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Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Virgil C. Summer Nuclear Station Unit 1
Docket No. 50/395
Operating License No. NPF-12
Report of Status of Decommissioning Funding

Dear Sir/Madam:

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. As provided in 10 CFR § 50.75 (f)(1), each power reactor licensee is required to report to the Nuclear Regulatory Commission (NRC) on a calendar year basis, beginning March 31, 1999, and every two years thereafter, the status of its decommissioning funding for each reactor or share of reactor it owns. SCE&G has advised the Authority that it will disclose the required information relative to its two-thirds ownership share in a separate submittal.

The Authority's one-third share using the NRC formula for the minimum funding required for license termination is approximately $143 million as of December 31, 2016. This one-third liability is funded by payments to an external sinking fund as provided for in 10 CFR § 50.75. The escalated one-third liability for license termination costs is expected to total $312 million, stated in dollars of the year of expenditure. The market value of the external fund was approximately $131 million as of December 31, 2016. (Please see Attachment 1.)

A site-specific decommissioning study completed in 2016 identified the total decommissioning costs for the site. Total site decommissioning includes license termination, spent fuel management and site restoration. The total costs identified by the study are in excess of NRC formula for minimum funding requirements. Further, as the result of a 2006 settlement with the Department of Energy (DOE), the Authority expects to receive reimbursement for spent fuel management costs incurred that would have been avoided had the DOE met its contractual obligation to store spent fuel. The one-third liability in excess of the NRC minimum funding requirements less DOE reimbursements is estimated by the Authority to be approximately $176 million as of December 31, 2016. The escalated one-third liability is expected to be approximately $1.773 billion, stated in dollars of the year of expenditure. The market value of the Authority's internal fund, designated for spent fuel management and site restoration, was approximately $87 million as of December 31, 2016. (Please see Attachment 1.)

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
NRC Resident Inspector

ADD1
NRR

1(a). The minimum decommissioning fund estimate, pursuant to 10 CFR § 50.75 (b) and (c). $143,442,040

Base Amount for PWR between 1,200 MWt and 3,400 MWt

Estimated Cost (Year X) = (1986 $ Base Cost) ($AL_x + BE_x + CB_x$)
= ($100,520,000) {(.65 x 2.499) + (.13 x 1.871) + (.22 x 10.971)}
= $430,326,120

Authority's one-third share of 2016 Estimated Cost = $143,442,040

Where:

A	=	.65	10 CFR § 50.75 (c)(2)
B	=	.13	10 CFR § 50.75 (c)(2)
C	=	.22	10 CFR § 50.75 (c)(2)
L_x	=	2.429	(Computed Below)
E_x	=	1.871	(Computed Below)
P_x	=	1.883	(Computed Below)
F_x	=	1.854	(Computed Below)
B_x	=	10.971	(NUREG 1307 Rev. 16)

1986 $ Base Cost = ($75,000,000 + .0088Pmillion)
= ($75,000,000 + 25,520,000)
= $100,520,000

P = 2,900 MWt

L_x = Base L_x (Dec 2005) x ECI(Qtr 4 2016) / 100
= 1.98 x 126.2 / 100
= 2.499

P_x = December 2016 Value / January 1986 Value
= 215.0 / 114.2
= 1.883

F_x = December 2016 Value / January 1986 Value
= 152.0 / 82.0
= 1.854

E_x = $\{(.58P_x) + (.42F_x)\}$
= {(.58 x 1.883) + (.42 x 1.854)}
= (1.092 + 0.779)
= 1.871

Fourth Quarter 2016 / December 2016 values in the following Bureau of Labor Statistics indices were used to compute NRC minimum requirements:

Employment Cost Index – Total compensation, private industry, South region
Series ID: CIU2010000000220I

Producer Price Index – Commodities (Industrial electric power)
Series ID: wpu0543

Producer Price Index – Commodities (Light fuel oils)
Series ID: wpu0573

1(b). Escalation of the Authority's one-third share of the minimum funding requirement through the end of decommissioning.

Cost categories Labor, Equipment & Materials, Burial, and Other were estimated in a site-specific decommissioning study. These costs were escalated through the end of the decommissioning period based on various indices and estimates. Ultimate decommissioning costs to be funded from the external trust are estimated at $311,695,382 in escalated dollars.

