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Office of Nuclear Material Safety and Safeguards
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Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NOS. 50-395 and 72-1038
OPERATING LICENSE NO. NPF-12
INDEPENDENT SPENT FUEL STORAGE INSTALLATION DECOMMISSIONING
FUNDING PLAN

Ladies and Gentlemen:

The South Carolina Public Service Authority (Authority) and South Carolina Electric & Gas Company (SCE&G) have ownership interests of one-third and two-thirds, respectively, in the Virgil C. Summer Nuclear Station, Unit 1 Independent Spent Fuel Storage Installation (ISFSI). As provided in 10 CFR 72.30 (b), each holder of, or applicant for, a license under this part must submit a decommissioning funding plan for Nuclear Regulatory Commission (NRC) review and approval. The enclosed ISFSI Decommissioning Funding Plan (please see Attachment) provides financial assurance for the Authority's one-third share. SCE&G will file the required decommissioning funding plan relative to its two-thirds ownership share in a separate submittal.

The estimated cost to decommission the V.C. Summer, Unit 1 ISFSI and release it for unrestricted use is \$6.4 million (please see Table 2 in the Attachment). The Authority's one-third share is \$2.1 million. The Attachment contains cost estimate details, including key assumptions, a description of the method of assuring funds for decommissioning, and a certification that financial assurance has been provided in the amount of the cost estimate for decommissioning.

This letter contains no new regulatory commitments. If there are any questions concerning this report, please contact me at (843) 761-4126.

Sincerely,



Michael R. Crosby
Senior Vice President
Nuclear Energy

MRC:trw

Attachment

cc: Catherine Haney
Shawn A. Williams
Mark Lombard
NRC Resident Inspector

NMSS24
NMSS26

ATTACHMENT

10 CFR 72.30 ISFSI DECOMMISSIONING FUNDING PLAN

FOR

VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1

ISFSI DOCKET 72-1038

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

10 CFR 72.30 ISFSI Decommissioning Funding Plan

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 the Virgil C. Summer Nuclear Station, Unit 1 (V.C. Summer) 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;
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 license for V.C. Summer is currently set to expire on August 6, 2042. Approximately 2,757 spent fuel assemblies are currently projected to be generated over the life of the plant. Because of the breach by the Department of Energy (DOE) of its contract to remove fuel from the site, an ISFSI has been constructed with spent fuel planned to be transferred to the dry storage modules located at the ISFSI, to support continued plant operations. The ISFSI will be operated under a Part 50 General License (in accordance with 10 CFR 72, Subpart K^[2]).

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

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]

In January 2013, the DOE issued the "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," in response to the recommendations made by the Blue Ribbon Commission on America's Nuclear Future and as "a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel..."^[4] The report stated, "[W]ith the appropriate authorizations from Congress, the Administration currently plans to implement a program over the next 10 years that: ...[A]dvances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities;

Based upon DOE's latest strategy (and the potential for other, consent-based siting of consolidated interim storage facilities), South Carolina Electric & Gas (SCE&G) believes that one or more monitored retrievable storage facilities could be put into place within a reasonable time. SCE&G's current spent fuel management plan for the V.C. Summer spent fuel is based in general upon the spent fuel being fully removed from the V.C. Summer site by 2095.

SCE&G'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. The estimates presented in this report are for budgeting purposes only, and do not represent any conclusion by the licensee about how the DOE will actually perform in the future. If DOE's failure to perform results in specific additional costs beyond those reflected in this report, it is expected that the DOE will compensate the licensee for those costs.

3. ISFSI Decommissioning Strategy

At the conclusion of the spent fuel transfer process the ISFSI will be promptly decommissioned (similar to the power reactor DECON alternative).

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 ..."

⁴ "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," U.S. DOE, January 11, 2013

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 V.C. Summer ISFSI is based upon Holtec International's (Holtec) HI-STORM FW System for the dry storage of used nuclear fuel. The HI-STORM FW System consists of a sealed metallic multi-purpose canister (MPC) contained within an overpack constructed from a combination of steel and concrete. The MPC can accommodate up to 37 undamaged Zircaloy-clad pressurized water fuel assemblies. The overpack provides structural protection, cooling, and radiological shielding for the MPC.

