Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37384-2000

April 25, 2003

TVA-SQN-TS-02-06 10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - UNITS 1 AND 2- TECHNICAL SPECIFICATIONS (TS) CHANGE NO. 02-06, RESPONSE TO INFORMAL REQUEST FOR ADDITIONAL INFORMATION (RAI) (TAC NO. MB7205 AND MB7206)

References:

1. TVA letter to NRC dated November 15, 2002, "Sequoyah Nuclear Plant (SQN) - Units 1 and 2 - Technical Specification (TS) Change 02-06, 'Increase Condensate Storage Tank (CST) Minimum Volume' "
2. NRC letter to TVA dated February 14, 2003, "Sequoyah Nuclear Plant Units 1 and 2 — Request for Additional Information (RAI) Regarding Technical Specification (TS) Change Request No. 02-06, 'Increase Condensate Storage Tank (CST) Minimum Volume' (TAC Nos. MB7205 and MB7206)"
3. TVA letter to NRC dated February 28, 2003, "Sequoyah Nuclear Plant (SQN) - Units 1 and 2 - Technical Specification (TS) Change No. 02-06, Response to Request for Additional Information (RAI) (TAC Nos. MB7205 and MB7206)"

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4. TVA letter to NRC dated March 14, 2003, "Sequoyah Nuclear Plant (SQN) - Units 1 and 2 - Technical Specification (TS) Change 02-06, 'Increase Condensate Storage Tank (CST) Minimum Volume' Supplement No. 1 (TAC Nos MB7205 and MB7206)"

TVA submitted TS Change 02-06 to NRC (Reference 1) to propose an increase in the minimum amount of inventory stored in the CST. NRC requested additional information regarding the proposed TS change in Reference 2. TVA responded to the questions via Reference 3. Upon request by the NRC, TVA made administrative changes to the TS language to eliminate ambiguity (Reference 4).

This letter and the attached enclosure provide the responses to additional NRC questions discussed with TVA on April 9 and 17, 2003. There are no commitments contained in this letter. As requested in previous correspondence, TVA requests NRC approval to support the Sequoyah refueling outage currently in progress.

This letter is being sent in accordance with NRC RIS 2001-05, "Guidance on Submitting Documents to the NRC by Electronic Information Exchange, CD-ROM, or Hard Copy." If you have any questions about this change, please contact me at 843-7170 or Jim Smith at 843-6672.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 25 day of April, 2003.

Sincerely,

Pedro Salas
Manager of Licensing
and Industry Affairs

Enclosure: Response to Request for Additional Information (RAI) TS Change 02-06

cc: See page 3

Enclosure
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ENCLOSURE

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI)
TECHNICAL SPECIFICATION (TS) CHANGE 02-06

RAI Question 1 (Part 1 of 2).

On page 69 of your calculation, you provide a two-group model for actinide power contribution. This calculation appears to model the actinide power contribution due to U239 and NP239. How does this actinide correction correlate to the values evaluated for the 1994 ANS standard in Research Information Letter 0202, "Revision of 10 CFR 50.46 and Appendix K," June 20, 2002?

Response

There is no correlation between the actinide contribution to core heat utilized in the condensate storage tank (CST) volume calculation, 32-5014532-00, and the actinide model described in the 94 ANS Standard, ANSI/ANS-5.1-1994. The "B&W Heavy Actinide" model was used. This model is based on ORIGEN runs and considers different times in core life and fuel enrichment. Unlike the "94 Standard" model, the B&W Heavy Actinide model actually represents all of the heavy actinides, not just NP239 and U239 but is fitted to a two-group model.

A comparison of the two actinide models is presented in the following table. The table compares integrated relative actinide power (fraction-sec) over an eight-hour period. The models predict very similar actinide contributions to the total core decay heat power generation.

Actinide Comparison
Integrated Actinide Fraction vs. Time (fraction-s)

time, s	1994 Standard Actinides	B&W Heavy Actinides
0.00E+00	0.00E+00	0.00E+00
1.00E-01	3.12E-04	3.09E-04
2.00E-01	6.24E-04	6.18E-04
3.00E-01	9.36E-04	9.27E-04
4.00E-01	1.25E-03	1.24E-03
5.00E-01	1.56E-03	1.55E-03
6.00E-01	1.87E-03	1.85E-03
7.00E-01	2.18E-03	2.16E-03
8.00E-01	2.50E-03	2.47E-03
9.00E-01	2.81E-03	2.78E-03
1.00E+00	3.12E-03	3.09E-03
1.20E+00	3.74E-03	3.71E-03
1.40E+00	4.37E-03	4.33E-03
1.50E+00	4.68E-03	4.64E-03
1.60E+00	4.99E-03	4.95E-03
1.80E+00	5.62E-03	5.56E-03
2.00E+00	6.24E-03	6.18E-03
2.20E+00	6.86E-03	6.80E-03
2.40E+00	7.49E-03	7.42E-03
2.60E+00	8.11E-03	8 04E-03
2.80E+00	8.74E-03	8 65E-03
3.00E+00	9.36E-03	9.27E-03
3.20E+00	9.98E-03	9.89E-03
3.40E+00	1.06E-02	1.05E-02
3.60E+00	1.12E-02	1.11E-02
3.80E+00	1.19E-02	1 17E-02
4.00E+00	1.25E-02	1.24E-02
4.20E+00	1.31E-02	1.30E-02
4.40E+00	1.37E-02	1.36E-02
4.60E+00	1.43E-02	1.42E-02
4 80E+00	1.50E-02	1.48E-02
5.00E+00	1.56E-02	1.54E-02
5.20E+00	1.62E-02	1.61E-02
5.40E+00	1.68E-02	1.67E-02
5.60E+00	1.75E-02	1.73E-02
5.80E+00	1.81E-02	1.79E-02
6.00E+00	1.87E-02	1.85E-02
6.20E+00	1.93E-02	1.92E-02
6.40E+00	2.00E-02	1.98E-02
6.60E+00	2.06E-02	2.04E-02

