TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

November 4, 1982

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Ms. Adensam:

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

In section 5.3.2 of Supplement 1 to the Sequoyah Nuclear Plant (SQN) Safety Evaluation Report (SER), NRC identified actions associated with the Residual Heat Removal (RHR) low-flow alarm, to be completed before startup after the first refueling outage for each unit. As required by the NRC, we have completed the installation of the RHR low-flow alarm, and have enclosed our response to the action items.

If you have any questions concerning this matter, please get in touch with J. E. Wills at FTS 858-2683.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Licensing

Sworn to and subscribed before me
this 4th day of Nov. 1982.

Bryant M. Lowery
Notary Public

My Commission Expires 4/8/86

B021

Enclosure
cc: U.S. Nuclear Regulatory Commission
Region II
Attn: Jr. James P. O'Reilly, Regional Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

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ENCLOSURE

Response to NRC Requirements In
Sequoyah Nuclear Plant SER, Section 5.3.2

RHR Low-Flow Alarm

NRC Requirements

In section 5.3.2 of the Safety Evaluation Report (SER), NRC's staff required the installation of a low-flow alarm on the RHR system. Concern was expressed about spurious isolation of the RHR system. Also stated in the SER was the need for further confirmatory documentation of the capability of the RHR system to meet the Branch Technical Position RSB 5-1, "Design Requirements of the Residual Heat Removal Systems." In Supplement 1 of the SER, the following actions were required before startup after the first refueling outage.

1. The applicant to provide a detailed description of the sensors which activate the alarm

2. Installation of the alarm

3. The applicant to provide test procedures which will be used to verify alarm functional adequacy

4. The applicant to identify settings for alarm sensors

5. The applicant to provide results from the tests demonstrating the functional adequacy of the alarm system

6. NRC staff review and approval of items 1 through 5

TVA Response

1. The sensors which activate the RHR low-flow alarm system consist of Barton model 224 differential pressure units (DPUs) and Barton model 228A differential pressure indicating switches. The function of the DPU is to sense the differential pressure developed across an orifice plate, one of which is located on the high-pressure side of each RHR pump. The 288A switch closes an alarm circuit contact when the flow falls below the setpoint.

2. Installation of the RHR low-flow alarm system was completed September 1980. Figure 1 is a logic diagram of the alarm system.

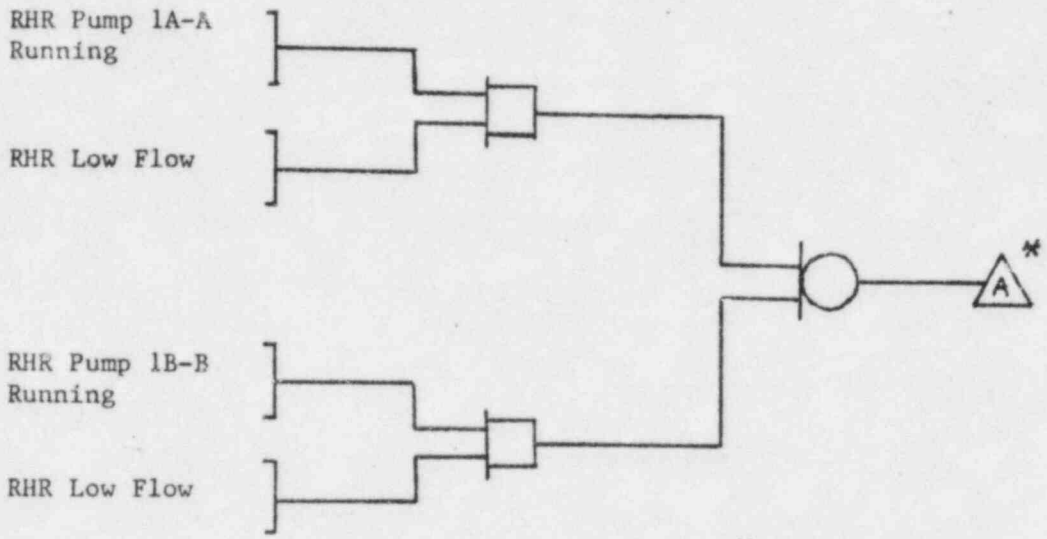

Figure 1

3. The test procedures used to verify calibration and alarm functional adequacy of the RHR low-flow alarm system are taken from pertinent sections of Sequoyah's Instrument Maintenance Instruction, IMI-74, and are given in the attachment.

4. Actuation of low-flow alarm occurs for RHR system flow $\leq$ 550 gal/min.

5. The sensors have been calibrated and the alarms tested for functional adequacy according to the procedures given in the attachment for both units at Sequoyah.