The HI-STORM FW overpack is a rugged, heavy-walled cylindrical vessel. The main structural function of the storage overpack is provided by carbon steel, and the main shielding function is provided by plain concrete. The overpack plain concrete is enclosed by a steel weldment of cylindrical shells, a thick baseplate, and a top annular plate. A set of four equally spaced radial connectors join the inner and outer shells and define a fixed width annular space for placement of concrete. The overpack lid also has concrete to provide neutron and gamma shielding.

The on-site ISFSI at V.C. Summer is located west of the Fuel Handling Building (FHB) and northeast of Warehouses A and B in an expansion of the plant Protected Area. The ISFSI pad has been sized to store 98 HI-STORM FW storage casks with each cask capable of storing 37 Pressurized Water Reactor spent fuel assemblies, which will meet V.C. Summer's spent fuel storage needs over the 60-year licensed life of the plant.

The current spent fuel management plan for the V.C. Summer spent fuel would result in 75 spent fuel storage casks being placed on the ISFSI pad during plant operations. This conservatively assumes that no fuel is removed from the site by the DOE during plant operations or during the nine years of pool operations after the permanent cessation of operations.

The 75 casks projected to be on the ISFSI pad after shutdown excludes any additional casks that may be used for Greater-than-Class-C (GTCC) storage. The storage overpacks used for the GTCC canisters (estimated quantity of 4) are not expected to have any interior contamination of 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 station operating until the end of its current license (2042) and the DOE's spent fuel acceptance assumptions, as previously described.

The dry storage vendor, Holtec International, does not expect the overpacks to have any interior or exterior radioactive surface contamination. Any neutron activation of the steel and concrete is expected to be extremely small.^[5] The decommissioning estimate is based on the premise that some of the inner steel liners and concrete overpacks will contain low levels of neutron-induced residual radioactivity that would necessitate remediation at the time of decommissioning. As an allowance, 5 of the 75 Holtec overpacks are assumed to be affected, i.e., contain residual radioactivity. The allowance quantity is based upon the number of casks required for the final core off-load (i.e., 157 offloaded assemblies, 37 assemblies per cask which results in 5 overpacks). It is assumed that these are the final casks offloaded; consequently they have the least time for radioactive decay of the neutron activation products.

The dry storage vendor, Holtec International, does not expect any residual contamination to be left on the concrete ISFSI pad.^[6] It would be 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. 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. An allowance is also included for surveying any transfer equipment.

There is no known subsurface material (soil contamination) in the immediate vicinity of the ISFSI pad that will require remediation to meet the criteria for license termination. As such, there is no allowance for soil remediation in the estimate.

Costs are reported in 2016 dollars and based upon an internal decommissioning analysis being prepared for V.C. Summer in 2016.

Decommissioning is assumed to be performed by an independent contractor. As such, labor, equipment, and material costs are based on national averages, i.e., costs from national publications such as R.S. Means' Building Construction Cost Data (adjusted for regional variations), and laboratory service costs are based on vendor price lists. SCE&G, as licensee, will oversee the site activities.

⁵ HI-STORM FW FSAR, Holtec International, Report HI-2114830, Rev.2 , at page 2-83 (Accession Number ML13177A428)

⁶ HI-STORM FW FSAR, Holtec International, Report HI-2114830, Rev. 2, at page 2-84 (Accession Number ML13177A428)

Low-level radioactive waste disposal costs are based on SCE&G's currently negotiated rates with the Atlantic Compact and other waste handling service providers.

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.^[7]

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 Considerations

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 in which the empty overpacks, ISFSI pad, and surrounding environs are characterized and the activity specifications and work procedures for the remediation (overpack disposition) developed.
- The remediation phase includes the cost for craft labor to demolish the activated overpacks, package the steel and concrete in certified waste containers, transportation to the Atlantic Compact Regional Waste site in Barnwell, South Carolina or a bulk waste processing site in Tennessee, for disposal, as well as the costs for the supporting equipment, materials and supplies.
- The final phase includes the cost for the license termination survey, verification survey, and the associated equipment and laboratory support.

The estimate also contains costs for the NRC (and NRC contractor to perform the verification survey), SCE&G'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 2096, the year following all spent fuel removal.

