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ND-08-1817

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

Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4 Combined License Application
Response to Request for Additional Information Letter No. 010

Ladies and Gentlemen:

By letter dated March 28, 2008, Southern Nuclear Operating Company (SNC) submitted an application for combined licenses (COLs) for proposed Vogtle Electric Generating Plant (VEGP) Units 3 and 4 to the U.S. Nuclear Regulatory Commission (NRC) for two Westinghouse AP1000 reactor plants, in accordance with 10 CFR Part 52. During the NRC's detailed review of this application, the NRC identified a need for additional liquid waste management system information required to complete their review of the COL application's Final Safety Analysis Report (FSAR) Section 11.2, "Liquid Waste Management Systems." By letter dated November 13, 2008, the NRC provided SNC with Request for Additional Information (RAI) Letter No. 010 concerning this liquid waste management system information need. This RAI letter contains one RAI question numbered 11.02-1. The enclosure to this letter provides the SNC response to this RAI.

If you have any questions regarding this letter, please contact Mr. Wes Sparkman at (205) 992-5061.

D092
HRO

Mr. J. A. (Buzz) Miller states he is a Senior Vice President of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY



Joseph A. (Buzz) Miller

Sworn to and subscribed before me this 11 day of December, 2008

Notary Public: Mari H. Guin

My commission expires: 05/06/07

JAM/BJS/lac

Enclosure: Response to NRC RAI Letter No. 010 on the VEGP Units 3 & 4 COL Application
Involving the Liquid Waste Management System

cc: Southern Nuclear Operating Company

Mr. J. H. Miller, III, President and CEO (w/o enclosure)
Mr. J. T. Gasser, Executive Vice President, Nuclear Operations (w/o enclosure)
Mr. T. E. Tynan, Vice President - Vogtle (w/o enclosure)
Mr. D. M. Lloyd, Vogtle Deployment Director
Mr. C. R. Pierce, Vogtle Development Licensing Manager
Mr. M. J. Ajluni, Nuclear Licensing Manager
Mr. W. A. Sparkman, COL Project Engineer
Document Services RTYPE: AR01.1053
File AR.01.02.06

Nuclear Regulatory Commission

Mr. L. A. Reyes, Region II Administrator (w/o enclosure)
Mr. M. R. Johnson, Director of Office of New Reactors (w/o enclosure)
Mr. D. B. Matthews, Director of Division of New Reactor Licensing (w/o enclosure)
Ms. S. M. Coffin, AP1000 Manager of New Reactors (w/o enclosure)
Mr. C. J. Araguas, Lead Project Manager of New Reactors
Mr. B. Hughes, Project Manager of New Reactors
Mr. R. G. Joshi, Project Manager of New Reactors
Ms. T. E. Simms, Project Manager of New Reactors
Mr. B. C. Anderson, Project Manager of New Reactors
Mr. M. M. Comar, Project Manager of New Reactors
Mr. S. C. Flanders, Director of Site and Environmental Reviews
Mr. W. F. Burton, Chief – Environmental Technical Support
Mr. M. D. Notich, Environmental Project Manager
Mr. J. H. Fringer, III, Environmental Project Manager
Mr. G. J. McCoy, Senior Resident Inspector of VEGP

Georgia Power Company

Mr. O. C. Harper, IV, Vice President, Resource Planning and Nuclear Development (w/o enclosure)

Oglethorpe Power Corporation

Mr. M. W. Price, Chief Operating Officer (w/o enclosure)

Municipal Electric Authority of Georgia

Mr. C. B. Manning, Jr., Senior Vice President, Participant and Corporate Affairs (w/o enclosure)

Dalton Utilities

Mr. D. Cope, President and Chief Executive Officer (w/o enclosure)

Bechtel Power Corporation

Mr. J. S. Prebula, Project Engineer (w/o enclosure)
Mr. R. W. Prunty, Licensing Engineer

Tetra Tech NUS, Inc.

Ms. K. K. Patterson, Project Manager

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Shaw Stone & Webster, Inc.