Attacment 1

TEST PROCEDURE TO VERIFY CALIBRATION AND ALARM FUNCTION ADEQUACY

SEQUOYAH NUCLEAR PLANT -LOOP CALIBRATION

UNIT NO. _____

LOOP NAME RHR Pump A-A Minimum Flow Valve Switch Loop No. F-74-12

DATE LOOP: OUT _____ IN _____ I.M. _____ Date _____

TIME LOOP: OUT _____ IN _____ Sheet 1 of 1

TEST	JIP. I.D.

INPUT inches H_2O		LOOP COMPONENTS								
I.D. NO.		FIS-74-12*								
Process (GPM)	Input ΔP ("H_2O)	Panel L-5 Desired GPM	As Found	As Left	Desired	As Found	As Left	Desired	As Found	As Left
0	0	0 ± 150			±			±		
375	4.25	375 ± 28.9			±			±		
750	17	750 ± 14.9			±			±		
1125	38.25	1125 ± 9.9			±			±		
1500	68	1500 ± 7.5			±			±		
1125	38.25	1125 ± 9.9			±			±		
750	17	750 ± 14.9			±			±		
375	4.25	375 ± 28.9			±			±		
0	0	0 ± 150			±			±		
		±			±			±		

LOOP SETPOINT COMPONENTS T.S.								ASSOCIATED ANNUNCIATION VERIFICATION
Instrument No.	Setpoint Type	Action	Process Setpoint	Desired Setpoint	Allowable	As Found	As Left	
FIS-74-12	Low Flow	CC ↓	550 gal/min	9.14" ± .34"wc	N/A			F/PA-74-13 Alm ☐ XA-55-6D-4 Loc.
L-5	Reset	CO ↑	—	—	N/A			Alm ☐ Loc.
FIS-74-12	High Flow	CC ↑	1250 gal/min	47.22" ± .34"wc	N/A			Alm ☐ Loc.
L-5	Reset	CO ↓	—	—	N/A			Alm ☐ Loc.

REMARKS/REFERENCES *Loop calibration and setpoint check to be performed per special calibration instructions on pages 3 through 4a (Appendix A). Section A to be used if RHR pump A-A is running; Section B if pump is not running.

Mode _____ Unit _____

RHR PUMP A-A MINIMUM FLOW VALVE SWITCH FIS-74-12 SPECIAL CALIBRATION INSTRUCTIONS

1. This instruction is written to be applicable to both units. Any differences in J.B. Ø's, T.B. #'s, etc., will be denoted in parentheses ( ) for Unit 2.

2. Coordinate all work with shift engineer and operators to ensure correct alignment of the RHR pumps and associated valves for duration of test. Obtain shift engineer's approval to perform test and inform him that with the pumps not running, the pump in the train to be tested will be locked out to prevent possible damage if it should start during an emergency. During modes 1, 2, 3, & 6, this will cause the Unit to enter an action statement in Tech Spec sections 3.5.2 and 3.9.8.2.

_____/_____
S.E. Signature Date

3. RHR Pump A-A running? Yes _____ No _____;
Operator Verification _____
If "No", then perform Section B of this sheet, "N/A" Section A.
If "Yes', perform Section A, "N/A" Section B.

A. PUMP RUNNING

A.1 Inform shift engineer and operators that this test will cause the opening and closing of the RHR Pump A-A miniflow recirc valve, FCV-74-12. If operational conditions will not allow this, perform steps A.2 and/or A.3, as required to prevent inadvertant movement of FCV-74-12. Otherwise, "N/A" these steps and proceed with step A.4.

NOTE: Step A.2 will prevent the valve from closing on actuation of high flow alarm and is to be used if pump A-A is running in strictly recirc mode. Steps A.2 and A.3 together will prevent any movement of the valve from its present position and is to be used if uninterrupted RHR system operation is required.

A.2 In JB 1104 (1106), disconnect the red wire from terminal no. 7C204 to prevent FCV-74-12 from closing.

_____ _____
Performed By Verified By

A.3 In 480V Reactor MOV Bd 1A1-A (2A1-A), compartment 8A, col tA4 (sA12), el. 749, disconnect wire #45 from contact 2 of Relay #3 to prevent FCV-74-12 from opening.

_____ _____
Performed By Verified By

A.4 Verify calibration of FIS-74-12 and associated low flow alarm actuation as per the loop calibration sheet. (Note: To verify the high flow setpoint, check contact closure across terminals 7C204 and 7C2C2 in JB 1104 (1106)).