7. Financial Assurance

ISFSI operations at V.C. Summer ISFSI are in response to the DOE's failure to remove spent nuclear fuel from the site in a timely manner. The costs for management of the spent fuel are costs for which the DOE is responsible under federal law and the Standard Contract. It is therefore expected that, once the ISFSI is no longer needed, the cost to

⁷ "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.

decommission the ISFSI would be a DOE-reimbursable expense. Until such time that the costs can be recovered from the DOE, the Authority will rely upon the money available in its decommissioning trust fund to terminate the ISFSI license and release the facility for unrestricted use.

Using the decommissioning trust fund is reasonable based on the following:

- Although the decommissioning trust fund is for radiological decommissioning (i.e., post-shutdown) costs only, the ISFSI decommissioning is a radiological cost. Also, to the extent that the trust fund balance exceeds costs required for Part 50 radiological decommissioning, these funds would be available to address costs incurred by the Authority, including ISFSI decommissioning costs.
- The projected minimum certification amount, calculated pursuant to 10 CFR 50.75(c) required to demonstrate reasonable assurance of funds for decommissioning V.C. Summer is \$494,859,960 (2014 dollars), based upon the NRC's latest figures for calculating that value. The Authority's one-third share is \$164,953,320.
- Based upon the Authority's V.C. Summer decommissioning trust fund balance as of December 31, 2014 as reported in the Authority's March 27, 2015 biennial Decommissioning Funding Report and considering an average real rate of return of 0.4 percent on the fund between December 31, 2014 and 2049 when plant decommissioning activities are completed, the trust fund is projected to contain a \$47,966,502 surplus (refer to Table 3) beyond the NRC minimum funding formula provided in 10 CFR 50.75(c). This surplus is more than sufficient to complete the future decommissioning of the ISFSI (estimated cost provided in Table 2).
- The Authority will continue to assess the decommissioning trust fund status in accordance with NRC requirements (e.g. 10 CFR 50.75(b)(2), 10 CFR 50.75(f)(1), 10 CFR 72.30(c)) and projected surplus, to account for the continued assurance of adequate funds for ISFSI decommissioning. Any adjustments to the cost estimate and funding levels will be made in connection with the triennial filing required pursuant to 10 CFR 72.30(c). To the extent any specific regulatory actions are necessary at the time of withdrawal from the trust fund of the amount necessary for ISFSI decommissioning, the Authority will pursue such actions.

The Authority hereby certifies that financial assurance for decommissioning its one-third share of V.C. Summer's ISFSI has been provided in the amount of the cost estimate for decommissioning using the methodology described above.

Table 1
Significant Quantities and Physical Dimensions

ISFSI Pad

Item	Length (ft)	Width (ft)	Residual Radioactivity
ISFSI Pad	251.5	129.0	No

ISFSI Storage Overpack (Holtec FW)

Item	Value	Notes
Overall Height (inches)	239.5	Dimensions are nominal
Outside Diameter (inches)	139	Dimensions are nominal
Inside Diameter (inches)	81	Dimensions are nominal
Quantity	79	75 Spent fuel + 4 GTCC
Quantity (with residual radioactivity)	5	Equivalent to the number of overpacks used to store last complete core offload
Low-Level Radioactive Waste from Overpack (pounds)	1,705,088	Concrete and steel
Other Low-Level Radioactive Waste (pounds)	1,766	DAW, filters and other secondary waste
Low-Level Radioactive Waste (total packaged volume)	30,414	Cubic feet
Low-Level Radioactive Waste (packaged density)	56	Average weight density

Other Potentially Impacted Items

Item	Value	Notes
Transfer Cask	1	No residual radioactivity
Number of Overpacks used for GTCC storage	4	No residual radioactivity

Table 2
ISFSI Decommissioning Costs and Waste Volumes

	Costs (thousands, 2016 dollars)						Waste Volume	Person-Hours	
	Removal	Packaging	Transport	Disposal	Other	Total	Class A (cubic feet)	Craft	Oversight and Contractor
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	290	290	-	-	1,096
Decontamination/Demolition (activated cask disposition)	132	95	147	2,096	29	2,499	30,414	2,135	-
License Termination (radiological surveys)	-	-	-	-	1,313	1,313	-	11,060	-
Subtotal	132	95	147	2,096	1,632	4,102	30,414	13,195	1,096
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	400	400	-	-	776
Insurance	-	-	-	-	117	117	-	-	-
Property Taxes	-	-	-	-	-	-	-	-	-
Plant Energy Budget	-	-	-	-	46	46	-	-	-
Non-Labor Overhead	-	-	-	-	12	12	-	-	-
Corporate A&G	-	-	-	-	25	25	-	-	-
Security (industrial)	-	-	-	-	206	206	-	-	5,013
SCE&G Oversight Staff	-	-	-	-	235	235	-	-	3,803
Subtotal	-	-	-	-	1,042	1,042	-	-	9,592
Total (w/o contingency)	132	95	147	2,096	2,674	5,144	30,414	13,195	10,688
Total (w/25% contingency)	165	119	184	2,620	3,342	6,430			

