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DEC 14 1990

U.S. Nuclear Regulatory Commission
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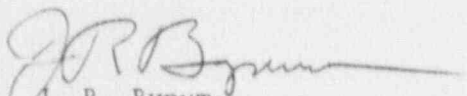
Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 1 - DOCKET NO.
50-327 - FACILITY OPERATING LICENSE DPR-77 - LICENSEE EVENT REPORT (LER)
50-327/90030

The enclosed LER provides details concerning the automatic start of the auxiliary feedwater pumps because of a trip of the 1A main feedwater pump turbine on November 15, 1990. This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as an event that resulted in an automatic actuation of an engineered safety feature.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


J. R. Bynum

Enclosure
cc: See page 2

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U.S. Nuclear Regulatory Commission

DEC 14 1990

cc (Enclosure):

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Sequoyah Nuclear Plant, Unit 1 DOCKET NUMBER (2) | PAGE (3)
050003271005

TITLE (4) Automatic start of the auxiliary feedwater system as a result of a trip of the 1A main feedwater pump turbine

EVENT DAY (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES			DOCKET NUMBER(S)
11	15	90	030	00	11	21	49				050003

OPERATING MODE (9) | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 4:
(Check one or more of the following) (11)

OPERATING MODE (9)	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
POWER LEVEL (10)	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
<u>C. H. Whittmore, Compliance Licensing</u>	<u>615843-7210</u>

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
A	4	6	R L Y W	120 N					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/>	<input checked="" type="checkbox"/>				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines)

(16)
On November 15, 1990, at 0435 Eastern standard time (EST) with Unit 1 in Mode 1, an automatic start of the Unit 1 auxiliary feedwater pumps (AFWP) occurred. Two hours earlier a loss of the nonvital 120-volt alternating current preferred power board No. 1 occurred. Upon the loss of the preferred power board, the main feedwater pumps' control circuits transferred from their initial oil supply (the main oil pump [MOP] No. 1) to its alternate supply (i.e., the No. 2 MOP). This secondary alignment resulted in an abnormal alignment alarm. When the operators rotated the oil pump control switch to correctly indicate which pump was running, the No. 2 oil pump unexpectedly tripped. The No. 1 oil pump started after a five second delay, as designed; however, the loss in control oil pressure resulted in a trip of the 1A main feedwater pump turbine (MFPT). The loss of one MFPT at 80 percent power or greater will automatically initiate the start of the auxiliary feedwater pumps. The systems and components required to actuate as a result of the event functioned as required. The root cause of the event has been attributed to a faulty mechanical latch on the operating coil of the relay for No. 2 MOP. The Operations personnel recovered from the event, and the relay was replaced.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Sequoyah Nuclear Plant Unit 1	0500032790	03	0	0	0	2 OF 5

TEXT (If more space is required, use additional NRC Form 366A's) (17)

DESCRIPTION OF EVENT

On November 15, 1990, at 0435 Eastern standard time (EST) with Unit 1 in Mode 1 (97 percent power, 2,235 pounds per square inch gauge, and 578 degrees Fahrenheit), an automatic start of the Unit 1 auxiliary feedwater pumps (AFWPs) (EISS Code BA) occurred.

Two hours earlier at 0230 EST, a loss of the nonvital 120-volt alternating current preferred power board No. 1 occurred resulting in a mild secondary transient. The moisture separator reheater heating steam control valves failed closed as a result of the board deenergization. The resulting loss of efficiency caused turbine load to decrease by approximately 3 percent and a slight change in condensate/feedwater flows. Main control board alarms and transfer of power of affected components to alternate power supplies occurred from the loss of the board. The unit operator began recovering from the loss of power and clearing the alarms. One abnormal alignment that existed was a main feedwater pump "Reserve Oil Pump Running" alarm (EISS Code ALM). This alarm resulted from the startup of the standby oil pumps on both main feedwater pumps when the preferred power board tripped. Both main feedwater pumps' lube and control oil systems were initially being supplied by the No. 1 main oil pump (MOP). Upon loss of power, both feedwater pump oil systems automatically transferred to the alternate supply (i.e., the No. 2 MOP).