Entire page.

Mode _____ Unit _____

A.5 When the calibration is complete, reconnect the wire(s) lifted in steps A.2 and/or A.3.

_____ Performed By _____ Verified By

A.6 Hi and Lo side isolation valves open, equalizing valve and all drain valves closed.

_____ I.M. / _____ Date _____ Verified By / _____ Date

A.7 Shift engineer notified calibration is complete.

_____ I.M. Signature / _____ Date

B. PUMP NOT RUNNING

B.1 Have operator lock out RHR pump 1A1-A (2A1-A) using HS-74-10A (ensure other train is operable).

_____ Performed By, Operator

B.2 At 480V Reactor MOV Bd 1A1-A (2A1-A) have ASE rotate XS-74-12 to the auxiliary position, and HS-74-12C to the close position.

_____ Performed by ASE

B.3 Inform the Unit Operator that the mini flow alarm may be actuated when the following jumper is installed. Install a temporary jumper between terminals 7C2X1 and 7C206 in JB 1104,[1] (1106) to simulate pump running status.

_____ Performed By _____ Verified By

B.4 Verify calibration of FIS-74-12 and associated low flow alarm actuation as per the loop calibration sheet. (NOTE: To verify the high flow setpoint, check contact closure across terminal 7C204 and 7C2C2 in JB 1104 (1106)).

B.5 When the calibration is complete, remove the jumper installed in step B.2.

_____ Performed By _____ Verified By

[1]JB 1104 located at column vA5, elevation 653; JB 1106 at col vA11, elevation 653.

entire page

B.6 Have ASE return XS-74-12 and HS-74-12C to their proper positions.

_____ / _____
Performed By, ASE Date

B.7 Have operator return HS-74-10A to the P-AUTO (or desired) position.

_____ / _____
Performed By, Operator Date

B.8 Hi and Lo Side Isoaltion Valves open, equalizing valve and all drain valves closed.

_____ / _____ _____ / _____
I.M. Date Verified By Date

B.9 Shift engineer notified calibration is complete.

_____ / _____
I.M. Signature Date

SEQUOYAH NUCLEAR PLANT -LOOP CALIBRATION

UNIT NO. _____

LOOP NAME RHR Pump B-B Minimum Flow Valve Switch Loop No. F-74-24

DATE LOOP: OUT _____ IN _____ I.M. _____ Date _____

TIME LOOP: OUT _____ IN _____ Sheet 1 of 1

TEST EQUIP. I.D.

INPUT Inches H_2O		LOOP COMPONENTS								
I.D. NO.		FIS-74-24*								
Process (GPM)	Input ΔP ("H_2O)	Panel L-22								
		Desired	As Found	As Left	Desired	As Found	As Left	Desired	As Found	As Left
0	0	0 ± 150			±			±		
375	4.25	375 ± 28.9			±			±		
750	17	750 ± 14.9			±			±		
1125	38.25	1125 ± 9.9			±			±		
1500	68	1500 ± 7.5			±			±		
1125	38.25	1125 ± 9.9			±			±		
750	17	750 ± 14.9			±			±		
375	4.25	375 ± 28.9			±			±		
0	0	0 ± 150			±			±		
		±			±			±		

LOOP SETPOINT COMPONENTS T.S.								ASSOCIATED ANNUNCIATION VERIFICATION
Instrument No.	Setpoint Type	Action	Process Setpoint	Desired Setpoint	Allowable	As Found	As Left	
FIS-74-24	Low Flow	CC ↓	550 gal/min	9.14" ± .34"wc	N/A			F/PA-74-13 Alm ☐ XA-55-6D-4 Loc.
L-22	Reset	CO ↑	—	—	N/A			Alm ☐ Loc.
FIS-74-24	High Flow	CC ↑	1250 gal/min	47.22 ± .34"wc	N/A			Alm ☐ Loc.
L-22	Reset	CO ↓	—	—	N/A			Alm ☐ Loc.

REMARKS/REFERENCES *Loop calibration and setpoint check to be performed per special calibration instructions on pages 6 through 7a (Appendix A). Section A to be used if RHR pump B-B is running; Section B is pump is not running.

Mode _____ Unit _____

RHR PUMP B-B MINIMUM FLOW VALVE SWITCH FIS-74-24
SPECIAL CALIBRATION INSTRUCTIONS

1. This instruction is written to be applicable to both units. Any differences in J.B. #'s, T.B. #'s, etc., will be denoted in parentheses ( ) for Unit 2.