Mr. K. B. Allison, Project Manager (w/o enclosure)

Mr. J. M. Oddo, Licensing Manager

Westinghouse Electric Company, LLC

Mr. N. C. Boyter, Vice President, AP1000 Vogtle 3 & 4 Project (w/o enclosure)

Mr. J. L. Whiteman, Principal Engineer, Licensing & Customer Interface

Southern Nuclear Operating Company

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Enclosure

Response to NRC RAI Letter No. 010

on the VEGP Units 3 & 4 COL Application

Involving the Liquid Waste Management System

FSAR Section 11.2, Liquid Waste Management Systems

eRAI Tracking No. 1527

NRC RAI Number 11.02-1:

FSAR Sections 11.2.3.5.2 and 11.2.5.2 (including VEGP COL Item 11.2-2) reference draft NEI Template 07-11 as the basis of the cost-benefit analysis for justifying, in part, the design of the Liquid Waste Management System (LWMS). The NEI template proposed a bounding envelope of population doses associated with liquid effluent releases, which, if met, would demonstrate compliance with ALARA cost-benefit requirements of Section II.D of Appendix I to Part 50. However, NEI Template 07-11 has been withdrawn from further consideration by NEI. Accordingly, please explain how the applicant intends to develop a plant and site-specific cost-benefit analysis demonstrating compliance with Section II.D of Appendix I to Part 50 with respect to the LWMS, and provide sufficient information for the staff to evaluate the bases and assumptions used in the analysis against the applicable NRC regulations and guidance.

SNC Response:

A plant-specific cost-benefit analysis has been developed demonstrating compliance with Section II.D of Appendix I to Part 50 with respect to the LWMS. This cost-benefit analysis replaces use of NEI 07-11; thus, reference to NEI 07-11 will be removed from the FSAR. The total annual costs of the liquid radwaste system augments listed in Regulatory Guide 1.110, Revision 0, were developed using the methodology and parameters provided in the regulatory guide. Conservative values were chosen for parameters not specified in the regulatory guide. The following variable parameters were used:

- Capital Recovery Factor (CRF) – This factor is taken from Table A-6 of Regulatory Guide 1.110 and reflects the cost of money for capital expenditures. A cost-of-money value of 7% per year is assumed in this analysis, consistent with the “Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission” (NUREG/BR-0058). A CRF of 0.0806 was obtained from Table A-6.
- Indirect Cost Factor (ICF) – This factor takes into account whether the radwaste system is unitized or shared (in the case of a multi-unit site) and is taken from Table A-5 of Regulatory Guide 1.110. It is assumed that the radwaste system for this analysis is a unitized system at a 2-unit site, which equals an ICF of 1.625.
- Labor Cost Correction Factor (LCCF) – This factor takes into account the differences in relative labor costs between geographical regions and is taken from Table A-4 of Regulatory Guide 1.110. A LCCF of 1.0 (the lowest value) is assumed in this analysis.

The lowest-cost option for liquid radwaste treatment system augments is a 20 gpm Cartridge Filter at \$11,140 per year, which yields a threshold value of 11.14 person-rem total body or thyroid dose from liquid effluents.

The population doses are given in FSAR Section 11.2.3.5. As discussed above, the lowest cost liquid radwaste system augment is \$11,140. Assuming 100% efficiency of this augment, the minimum possible cost per person-rem is determined by dividing the cost of the augment by the population dose. This is \$586,316 per person-rem total body ($\$11,140/0.019$ person-rem) and \$5,063,636 per person-rem thyroid ($\$11,140/0.0022$ person-rem). These costs per person-rem reductions exceed the \$1,000 per person-rem criterion prescribed in Appendix I to 10 CFR Part 50 and are therefore not beneficial.

The associated application revisions include items that are both PLANT-SPECIFIC and items that are expected to be STANDARD as shown in the Application Revisions section below. The portion of this response which describes the methodology and parameters used to develop the total annual costs of the radwaste system augments is expected to be STANDARD and has been adapted from the TVA response to NRC Request for Additional Information Letter No. 031 Related to SRP Section 11.02 for the Bellefonte Units 3 and 4 Combined License Application (Reference). The remaining portions are PLANT-SPECIFIC.

