Docket Nos.: 50-327
and 50-328

Mr. S. A. White
Manager of Nuclear Power
Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

6 OCT 1986

Dear Mr. White:

SUBJECT: DEVIATION REQUEST REGARDING T-COLD INSTRUMENTATION IN THE AUXILIARY CONTROL ROOM

By my letter to you dated May 29, 1986, the staff approved twenty deviation requests from Appendix R of 10 CFR Part 50. That letter also stated that the deviation request regarding T-cold instrumentation in the auxiliary control room was still under review.

The staff has completed its review on the above subject. The enclosed safety evaluation is in response to TVA letters dated December 18, 1984, March 10 and May 2, 1986. Based on its review, the staff concludes that TVA's proposed deviation request is acceptable at the Sequoyah Nuclear Plant.

With this letter, the staff has addressed all outstanding deviation requests from Appendix R of 10 CFR Part 50. Also, you should assure that any safety-related employee concerns pertaining to fire protection or Appendix R are appropriately addressed prior to the startup of the Sequoyah units.

Sincerely,

B.J. Youngblood, Director
PWR Project Directorate #4
Division of PWR Licensing-A

Enclosure:
Safety Evaluation

cc w/enclosure: See next page

DISTRIBUTION:

Docket File	NRC PDR	PMadden
Local PDR	PRC System	WMiller
NSIC	PWR#4 Reading	TConlon
MDuncan	BJYoungblood Reading	EJordan
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HDenton	JTaylor	JPartlow
BHayes	GZech, RII	OGC/Bethesda
NGrace	LSpessard	BGrimes
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DMuller	TNovak	KHooks
BJYoungblood	JHolonich	TPoindexter
CStahle	TKenyon	
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PWR#4/DPWR-A	PWR#4/DPWR-A	PWR#4/DPWR-A	PWR#4/DPWR-A
TAlexion/rad	MDuncan	CStahle	BJYoungblood
09/24/86	09/24/86	09/30/86	10/2/86

Mr. S. A. White
Tennessee Valley Authority

Sequoyah Nuclear Plant

cc:
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Resident Inspector/Sequoyah NPS
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Soddy Daisy, Tennessee 37379

ENCLOSURE

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 & 2
SAFETY EVALUATION REPORT FOR DEVIATION
FROM SECTION III.L.2.d OF APPENDIX R.
Docket Nos. 50-327/328

INTRODUCTION

By letters dated December 18, 1984, and March 19, and May 2, 1986, Tennessee Valley Authority (TVA), the licensee for Sequoyah Nuclear Plant (SQN), Units 1 and 2, requested a deviation from Section III.L.2.d of Appendix R requiring the installation of reactor coolant system cold leg temperature (T-cold) instrumentation in the Auxiliary Control Room (ACR). The staff's evaluation of the licensee's request is addressed below.

EVALUATION

Section III.L.2.d of Appendix R states that the process monitoring function shall be capable of providing direct readings of the process variables necessary to perform and control the functions to (a) achieve and maintain subcritical reactivity conditions in the reactor; (b) maintain reactor coolant inventory; (c) achieve and maintain hot standby conditions; (d) achieve cold shutdown within 72 hours; and (e) maintain cold shutdown conditions thereafter. During the post-fire shutdown, the reactor coolant system process variables shall be maintained within those predicted for a loss of normal A.C. power, and the fission product boundary integrity shall not be affected; i.e., there shall be no fuel clad damage, rupture of any primary coolant boundary, or rupture of the containment boundary. Reactor coolant system cold leg temperature (T-cold) indication is one of the process variables typically provided to aid in assessing the establishment of natural circulation cooling.

By letter dated May 2, 1986, the licensee provided their justification for not installing T-cold instrumentation in the ACR. The process monitoring capability already provided at the ACR includes pressurizer pressure and level indication, steam generator pressure indication for all four steam generators, T-hot indication for all four RCS loops, ability to feed all four steam generators, level indication for all tanks and diagnostic instrumentation for shutdown systems. In addition, the licensee proposes to use T-sat (saturation temperature corresponding to steam generator pressure) instead of T-cold instrumentation in the ACR. The licensee has stated that indications of reactor coolant system (RCS) subcooling, T-hot stable or decreasing, and steam generator pressure stable or decreasing are available in the ACR to indicate loss of natural circulation cooling. Furthermore, all of the above indications are specified for use in the SQN emergency procedures to verify adequate natural circulation, and the operators are periodically trained to shutdown the plant from the ACR.

Based on data obtained during startup testing at SQN and Diablo Canyon, the licensee provided the results of an evaluation of the relationship between T-sat and T-cold (Tc-Tsat), as follows:

	Sequoyah	Diablo Canyon
Mean	4.33°F	4.67°F
Standard Deviation	3.29°F	1.65°F

The temperature differences noted above are well within the tolerance and accuracy levels of the instrumentation. In obtaining the data, the SQN cooldown was terminated at approximately 465°F, whereas the Diablo Canyon cooldown was continued to below RHR initiation. Since the data (T-cold and steam generator pressure) were obtained simultaneously during the cooldown tests, the data demonstrate the adequacy of using steam generator pressure to determine T-sat and infer T-cold, as well as the lack of significant time lag between the two indications.

The licensee has stated that the natural circulation test at SQN was performed from the main control room and the equipment (not controls) used during the natural circulation test is identical to the equipment which would be used in an Appendix R shutdown from the ACR. For example, the auxiliary feedwater pumps, the centrifugal charging pumps, ERCW pumps and CCS pumps are used for natural circulation cooldown from the ACR and were also used during the main control room (MCR) test. Therefore, the test results are applicable to a shutdown from the ACR. Also, the instrumentation provided for verification of natural circulation is consistent with the Westinghouse Owners Group emergency response guidelines.

TVA has also evaluated the cost and radiological impact of installing T-cold instrumentation. The estimated cost for both units at Sequoyah is approximately $3.9 million, and would result in a radiation exposure of about 537 man-rem. Most of the work must be done in congested areas, and, for thermowell and thermocouple installation, in areas of high radiation. The above cost estimate does not include the cost of a post-modification hydrostatic test of the RCS, the cost of long term maintenance, or the cost of lost power generation if the installation of T-cold is a critical path activity for a refueling outage.

CONCLUSION

The staff has evaluated the licensee's justification for using steam generator pressure to obtain T-sat and infer T-cold in lieu of directly measuring T-cold, in the ACR. The staff finds, based on the natural circulation tests at Sequoyah and Diablo Canyon, that T-sat and T-cold trend together reasonably well; furthermore, the operators have been trained in the use of steam generator pressure. Also, the licensee has the ability to monitor RCS subcooling and to feed and monitor all four steam generators from the ACR. Therefore, based on the staff's consideration of the technical merits of the licensee's proposal, and the cost and radiological impact of providing T-cold monitoring capability in the ACR, the staff concludes that the use of T-sat in assessing natural circulation cooling in the RCS is acceptable at the Sequoyah Nuclear Plant.