2. Coordinate all work with shift engineer and operators to ensure correct alignment of the RHR pumps and associated valves for duration of test. Obtain shift engineer's approval to perform test and inform him that with the pumps not running, the pump in the train to be tested will be locked out to prevent damage if it should start during an emergency. During modes 1, 2, 3, & 6, this will cause the unit to enter an action statement in Tech Spec Section 3.5.2 and 3.9.8.2.

_____ / _____
S.E. Signature Date

3. RHR Pump B-B running? Yes _____ No _____
Operator Verification _____
If "No", then perform Section B of this sheet, "N/A" Section A.
If "Yes", perform Section A, "N/A" Section B.

A. PUMP RUNNING

A.1 Inform shift engineer and operators that this test will cause the opening and closing of the RHR Pump B-B miniflow recirc valve, FCV-74-24. If operational conditions will not allow this, perform steps A.2 and/or A.3, as required to prevent inadvertant movement of FCV-74-24. Otherwise, "N/A" these steps and proceed with step A.4.

NOTE: Step A.2 will prevent the valve from closing on actuation of high flow alarm and is to be used if pump B-B is running in strictly recirc mode. Steps A.2 and A.3 together will prevent any movement of the valve from its present position and is to be used if uninterrupted RHR system operation is required.

A.2 In JB 1105[1] (1107), disconnect the red wire from terminal no. 14E04 to prevent FCV-74-24 from closing.

_____ _____
Performed By Verified By

A.3 In 480V Reactor MOV Bd 1B1-B (2B1-B), compartment 6A, col sA4 (rA12), elev. 749, disconnect wire #45 from contact 2 of Relay #3 to prevent FCV-74-24 from opening.

_____ _____
Performed By Verified By

A.4 Verify calibration of FIS-74-24 and associated low flow alarm actuation as per the loop calibration sheet. (NOTE: To verify the high flow setpoint, check contact closure across terminals 14E04 and 14EC2 in JB1105 (1107)).

Mode _____ Unit _____

A.5 When the calibration is complete, reconnect the wire(s) lifted in steps A.2 and/or A.3.

_____ _____
Performed By Verified By

A.6 Hi and Lo side isolation valves open, equalizing valve and all drain valves closed.

_____/_____ _____/_____
I.M. Date Verified By Date

A.7 Shift engineer notified calibration is complete.

_____/_____
I.M. Signature Date

B. PUMP NOT RUNNING

B.1 Have operator lock out RHR pump 1B1-B (2B1-B) using HS-74-20A (ensure other train is operable).

_____
Performed By, Operator

B.2 At 480V Reactor MOV Bd 1B1-B (2B1-B) have ASE rotate XS-74-24 to the auxiliary position, and HS-74-24C to the close position.

_____
Performed by ASE

B.3 Inform the unit operator that the mini flow alarm may be actuated when the following jumper is installed. Install a temporary jumper between terminals 14EX1 and 14E06 in JB1105[1] (1107) to simulate pump running status.

_____ _____
Performed By Verified By

B.4 Verify calibration of FIS-74-24 and associated low flow alarm actuation as per the loop calibration sheet. (NOTE: To verify the high flow setpoint check contact closure across terminals 14E04 and 14EC2 in JB 1105 (1107)).

B.5 When the calibration is complete, remove the jumper installed in step B.2.

_____ _____
Performed By Verified By

[1]JB1105 located at column uA5, elevation 653; JB1107 at column uA11, elevation 653.

B.6 Have ASE return XS-74- 24 and HS-74- 24C to their proper positions.

_____ _____/_____
Performed By, ASE Date

B.7 Have operator return HS-74- 20A to the P-AUTO (or desired) position.

_____ _____/_____
Performed By, Operator Date

B.8 Hi and Lo Side Isolation Valves open, equalizing valve and all drain valves closed.

_____/____ _____/____
I.M. Date Verified By Date

B.9 Shift engineer notified calibration is complete.

_____/_____
I.M. Signature Date

URGENT

ROUTINE

PWR PROJECTS
CORRESPONDENCE INFORMATION SHEET

SUBJECT SQN- Low flow ALARM (FAR)

ENGR RESPONSIBLE JEW

ACTION NO./REFERENCE P-791 ,

DATE OF DRAFT TO SUPERVISOR 11/2/82

DATE DUE TO LMM 11/3/82

COORDINATED WITH NUC PR (CHS Memo dated 10/26/82)

SPECIFIC INSTRUCTIONS:

MAILING INSTRUCTIONS

Supervisor Approval

Secretary

Date Received

Document Name

NOTES: