Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37379-2000

November 25, 1997

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

Gentlemen:

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

SEQUOYAH NUCLEAR PLANT (SQN) - 10 CFR 50.46 ANNUAL AND 30-DAY REPORT

Reference: TVA letter to NRC dated May 28, 1997, "Sequoyah Nuclear Plant (SQN) - 10 CFR 50.46 Annual and 30-Day Report"

The purpose of this letter is to provide changes to the calculated peak fuel cladding temperature (PCT) resulting from recent changes to the SQN emergency core cooling system evaluation model. The Unit 2 change to the PCT is in excess of 50 degrees Fahrenheit from the last annual report value and this submittal satisfies the 30-day special report required by 10 CFR 50.46(a)(3)(ii). The Unit 1 PCT change does not exceed 50 degrees Fahrenheit, but it is included in this letter to provide the reported PCT values for Units 1 and 2 that are consistent and based on the same analysis model. This letter will establish the annual reporting interval for future 10 CFR 50.46 reports.

TVA has included a detailed discussion of the large and small break loss-of-coolant accident evaluation changes in the attached enclosure. The changes to the Unit 2 evaluations result from the addition of Framatome Cogema Fuel to the core and are consistent with the Unit 1 Cycle 9 evaluations in the referenced letter. This letter returns the PCT to the same value for both units based on the utilization of the same evaluation model.

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Please direct questions concerning this issue to me at (423) 843-7170 or J. D. Smith at (423) 843-6672.

Sincerely,

Pedro Salas
Site Licensing and Industry Affairs Manager

Enclosure
cc (Enclosure):
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ENCLOSURE

10 CFR 50.46 REPORT DOCUMENTATION

Sequoyah Unit 1

Large Break Loss-of-Coolant Accident (LOCA)

| | PCT | Attachment |
|---|---|---|
| Previous Licensing Basis PCT (May 28, 1997) | 2115°F | |
| 1. Decay Heat Generation Model Correction-Actinide Isotope Decay Contribution (Framatome Cogema Fuel [FCF] Letter MCM-832, B38 970809 804) | +47°F | 2 |
| Updated Licensing Basis PCT | 2162°F | |
| Net Change | +47°F | |

Small Break LOCA

| | PCT | Attachment |
|---|---|---|
| Previous Licensing Basis PCT (May 28, 1997) | 1162°F | |
| Updated Licensing Basis PCT | 1162°F | |
| Net Change | None | |

Sequoyah Unit 2

Large Break LOCA

| | PCT | Attachment |
|---|---|---|
| Previous Licensing Basis PCT (May 28, 1997) | 1926°F | |
| 1. Reanalysis to Support FCF Mark-BW17 Fuel Type (FCF Letter RGC-531, B38 951108 803) | +189°F | 1 |
| 2. Decay Heat Generation Model Correction-Actinide Isotope Decay Contribution (FCF Letter MCM-832, B38 970809 804) | +47°F | 2 |
| Updated Licensing Basis PCT | 2162°F | |
| Net Change | +236°F | |

Small Break LOCA

| | PCT | Attachment |
|---|---|---|
| Previous Licensing Basis PCT (May 28, 1997) | 1782°F | |
| 1. Reanalysis to Support FCF Mark-BW17 Fuel Type (FCF Letter MCM-456, B38 970519 801) | -620°F | 3 |
| Updated Licensing Basis PCT | 1162°F | |
| Net Change | -620°F | |

Detailed discussions of each of the emergency core cooling system evaluation model changes outlined above are attached to this enclosure. The information in the attachments is based upon the referenced Framatome Cogema Fuel submittals. The "Previous Licensing Basis PCT" value for Unit 2 small break LOCA has been corrected in this report. TVA incorrectly calculated the PCT value in the May 28, 1997 report, based on the applicable changes, and conservatively reported the PCT four degrees higher than required.

Please note that this special report contains separate information for Sequoyah Unit 1 and Sequoyah Unit 2. Separation of the units was required because of the differences in the fuel types in use on Unit 1 (Westinghouse V5H/Standard and Framatome Mark-BW17) and Unit 2 (Westinghouse V5H/Standard) and the different emergency core cooling system evaluation models used to analyze each fuel type. With the introduction of the Mark-BW17 fuel type for the Unit 2 Cycle 9 operation, the reported peak clad temperature will revert to a single value for both units. Future 10 CFR 50.46 reports will reflect the use of a single emergency core cooling system evaluation model for both units.