Actinide Comparison Continued
Integrated Actinide Fraction vs. Time (fraction-s)

time, s	1994 Standard Actinides	B&W Heavy Actinides
6.80E+00	2.12E-02	2.10E-02
7.00E+00	2.18E-02	2.16E-02
7.20E+00	2.24E-02	2.22E-02
7.40E+00	2.31E-02	2.29E-02
7.60E+00	2.37E-02	2.35E-02
7.80E+00	2.43E-02	2.41E-02
8.00E+00	2.49E-02	2.47E-02
8.20E+00	2.56E-02	2.53E-02
8.40E+00	2 62E-02	2.59E-02
8.60E+00	2.68E-02	2.66E-02
8.80E+00	2.74E-02	2.72E-02
9.00E+00	2.81E-02	2.78E-02
9.20E+00	2.87E-02	2.84E-02
9.40E+00	2.93E-02	2.90E-02
9.60E+00	2.99E-02	2.96E-02
9.80E+00	3.05E-02	3.03E-02
1.00E+01	3.12E-02	3.09E-02
1.50E+01	4.67E-02	4.63E-02
2.00E+01	6.23E-02	6 17E-02
4.00E+01	1.24E-01	1.23E-01
6.00E+01	1.86E-01	1.84E-01
8 00E+01	2.47E-01	2.45E-01
1.00E+02	3.08E-01	3.05E-01
1.50E+02	4.59E-01	4 55E-01
2.00E+02	6.08E-01	6.03E-01
3.00E+02	9.01E-01	8.93E-01
4.00E+02	1.19E+00	1.18E+00
6.00E+02	1.74E+00	1.72E+00
8.00E+02	2.27E+00	2.25E+00
1.00E+03	2.77E+00	2.75E+00
1.50E+03	3.96E+00	3.92E+00
2.00E+03	5.04E+00	5.00E+00
3.60E+03	8.10E+00	8 03E+00
4.00E+03	8.78E+00	8.71E+00
6.00E+03	1.20E+01	1 19E+01
7.20E+03	**1.38E+01**	**1.37E+01**
8.00E+03	1.50E+01	1.49E+01
1.00E+04	1.79E+01	1.78E+01
1.50E+04	2.50E+01	2.48E+01
2.00E+04	3.19E+01	3.17E+01
2.88E+04	**4.39E+01**	**4.36E+01**

RAI Question 1 (Part 2 of 2)

Additionally RIL 0202, Appendix B, "Sensitivity to Individual Choices in the 1994 ANS Standard," identifies non-conservatisms in the 1994 ANS standard. For the percent of decay heat from actinides excluding U239 and NP239, these non-conservatisms can be as much as 4 percent at 10,000 seconds and as much as 6 percent at 28,200 seconds (8 hours). Show how you account for this non-conservatism and assess the affects of its inclusion on your cooldown calculations.

Response

Because the B&W Heavy Actinide model used in the CST volume calculation was developed independent of the actinide model described in the 1994 ANS Standard, non-conservatisms in the latter model are not accounted for. The effect of 6 percent non-conservatism in the actinide model on the CST volume calculation can, however, be estimated for added perspective. Using the relationships developed from the First Law in 32-5014532-00, it is estimated that a 6 percent addition to the actinide model would equate to the need for an additional 949 gallons of condensate for cooldown from hot full power to residual heat removal cut-in. The proposed TS change has a margin of 12,000 gallons. This level of non-conservatism in the actinide model is, therefore, well within the available margin of CST volume.

RAI Question 2.

Attachment 1 of RIL 0202 identifies the equation for the simplified decay heat power uncertainty (equation 13) of the 1994 ANS standard to be in error. The draft 2002 ANS standard corrects equation 13. Assess the effects of this equation change upon your cooldown calculations.

Response

The uncertainty term in the 1994 ANS Standard (simplified method), Equation 13, was corrected in the 2002 ANS Standard.

$$\frac{\Delta P_d}{P_d} = \sqrt{\left(\frac{\Delta P_{\max}}{P_{\max}}\right)^2 + \frac{(\Delta F_{\max})^2 + (\Delta F_{\min})^2}{(F_{\max}(t,\infty) - F_{\min}(t+T,\infty))^2} + \left(\frac{\Delta Q}{Q}\right)^2}$$

The uncertainty terms, ΔFmax and ΔFmin, are 2-sigma uncertainties of the individual decay heat terms, Fmax and Fmin, respectively. Q and ΔQ are the average energy produced by

fission and the associated uncertainty, respectively. The decay heat contribution to the plant cooldown energy was recalculated out to eight hours. It was determined that the effect of the error on the calculation of integrated decay heat is about a 3.4 percent increase. Equating the increased decay heat to CST volume requirement it was determined that the increase in CST is about 3589 gallons. This is well within the 12,000 gallon margin associated with the proposed TS change.