete as a result of the long-term storage of the spent fuel. The cost to dispose of material with 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.

As the plant operator, Susquehanna Nuclear's current spent fuel management plan for the Susquehanna spent fuel would result in approximately 327 HSMs (27 DSCs containing 52 assemblies each and 300 DSCs containing a nominal 61 assemblies per DSC) being in position on the storage pad at the site after all spent fuel has been removed from the spent fuel pools. This represents 100% of the total spent fuel projected to be generated during the currently licensed operating period.

In addition to the spent fuel HSMs located on the ISFSI pad after shutdown there are projected to be additional HSMs that are expected to be used for Greater-than-Class-C (GTCC) storage. The HSMs used for the GTCC canisters (estimated quantity of 4 per unit) 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 expected after all spent fuel and GTCC material has been removed from the site. The configuration of the ISFSI is based on the Susquehanna units operating until the end of their current licenses, July 16, 2042 and March 22, 2044, respectively, and the assumptions associated with DOE's spent fuel acceptance, as previously described.

For purposes of this analysis the current pad (221 feet by 224 feet) will be expanded to accommodate the 335 modules (including the 8 modules for storing GTCC). The dry storage vendor, Transnuclear, Inc., does not expect the horizontal storage modules to have any interior or exterior radioactive surface contamination.<sup>[7]</sup> Any neutron

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<sup>7</sup> Updated Final Safety Analysis Report for the Standardized NUHOMS® Horizontal Modular Storage System for Irradiated Nuclear Fuel, Transnuclear Inc., NUH-003, Rev. 12, at page 3.5-1

activation of the steel and concrete is expected to be extremely small.<sup>[8]</sup> This assumption is adopted for this analysis.

The decommissioning estimate is based on the premise that some of the DSC support structure within some of the HSMs and the adjacent concrete will contain low levels of neutron-induced residual radioactivity that would necessitate remediation at the time of decommissioning. As an allowance, 26 of the 327 HSMs are assumed to be affected, i.e., contain residual radioactivity. The allowance quantity is based upon the number of DSCs required for the final core off-load (i.e., 764 offloaded assemblies/unit, 61 assemblies per DSC) which results in a total of 13 HSMs/unit or 26 total that contain residual radioactivity. It is assumed that these are the final HSMs offloaded; consequently they have the least time for radioactive decay of the neutron activation products.

It is not expected that there will be any residual contamination left on the concrete ISFSI pad. Therefore, it is assumed for this analysis that the ISFSI pad will not be contaminated. As such, only verification surveys are included for the pad in the decommissioning estimate.

There is no known<sup>[9]</sup> subsurface material in the proximity of the ISFSI containing residual radioactivity that will require remediation to meet the criteria for license termination.

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 the 2015 R.S. Means' Building Construction Cost Data (adjusted for regional variations), and laboratory service costs are based on vendor price lists. Susquehanna Nuclear, as majority owner, licensee, and plant operator will oversee the site activities; the estimate includes Susquehanna Nuclear's labor and overhead costs from an internal decommissioning cost estimate prepared in 2010. Costs, excluding those associated with radioactive waste disposal were escalated to 2015 dollars using the Consumer Price Index, Services.<sup>[10]</sup> Low-level radioactive waste disposal costs were escalated to 2015 dollars using the Consumer Price Index, All Items.<sup>[11]</sup>

Contingency has been added at an overall rate of 25%. This is consistent with the contingency evaluation criteria referenced by the NRC in NUREG-1757.<sup>[12]</sup>

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<sup>8</sup> Ibid. at page 9.6-1

<sup>9</sup> Susquehanna Radiation Protection Manager

<sup>10</sup> Bureau of Labor Statistics, Consumer Price Index - All Urban Consumers, Services, Series ID: CUUR0000SAS

<sup>11</sup> Bureau of Labor Statistics, Consumer Price Index - All Urban Consumers, All Items, Series ID: CUUR0000AA0

<sup>12</sup> "Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. Nuclear Regulatory Commission's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Volume 3, Revision 1, February 2012

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

## 6. Cost Estimate

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

- An initial planning phase - empty HSMs are characterized and the specifications and work procedures for the decontamination developed.
- The remediation phase - material with residual radioactivity is removed, packaged in certified waste containers, transported to the low-level waste site, and disposed of at 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 to perform the verification survey), Susquehanna Nuclear's oversight staff, site security (industrial), and other site operating costs.

For estimating purposes it is conservatively assumed that all expenditures will be incurred in the year 2102, the year following all spent fuel removal.

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

ISFSI Pad

Item	Length (ft)	Width (ft)	Residual Radioactivity
Current ISFSI Pad (nominal dimensions)	221	224	No

ISFSI Horizontal Storage Module – Model 102

Item	Value	Notes (all dimensions are nominal)
Outside Height (inches)	180	Without vent cover
Outside Length (inches)	238	Without shield walls
Outside Width (inches)	116	Without shield walls
Quantity (total)	335	Spent Fuel (327) + GTCC (8)
Quantity (with residual radioactivity)	26	Equivalent to the number of HSMs used to store last complete core offload
HSM Internal Steel with Residual Radioactivity (pounds)	83,200	
Low-Level Radioactive Waste (cubic feet)	46,492	
Low-Level Radioactive Waste (packaged density) (lbs/cubic feet)	147	Average weight density

Other Potentially Impacted Items

Item	Value	Notes
Number of HSMs used for GTCC storage	8	No residual radioactivity

**Table 2**  
**ISFSI Decommissioning Costs and Waste Volumes**

	Costs (thousands, 2015 dollars)						Waste Volume	Person-Hours	
	Removal	Packaging	Transport	Disposal	Other	Total	Class A (cubic feet)	Craft	Oversight and Contractor
<b>Decommissioning Contractor</b>									
Planning (characterization, specs and procedures)	-	-	-	-	500	500	-	-	1,744
Decontamination/Demolition (activated cask disposition)	1,027	115	2,713	4,063	-	7,917	46,492	8,190	-
License Termination (radiological surveys)	-	-	-	-	2,202	2,202	-	19,396	-
<b>Subtotal</b>	<b>1,027</b>	<b>115</b>	<b>2,713</b>	<b>4,063</b>	<b>2,702</b>	<b>10,619</b>	<b>46,492</b>	<b>27,585</b>	<b>1,744</b>
<b>Supporting Costs</b>									
NRC and NRC Contractor Fees and Costs	-	-	-	-	424	424	-	-	776
Insurance	-	-	-	-	178	178	-	-	-
Property Taxes	-	-	-	-	20	20	-	-	-
Security (industrial)	-	-	-	-	317	317	-	-	2,510
Utility Oversight Staff	-	-	-	-	309	309	-	-	1,901
<b>Subtotal</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1,248</b>	<b>1,248</b>	<b>-</b>	<b>-</b>	<b>5,187</b>
<b>Total (w/o contingency)</b>	<b>1,027</b>	<b>115</b>	<b>2,713</b>	<b>4,063</b>	<b>3,949</b>	<b>11,867</b>	<b>46,492</b>	<b>27,585</b>	<b>6,931</b>
<b>Total (w/25% contingency)</b>	<b>1,283</b>	<b>144</b>	<b>3,391</b>	<b>5,079</b>	<b>4,937</b>	<b>14,833</b>			

Note 1: for funding planning purposes decommissioning costs can be assumed to be incurred in year 210