Docket Nos. 50-327
and 50-328

December 8, 1992

Tennessee Valley Authority
ATTN: Dr. Mark O. Medford, Vice President
Nuclear Assurance, Licensing & Fuels
3B Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Dr. Medford:

SUBJECT: ISSUANCE OF BASES CHANGE (TAC NOS. M84955 AND M84956)
(TS 92-14)

The Commission has issued the enclosed Technical Specifications (TS) Bases changes to Facility Operating License Nos. DPR-77 and DPR-79 for the Sequoyah Nuclear Plant, Units 1 and 2 respectively. These changes are in response to your application dated November 16, 1992.

The changes (a) replace the reference in Bases 2.1.1 to the departure from nucleate boiling ratio (DNBR) correlation limit with reference to the design DNBR limit (which is calculated using the new Mini-Revised Thermal Design Procedure-RTDP), (b) delete reference to the DNBR value of 1.38 used in the safety analysis, and (c) replace the reference to the "WRB-1 or W-3" correlation and the specific limit of 1.17 with a reference to the "Design DNBR Limit." The changes represent removal of design values from the technical specifications and use of the Mini-RTDP method to generate additional DNBR margin. A description of the Mini-RTDP, specific values of the design DNBR limit, the safety analysis DNBR limit, and the DNBR correlation limit, have been incorporated into a change to the Final Safety Analysis Report that was submitted with the TS change request. Any future changes to these would be addressed in each Unit's reload analysis and in a safety evaluation. TVA evaluated these changes under the provisions of 10 CFR 50.59. They were developed using such references as the Sequoyah Core Operating Limits Report; WCAP-12178, "Mini Revised Thermal Design Procedure (Mini-RTDP)," dated October 1989; the staff's Topical Report on WCAP-12178 dated July 31, 1989; and a Westinghouse evaluation of the FSAR changes. The staff has determined that the proposed Bases changes are acceptable.

Sincerely,
Original signed by
David E. LaBarge, Senior Project Manager
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
1. Unit 1 Technical Specification Bases page changes
2. Unit 2 Technical Specification Bases page changes

cc w/enclosure:
See next page *see previous concurrence

OFC:	PDII-4/LA	PDII-4/PM	SPXB*	PDII-4/D	
NAME:	MSanders	DLaBarge:as	RJones	FHebdon	
DATE:	12/8/92	12/8/92	12/1/92	12/8/92	

DF01
1/1

2.1.1 REACTOR CORE

The restrictions of this safety limit prevent overheating of the fuel and possible cladding perforation which would result in the release of fission products to the reactor coolant. Overheating of the fuel cladding is prevented by restricting fuel operation to within the nucleate boiling regime where the heat transfer coefficient is large and the cladding surface temperature is slightly above the coolant saturation temperature.

Operation above the upper boundary of the nucleate boiling regime could result in excessive cladding temperatures because of the onset of departure from nucleate boiling (DNB) and the resultant sharp reduction in heat transfer coefficient. DNB is not a directly measurable parameter during operation and therefore THERMAL POWER and Reactor Coolant Temperature and Pressure have been related to DNB through the WRB-1 correlation and the W-3 correlation for conditions outside the range of WRB-1 correlation. The DNB correlations have been developed to predict the DNB flux and the location of DNB for axially uniform and non-uniform heat flux distributions. The local DNB heat flux ratio, DNBR, defined as the ratio of the heat flux that would cause DNB at a particular core location to the local heat flux, is indicative of the margin to DNB.

The DNB design basis is as follows: there must be at least a 95 percent probability that the minimum DNBR of the limiting rod during Condition I and II events is greater than or equal to the design DNBR limit. The design DNBR limit is established such that there is a 95 percent probability with 95 percent confidence that DNB will not occur when the minimum DNBR is at the design DNBR limit.

The curves of Figure 2.1-1 show the loci of points of THERMAL POWER, Reactor Coolant System pressure and average temperature for which the minimum DNBR is no less than the safety analysis DNBR limit, or the average enthalpy at the vessel exit is equal to the enthalpy of saturated liquid.

The curves are based on an enthalpy hot channel factor, $F^N_{\Delta H}$, specified in the Core Operating Limit Report (COLR) and a reference cosine with a peak of 1.55 for axial power shape. An allowance is included for an increase in $F^N_{\Delta H}$ at reduced power based on the expression:

$$F^N_{\Delta H} = F^{RTP}_{\Delta H}[1+ PF_{\Delta H} (1-P)]$$

where $P = \dfrac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$,

$F^{RTP}_{\Delta H}$ = the $F^N_{\Delta H}$ limit at RATED THERMAL POWER (RTP) specified in the COLR, and

$PF_{\Delta H}$ = the power factor multiplier for $F^N_{\Delta H}$ specified in the COLR.

Fuel rod bowing reduces the value of DNB ratio. Margin has been retained between the DNBR value used in the safety analysis and the design DNBR limit to completely offset the rod bow penalty.

The applicable value of rod bow penalty is referenced in the FSAR.

Margin in excess of the rod bow penalty is available for plant design flexibility.

The hot channel factor $F_Q^M(z)$ is measured periodically and increased by a cycle and height dependent power factor, W(z), to provide assurance that the limit on the hot channel factor, $F_Q(z)$, is met. W(z) accounts for the effects of normal operation transients and was determined from expected power control maneuvers over the full range of burnup conditions in the core. The W(z) function is specified in the COLR.

3/4.2.4 QUADRANT POWER TILT RATIO

The quadrant power tilt ratio limit assures that the radial power distribution satisfies the design values used in the power capability analysis. Radial power distribution measurements are made during startup testing and periodically during power operation.

The two hour time allowance for operation with a tilt condition greater than 1.02 but less than 1.09 is provided to allow identification and correction of a dropped or misaligned rod. In the event such action does not correct the tilt, the margin for uncertainty on F_Q is reinstated by reducing the power by 3 percent from RATED THERMAL POWER for each percent of tilt in excess of 1.0.

3/4.2.5 DNB PARAMETERS

The limits on the DNB related parameters assure that each of the parameters are maintained within the normal steady state envelope of operation assumed in the transient and accident analyses. The limits are consistent with the initial FSAR assumptions and have been analytically demonstrated adequate to maintain a minimum DNBR of greater than or equal to the safety analysis DNBR limit throughout each analyzed transient.

The 12 hour periodic surveillance of these parameters through instrument readout is sufficient to ensure that the parameters are restored within their limits following load changes and other expected transient operation.

ENCLOSURE 2

ATTACHMENT TO BASES CHANGE TS 92-14

FACILITY OPERATING LICENSE NO. DPR-79

DOCKET NO. 50-328

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages contain marginal lines indicating the area of change.

REMOVE	INSERT
B 2-1	B 2-1
B 3/4 2-4	B 3/4 2-4

2.1 SAFETY LIMITS

BASES

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Distribution

Docket File	
NRC & Local PDRs	
SQN Rdg. File	
S. Varga	14-E-4
G. Lainas	14-H-3
F. Hebdon	
M. Sanders	
D. LaBarge	
R. Jones	8-E-23
OGC	15-B-18
D. Hagan	MNBB-3302
G. Hill	(4 per docket)
W. Jones	P1
C. Grimes	11-E-22
ACRS(10)	
OPA	2-G-5
OC/LFDCB	MNBB-9112
B. Wilson	RII
E. Merschoff	RII