2. Market value of the external trust fund at December 31, 2016 for items included in 10 CFR § 50.75. $131,175,284

3. Schedule of annual amounts remaining to be collected for items in 10 CFR § 50.75.

	2016 Dollars					
Year	Beginning Balance	Decommissioning Expenditures	Annual Deposits	Earnings	Ending Balance	Real Rates of Return
2017	131,175,284		0	1,114,990	132,290,274	0.0085
2018	132,290,274		0	1,111,238	133,401,512	0.0084
2019	133,401,512		0	1,227,294	134,628,806	0.0092
2020	134,628,806		0	1,346,288	135,975,094	0.0100
2021	135,975,094		0	1,414,141	137,389,235	0.0104
2022	137,389,235		0	1,456,326	138,845,561	0.0106
2023	138,845,561		0	1,541,186	140,386,747	0.0111
2024	140,386,747		0	1,488,100	141,874,846	0.0106
2025	141,874,846		0	1,588,998	143,463,845	0.0112
2026	143,463,845		0	1,606,795	145,070,640	0.0112
2027	145,070,640		0	1,624,791	146,695,431	0.0112
2028	146,695,431		0	1,628,319	148,323,750	0.0111
2029	148,323,750		0	1,646,394	149,970,144	0.0111
2030	149,970,144		0	1,664,669	151,634,812	0.0111
2031	151,634,812		0	1,667,983	153,302,795	0.0110
2032	153,302,795		0	1,686,331	154,989,126	0.0110
2033	154,989,126		0	1,704,880	156,694,006	0.0110
2034	156,694,006		0	1,723,634	158,417,640	0.0110
2035	158,417,640		0	1,726,752	160,144,393	0.0109
2036	160,144,393		0	1,745,574	161,889,967	0.0109
2037	161,889,967		0	1,764,601	163,654,567	0.0109
2038	163,654,567		0	1,767,469	165,422,037	0.0108
2039	165,422,037		0	1,786,558	167,208,595	0.0108
2040	167,208,595		0	1,805,853	169,014,447	0.0108
2041	169,014,447		0	1,808,455	170,822,902	0.0107
2042	170,822,902	8,538,217		1,736,446	164,021,131	0.0107
2043	164,021,131	20,491,720		1,535,765	145,065,176	0.0107
2044	145,065,176	20,491,720		1,332,936	125,906,392	0.0107
2045	125,906,392	20,491,720		1,117,396	106,532,067	0.0106
2046	106,532,067	20,491,720		912,028	86,952,375	0.0106
2047	86,952,375	20,491,720		704,483	67,165,138	0.0106
2048	67,165,138	20,491,720		490,071	47,163,489	0.0105
2049	47,163,489	11,953,503		369,705	35,579,691	0.0105

Year	Beginning Balance	Decommissioning Expenditures	Annual Deposits	Earnings	Ending Balance
Total	131,175,284	143,442,040	0	47,846,447	35,579,691

4. The assumptions used regarding escalation in decommissioning cost, rates of earnings on decommissioning funds, and rates of other factors used in funding projections follow:

- The above schedule of annual amounts remaining to be collected is based on a DECON method of decommissioning. In contrast, the Authority currently intends to utilize a SAFSTOR method of decommissioning.

- Costs are escalated by four categories identified in the 2016 site-specific study using the following rates: labor (2.7%), equipment and materials (1.2%), waste burial (3.8%) and other (2.8%). These rates were proposed in an internal memorandum and approved on March 27, 2017 by the Senior Vice President of Nuclear Energy and represent the Authority's best estimate of future cost increases (see Attachment 2). The schedule below shows weighted average escalation rates reflecting the above cost categories weighted by individual category costs over the sum of the four categories.

- Waste vendors will be utilized.

- The trust fund accrues earnings in accordance with estimated effective yield (approximately 3.8% as shown below). The Authority's Board of Directors approves all customer rates. As the rate-regulatory authority, the Board adopted on March 22, 1999 a resolution containing the following language: "Upon recommendation of management, the Board of Directors authorizes the use of the effective yield of the trust portfolio for purposes of determining future decommissioning funding needs."