Attachment 1

LARGE BREAK LOSS-OF-COOLANT (LOCA) ANALYSIS FOR FRAMATOME COGEMA FUEL (FCF) MARK-BW17 FUEL TYPE

Background

Beginning with the Cycle 9 operation, Sequoyah will convert from the Westinghouse V5H fuel type to the FCF Mark-BW17 fuel type for new fuel reloading. The use of the Mark-BW17 fuel type required a complete analysis of the large break LOCA by FCF. FCF performed the analysis using the Framatome recirculating steam generator evaluation model that uses the RELAP/MOD2-B&W, REFLOD3B, and BEACH computer codes. The Sequoyah plant-specific analysis is detailed in Section 5 of Topical Report No. BAW-10220P, Revision 00. TVA submitted this report to NRC as part of the supporting technical information for Sequoyah Technical Specification Change Request No. TVA-SQN-TS-96-01.

The analysis performed by Framatome is applicable only to the Mark-BW17 reload fuel. The resident Westinghouse V5H/Standard fuel assemblies continue to be governed by the previous analysis of record performed with the 1981 Westinghouse emergency core cooling evaluation model using the BASH computer code. Westinghouse performed this analysis assuming a slightly higher reactor coolant system thermal design flow than the Framatome analysis. Westinghouse evaluated the analysis for the reduced thermal design flow.

The pressure drop associated with the Westinghouse V5H fuel assembly is slightly higher than the Mark-BW17 fuel and the Westinghouse Standard fuel. As a result, the Mark-BW17 and the Westinghouse Standard fuels would benefit or receive more flow in a mixed core configuration. The Westinghouse V5H fuel will receive slightly less flow. An evaluation of mixed core conditions was performed for the Westinghouse V5H fuel and a conservative peak clad temperature penalty was established.

Results

The Framatome analysis for the Mark-BW17 fuel increased the calculated maximum peak clad temperature by 189 degrees Fahrenheit (F). The Westinghouse evaluation of the reduced thermal design flow on the V5H fuel concluded that the slightly reduced thermal design flow would have no effect on the

calculated peak clad temperature. The evaluation of mixed core operation on the V5H fuel concluded that an increase in the calculated peak clad temperature of 20 degrees F would conservatively bound the effects of mixed core operation for once burned or twice burned fuel assemblies.

Since the maximum calculated peak clad temperature for the Mark-BW17 fuel assemblies bounds the maximum peak clad temperature for the V5H fuel assemblies (1976 degrees F), the bounding number is reported in accordance with the 10 CFR 50.46 reporting requirements. TVA is maintaining both analyses for mixed core (V5H/Standard and Mark-BW17) operation. The bounding analysis will be reported for compliance with 10 CFR 50.46.

Attachment 2

LOSS-OF-COOLANT ACCIDENT (LOCA) DECAY HEAT GENERATION CORRECTION - ACTINIDE ISOTOPE DECAY

Background

A review of the Framatome recirculating steam generator emergency core cooling system evaluation model described in Topical Report BAW-10168P-A, Revision 03, identified a possible under-prediction of the actinide isotope decay contribution to the overall decay heat generation rate used in the evaluation model. A detailed study of the energy released in the decay of actinides (Uranium, Plutonium, and Neptunium) was performed to establish a revised actinide decay model for use in the emergency core cooling system evaluation. The revised model resulted in an increased decay heat contribution from the decay of actinide isotopes. A detailed discussion of this issue and its resolution was submitted to NRC by Framatome Technologies Letter JHT/97-29 dated June 27, 1997.

Results

The Sequoyah large break LOCA for the Mark-BW17 fuel was reanalyzed using the revised actinide decay model. The substitution of the new actinide decay model resulted in an increase in the calculated peak cladding temperature of 47 degrees F.

The small break LOCA was reviewed and was determined to contain sufficient conservatism in the assumed decay heat generation rate to bound the revised actinide decay model. As such, no reanalysis of the small break accident was performed and no peak clad temperature penalty was assessed.

Attachment 3

SMALL BREAK LOSS-OF-COOLANT (LOCA) ANALYSIS FOR FRAMATOME COGEMA FUEL (FCF) MARK-BW17 FUEL TYPE

Background

Beginning with Cycle 9 operation, Sequoyah will convert from the Westinghouse V5H fuel type to the FCF Mark-BW17 fuel type for new fuel reloading. The use of the Mark-BW17 fuel type required a complete reanalysis of the small break LOCA by FCF. Framatome performed this analysis using the Framatome recirculating steam generator LOCA evaluation model that uses the RELAP/MOD2-B&W and TACO3 computer codes. The Sequoyah plant-specific analysis is detailed in Section 5.9 of Topical Report No. BAW-10220P, Revision 00. TVA submitted this report to NRC as part of the supporting technical information for Sequoyah Technical Specification Change Request No. TVA-SQN-TS-96-01. TVA submitted supplemental information on the small break LOCA to NRC in TVA letters dated March 20, 1997, and April 1, 1997.

The analysis performed by Framatome is applicable to both the Mark-BW17 reload fuel and the resident Westinghouse V5H/Standard fuel.

Results

The Framatome small break loss-of-coolant analysis established a maximum peak clad temperature of 1162 degrees F for the break area equivalent to a 2.75 inch diameter pipe.