Associated VEGP COL Application Revisions:

1. COLA Part 2, FSAR, Chapter 11, Subsection 11.2.3.5, will be revised to delete the last paragraph and to add new Subsections 11.2.3.5.1 and 11.2.3.5.2 as shown below:

~~This section adopts NEI 07-11 (Reference 201) which is currently under review by the NRC staff. The application of the methodology of NEI 07-11 satisfies the cost benefit analysis requirements of 10 CFR Part 50, Appendix I, Section II.D. The augments provided in NEI 07-11 were reviewed and were found not to be cost beneficial due to the low VEGP population doses.~~

11.2.3.5.1 Liquid Radwaste Cost Benefit Analysis Methodology

STD COL 11.2-2

The application of the methodology of Regulatory Guide 1.110 was used to satisfy the cost benefit analysis requirements of 10 CFR Part 50, Appendix I, Section II.D. The parameters used in calculating the Total Annual Cost (TAC) are fixed and are given for each radwaste treatment system augment listed in Regulatory Guide 1.110, including the Annual Operating Cost (AOC) (Table A-2), Annual Maintenance Cost (AMC) (Table A-3), Direct Cost of Equipment and Materials (DCEM) (Table A-1), and Direct Labor Cost (DLC) (Table A-1). The following variable parameters were used:

- Capital Recovery Factor (CRF) – This factor is taken from Table A-6 of Regulatory Guide 1.110 and reflects the cost of money for capital expenditures. A cost-of-money value of 7% per year is assumed in this analysis, consistent with the “Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission” (NUREG/BR-0058). A CRF of 0.0806 was obtained from Table A-6.
- Indirect Cost Factor (ICF) – This factor takes into account whether the radwaste system is unitized or shared (in the case of a multi-unit site) and is taken from Table A-5 of Regulatory Guide 1.110. It is assumed that the radwaste system for this analysis is a unitized system at a 2-unit site, which equals an ICF of 1.625.
- Labor Cost Correction Factor (LCCF) – This factor takes into account the differences in relative labor costs between geographical regions and is taken from Table A-4 of Regulatory Guide 1.110. A LCCF of 1.0 (the lowest value) is assumed in this analysis.

Appendix I to 10 CFR Part 50 prescribes a \$1,000 per person-rem criterion for determining the cost benefit of actions to reduce radiation exposure.

The analysis used a conservative assumption that the respective radwaste treatment system augment is a “perfect” system that reduces the effluent and dose by 100%. The liquid radwaste treatment system augments annual costs were determined and the lowest annual cost considered a threshold value. The lowest-cost option for liquid

radwaste treatment system augments is a 20 gpm Cartridge Filter at \$11,140 per year, which yields a threshold value of 11.14 person-rem total body or thyroid dose from liquid effluents.

For AP1000 sites with population dose estimates less than 11.14 person-rem total body or thyroid dose from liquid effluents, no further cost-benefit analysis is needed to demonstrate compliance with 10 CFR 50, Appendix I Section II.D.

11.2.3.5.2 Liquid Radwaste Cost Benefit Analysis

VEGP COL 11.2-2

As discussed in Section 11.2.3.5.1, the lowest cost liquid radwaste system augment is \$11,140. Assuming 100% efficiency of this augment, the minimum possible cost per person-rem is determined by dividing the cost of the augment by the population dose. This is \$586,316 per person-rem total body (\$11,140/0.019 person-rem) and \$5,063,636 per person-rem thyroid (\$11,140/0.0022 person-rem). These costs per person-rem reduction exceed the \$1,000 per person-rem criterion prescribed in Appendix I to 10 CFR Part 50 and are therefore not beneficial.

2. COLA Part 2, FSAR, Chapter 11, Subsection 11.2.5.2, will be revised as shown below:

STD COL 11.2-2

This COL Item is addressed in Subsection 11.2.3.5.1.

VEGP COL 11.2-2

This COL Item is addressed in Subsections 11.2.3.3, 11.2.3.5 and 11.2.3.5.2.

3. COLA Part 2, FSAR, Chapter 11, Subsection 11.2.6, Reference 201, reference to NEI 07-11, will be deleted as shown below:

201. ~~NEI 07-11, "Generic Template Guidance for Cost-Benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear Power Reactors," Revision 0, September 2007. Deleted~~

Reference:

Letter from J. A. Bailey (TVA) to NRC, "Bellefonte Combined License Application - Response to Request for Additional Information - Liquid Waste Management System," dated August 1, 2008.