Table 3
Financial Assurance

10 CFR 50.75(b) & (c) Decommissioning Estimate (2014 Dollars): \$494,859,960
Authority's One-Third Share of Decommissioning Estimate (2014 Dollars): \$164,953,320

Market value of the external trust fund at December 31, 2014: \$123,008,921

Schedule of annual amounts remaining to be collected

Year	2014 Dollars					Real Rates of Return
	Beginning Balance	Decommissioning Expenditures	Annual Deposits	Earnings	Ending Balance	
2015	123,008,921		2,198,280	511,102	125,718,303	0.0042
2016	125,718,303		2,626,140	719,109	129,063,552	0.0057
2017	129,063,552		2,626,140	521,417	132,211,109	0.0040
2018	132,211,109		2,626,140	387,379	135,224,627	0.0029
2019	135,224,627		2,626,140	508,445	138,359,212	0.0038
2020	138,359,212		2,626,140	641,987	141,627,338	0.0046
2021	141,627,338		2,626,140	642,988	144,896,467	0.0045
2022	144,896,467		2,626,140	698,401	148,221,007	0.0048
2023	148,221,007		2,626,140	752,963	151,600,110	0.0051
2024	151,600,110		2,626,140	754,969	154,981,219	0.0050
2025	154,981,219		2,626,140	756,308	158,363,667	0.0049
2026	158,363,667		2,626,140	741,142	161,730,949	0.0047
2027	161,730,949		2,626,140	740,728	165,097,817	0.0046
2028	165,097,817		2,626,140	739,638	168,463,595	0.0045
2029	168,463,595		2,626,140	721,024	171,810,759	0.0043
2030	171,810,759		2,626,140	718,169	175,155,068	0.0042
2031	175,155,068		2,626,140	714,633	178,495,841	0.0041
2032	178,495,841		2,626,140	692,564	181,814,545	0.0039
2033	181,814,545		2,626,140	687,259	185,127,944	0.0038
2034	185,127,944		2,626,140	662,758	188,416,842	0.0036
2035	188,416,842		2,626,140	655,691	191,698,672	0.0035
2036	191,698,672		2,626,140	628,772	194,953,584	0.0033

2037	194,953,584		2,626,140	619,952	198,199,676	0.0032
2038	198,199,676		2,626,140	590,635	201,416,451	0.0030
2039	201,416,451		2,626,140	580,079	204,622,671	0.0029
2040	204,622,671		2,626,140	548,389	207,797,200	0.0027
2041	207,797,200		2,626,140	536,117	210,959,456	0.0026
2042	210,959,456	9,818,650		478,715	201,619,521	0.0024
2043	201,619,521	23,564,760		405,965	178,460,726	0.0023
2044	178,460,726	23,564,760		322,184	155,218,150	0.0021
2045	155,218,150	23,564,760		260,674	131,914,064	0.0020
2046	131,914,064	23,564,760		192,862	108,542,165	0.0018
2047	108,542,165	23,564,760		142,762	85,120,167	0.0017
2048	85,120,167	23,564,760		91,102	61,646,509	0.0015
2049	61,646,509	13,746,110		66,103	47,966,502	0.0014
Year	Beginning Balance	Decommissioning Expenditures	Annual Deposits	Earnings	Ending Balance	
Total	123,008,921	164,953,320	70,477,920	19,432,981	47,966,502	

The preceding table is excerpted from the Authority's March 27, 2015 Decommissioning Funding Status Report for V.C. Summer Nuclear Station, Unit 1 in accordance with 10 CFR 50.75(f)(1) Reporting and Recordkeeping for Decommissioning Planning and is provided for illustrative purposes.

The market value of the external trust fund at December 31, 2015 is \$126,487,027.