	A	B	(A - B)
Year	Projected Earning Rates	Weighted Average Escalation Rates	Real Rates of Return
2017	0.0346	0.0261	0.0085
2018	0.0345	0.0261	0.0084
2019	0.0354	0.0262	0.0092
2020	0.0362	0.0262	0.0100
2021	0.0366	0.0262	0.0104
2022	0.0369	0.0263	0.0106
2023	0.0374	0.0263	0.0111
2024	0.0369	0.0263	0.0106
2025	0.0376	0.0264	0.0112
2026	0.0376	0.0264	0.0112
2027	0.0376	0.0264	0.0112
2028	0.0376	0.0265	0.0111
2029	0.0376	0.0265	0.0111
2030	0.0376	0.0265	0.0111
2031	0.0376	0.0266	0.0110
2032	0.0376	0.0266	0.0110
2033	0.0376	0.0266	0.0110
2034	0.0376	0.0266	0.0110
2035	0.0376	0.0267	0.0109

2036	0.0376	0.0267	0.0109
2037	0.0376	0.0267	0.0109
2038	0.0376	0.0268	0.0108
2039	0.0376	0.0268	0.0108
2040	0.0376	0.0268	0.0108
2041	0.0376	0.0269	0.0107
2042	0.0376	0.0269	0.0107
2043	0.0376	0.0269	0.0107
2044	0.0376	0.0269	0.0107
2045	0.0376	0.0270	0.0106
2046	0.0376	0.0270	0.0106
2047	0.0376	0.0270	0.0106
2048	0.0376	0.0271	0.0105
2049	0.0376	0.0271	0.0105

5. Contracts upon which the licensee is relaying pursuant to 10 CFR § 50.75 (e) (1) (v).

None.

6. Modifications to the current funding assurance methods.

None.

7. Material changes to Trust Agreements.

None.

8. Authority's one-third share of the 2016 Site-Specific Study (SAFSTOR method).

	2016 Dollars	Year of Expenditure Dollars
NRC Minimum Funding Requirements - License Termination (radiological decommissioning costs) (1)	**143,442,040**	**311,695,382**
Excess Site-Specific Study Costs (license termination, spent fuel management and site restoration costs) Net of Estimated DOE Reimbursements (spent fuel management costs) (2)	**175,545,793**	**1,773,151,467**
2016 Site-Specific Study Costs (license termination, spent fuel management and site restoration costs) Net of Estimated DOE Reimbursements (spent fuel management costs) (2)	**318,987,833**	**2,084,846,849**

(1) Expenditure years are 2042-2049
(2) Expenditure years are 2042-2104

9. Market value of the internal fund at December 31, 2016 for spent fuel management and site restoration $86,525,930

Attachment 2

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INTER-OFFICE COMMUNICATION

DATE: March 27, 2017

TO: Michael Crosby, Senior Vice President, Nuclear Energy

FROM: Thomas Wagner, Financial Analyst III, VC Summer Unit 1 Operations TRW

SUBJECT: VC Summer Unit 1 Decommissioning Study Update

As required by the Nuclear Regulatory Commission (NRC) and in accordance with prudent utility practice, Santee Cooper systematically sets aside funds to provide for the eventual decommissioning of VC Summer Nuclear Station Unit 1. The annual decommissioning funding deposit amount is currently based on NRC requirements, estimated cost escalation and fund earnings rates, the results of a site-specific decommissioning study conducted by TLG Services, Inc. in 2012, and estimated Department of Energy (DOE) reimbursement of spent fuel storage costs.

In 2016, TLG updated the 2012 decommissioning cost study. The chart below compares the results of the 2012 TLG study with the 2016 study update.

Comparison of TLG Study Results - $000s

	2012 Study		2016 Study	Increase
Year of Costs	2012	2016	2016	2016
Decommissioning Costs @ 1/3	315,125	368,034	369,588	1,554

The findings of the 2016 study indicate that since 2012, the overall cost for decommissioning has escalated approximately $1.6 million more than anticipated by current funding assumptions. The variance is attributable to the addition of three structures to plant inventory (FLEX storage building, emergency response building and combined maintenance shop) and differences in estimated and actual cost escalations.