At the time of the trip, the control switch on each main feedwater control panel was in the "Start 1 Stop 2" pump position. Operations' personnel reviewed the annunciator response and system drawings and concluded that the oil pump control switch for each main feedwater pump should be rotated to the "Start 2 Stop 1" position. This action would clear the "Reserve Oil Pump Running" alarm. The control switch for main feedwater pump 1A oil pumps was rotated to the desired position, and unexpectedly, the No. 2 oil pump tripped. The No. 1 oil pump started after a delay of five seconds, as designed. However, the drop in oil pressure during this delay resulted in a trip of the 1A main feedwater pump turbine (MFPT) on low oil pressure. The loss of one MFPT at 80 percent power or greater will automatically initiate the start of the auxiliary feedwater pumps. Operations' personnel responded to the event using Abnormal Operating Instruction 16, "Loss of Normal Feedwater." The main turbine ran back automatically to approximately 65 percent of rated load. Operators stabilized the unit load at 60 percent of rated load to ensure that the capability of the remaining feedwater pump was not exceeded. The systems and components that were required to actuate as a result of the event functioned as required. Troubleshooting revealed the No. 2 MOP tripped because of a faulty mechanical latch on the operator coil of the operate/reset relay (86A2) (EISS Code RLY). (see Attachment)

CAUSE OF EVENT

The cause of the MFP trip and subsequent start of AFW was a faulty mechanical latch on the operator coil of the relay for MOP 2 and is considered as an unforeseen failure.

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Sequoyah Nuclear Plant Unit 1	05000327	90	030	00	03	05

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Initially both main feed pumps were supplied oil by MOP 1 (MOP 2 was in standby). Power to MOP 1 is supplied by preferred power board No. 1 through Panel 1-M-7, and upon loss of the preferred power board No. 1, the reserve pump (i.e., MOP 2) was automatically started, and MOP 1 stopped resulting in a reserve oil pump running alarm.

To clear the alarm, the control switch was rotated to the "Start 2 Stop 1" position. The MFPT 1A tripped when this action was taken. The MOP start circuit has a five-second time-delay relay that prevents the opposite MOP from automatically starting while the selected MOP is trying to establish oil pressure. This time-delay prevented the automatic start of MOP 1 for five seconds after MOP 2 tripped and resulted in the trip of the MFPT 1A on low-oil pressure. Troubleshooting revealed the trip resulted from a faulty mechanical latch on the operate coil of the relay for MOP 2. This coil was energized as long as the control handswitch was in the "Start 1 Stop 2" position, which is an alternate supply path other than the normal operating path. This supply path was removed as soon as the handswitch was rotated to the "Start 2 Stop 1" position.

ANALYSIS OF EVENT

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as an event or condition that resulted in an automatic actuation of an engineered safety feature (ESF). The MFP trip resulted in an auxiliary feedwater pump start as designed and as described in the Updated Final Safety Analysis Report Section 10.4.7.2, "Auxiliary Feedwater System." The auxiliary feedwater pumps are designed to start upon loss of normal feedwater to steam generators and maintain water level in the steam generators to remove residual heat from the reactor coolant system (RCS) to prevent overpressurization of RCS or loss of water from the reactor core. All three auxiliary feedwater pumps also start on a MFWP trip with a plant load of 80 percent power or greater. If loss of main feedwater to steam generators occurred during power operations, the ESF actuation would have functioned as designed.

The starting of the auxiliary feedwater pumps did not adversely affect or degrade any safety systems or components. The systems functioned as designed. There was no adverse effect on or danger to the health and safety of the plant or public.

CORRECTIVE ACTION

Immediate corrective action was to replace the faulty relay and functionally test the eight latching relays in the main oil pump's circuits of the MFPTs (1A, 1B, 2A, and 2B) to ensure that switching activities and MOP startups can be accomplished as designed.

TVA considers this event to have been an isolated case caused by an unforeseen component failure and no further corrective action is necessary.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Sequoyah Nuclear Plant Unit 1	0500327	90	030	00	04	05

TEXT (If more space is required, use additional NRC Form 366A's) (17)

COMMITMENTS

None.

ADDITIONAL INFORMATION

A review of LERs has revealed four instances where an ESF actuation resulted from MFPT trips. These events were reported in LERs 50-328/84009, 50-327/85030, 50-327/88044, and 50-327/90009. No instances were identified with identical or similar circumstances as this ESF actuation (i.e., failed relay on running oil pumps).

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1) Sequoyah Nuclear Plant Unit 1	DOCKET NUMBER (2) 0500032790	LER NUMBER (6)			PAGE (3) 5 OF 5
		YEAR 03	SEQUENTIAL NUMBER 0	REVISION NUMBER 0	

TEXT (If more space is required, use additional NRC Form 366A's) (17)

ATTACHMENT