In conjunction with the 2016 decommissioning cost study, TLG completed a related asset retirement obligation (ARO) study. This second study was used as a basis for revising the ARO liability associated with decommissioning VC Summer Unit 1. Based on the results of the two studies, current cost escalation assumptions have been reviewed and changes are recommended. The new proposed cost escalation assumptions by cost category are as follows:

Cost Category	Current Escalation Assumption	Proposed Escalation Assumption
Labor	3.13%	2.70%
Equipment & Materials	5.95%	1.20%
Burial	2.92%	3.78%
Other	4.96%	2.78%

The proposed escalation rates for *Labor, Equipment & Materials,* and *Other* are derived from published indices and are used by TLG to establish a basis for change in the ARO liability. No readily-available published index for *Burial* costs exists; however, TLG determined that adding one percent to the Consumer Price Index reasonably correlated to the change in *Burial* costs over the last decade.

The TLG 2016 decommissioning cost study includes a SAFSTOR scenario in which the plant upon cessation of operations is placed into safe storage, the spent fuel is moved to the Independent Spent Fuel Storage Installation (ISFSI) and stored for approximately 53 years until DOE takes possession of it, and the plant is decommissioned and license terminated within the required 60-year period. This is in contrast to the current DECON funding assumption in which decommissioning is initiated immediately upon plant closure. SCE&G has indicated its intention to decommission the plant under a SAFSTOR scenario. In order to align with SCE&G and recognize the most likely eventuality, it is proposed that SAFSTOR be adopted for funding purposes. The one-third cost for SAFSTOR in 2016 dollars is $415 million.

Projected earnings for the trust and the internal fund were recently reevaluated by Santee Cooper's Treasury department and both have decreased. From March 2015 to March 2017, the weighted average estimated earnings rate for the trust decreased from 4.4% to 3.8%, while the weighted average rate for the internal fund decreased from 4.3% to 3.8%.

The NRC required minimum funding amount was also updated based on the prescribed minimum funding formula and updated escalation factors. The NRC minimum amount decreased 12.4% from the prior year due to a 21.0% decrease in the burial escalation factor. The other two escalation factors, labor and energy, both increased partially offsetting the burial decrease. The overall impact on trust funding levels is significantly positive.

Based on the results of the 2016 TLG decommissioning cost study, the proposed escalation rates and SAFSTOR scenario, the updated earnings rates and NRC minimum funding amount, and the current 75% reimbursement assumption of spent fuel storage costs by DOE, the amounts on deposit in the Santee Cooper decommissioning accounts are currently sufficient to meet anticipated future VC Summer Unit 1 decommissioning obligations. However, these funds could become insufficient should decommissioning costs estimates, cost escalation assumptions, assumed fund earnings rates or DOE reimbursement assumptions change in the future.

The TLG decommissioning cost estimate does not include additional amounts for financial risk or uncertainty. Consideration of these financial risks affects funding decisions. Examples of these risks as identified in the TLG study include, but are not limited to, the following:

1. Premature decommissioning
2. Delays in the approval of the decommissioning plan due to intervention, public participation in local community meetings, legal challenges, and national and local hearings
3. Regulatory changes
4. Price escalation uncertainty
5. Fund earnings rate uncertainty

These risks, as well as the funding assumptions, must be reviewed periodically and are likely to result in changes to future funding level requirements.

As a result of the 2016 TLG study update and an evaluation of estimated cost escalation rates, it is recommended that additional deposits into the decommissioning funds be suspended until such time that assumption changes or policy changes require that deposits be reinstated. Funding will be re-evaluated annually, and consideration given to actual fund balances, projected funds' earnings rates, and NRC

minimum funding requirements, among other considerations. In addition, the decommissioning cost study will be updated periodically to reflect current regulations, technologies, and trends.

Effective January 1, 2017, monthly deposits to the decommissioning trust and the internal decommissioning fund will be suspended as shown below:

	2016 Current Funding	2017 & Later Proposed Funding	Increase (Decrease)
Trust	$218,845	$0	($218,845)
Internal Fund	$59,045	$0	($59,045)
Transfer from Internal Fund	$0	$0	$0
Total Monthly	$277,890	$0	($277,890)
Total Annual	$3,334,680	$0	($3,334,680)

Please let me know if you have any questions or would like to discuss further.

Concurrence: Michael Crosby 3-29-17

Michael Crosby
Senior Vice President, Nuclear Energy

Date

cc: Mike Baxley
Jeff Armfield
Suzanne Ritter
Shawan Gillians