

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Sequoyah, Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 2 8 1	PAGE (3) 1 OF 0 4
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TITLE
Voluntary Report Concerning Check Valves Used As Containment Isolation Valves In A Raw Water System Did Not Pass Leak Rate Test Due To Improper Application Of Valve Usage

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)					
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES			DOCKET NUMBER(S)		
0 4	2 2	8 8	8 8	0 2 0	0 0	0 5	2 4	8 8				0 5 0 0 0		
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OPERATING MODE (9) 5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §. (Check one or more of the following) (11)									
POWER LEVEL (10) 0 0 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)						
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(a)(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(a)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input checked="" 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)(ix)	73.71							

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER	
NAME K. E. Meade, Plant Operations Review Staff		AREA CODE 6 1 5	8 7 0 - 1 6 1 2 5 0

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)		
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)			<input checked="" type="checkbox"/> NO		

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)

This LER is being reported as a voluntary report to inform NRC of a problem which has generic ramifications to the rest of the industry concerning check valves being used as containment isolation valves in raw water systems.

On April 22, 1988, at approximately 0700 EDT with units 1 and 2 in mode 5 (0 percent power, 4 psig, 127 degrees F and 0 percent power, atmospheric pressure, 119 degrees F, respectively), the essential raw cooling water (ERCW) containment isolation valves (CIVs) 2-67-562A and 2-67-562C did not pass the Surveillance Instruction (SI)-158.1, "Containment Isolation Valve Leak Rate Test," test. These CIVs are check valves on the inboard side of the ERCW piping to the lower compartment coolers groups. The leakage measured from each of the valves was 507.9 standard cubic feet per hour (SCFH). The allowable leakage for all the testable penetrations in accordance with Technical Specification (TS) 3.6.1.2 is 135.1 SCFH.

The subject components were cleaned, and SI-158.1 was reperformed with acceptable results. This event was caused by sediment collecting on the seating surface of the subject valves. This prevented the valves from backseating and forming a tight seal. An additional root cause of the event is that swing check valves are not effective in raw water systems when low leakage rates are required. These type of check valves have an industry history of not passing leakage rate tests. In order to prevent recurrence of this event, two actions will be initiated. The short-term action involves ensuring the valves to the lower compartment coolers remain full open in order to maintain sufficient flow through the check valves to help prevent buildup of foreign material on the seating surface of the valves. The long-term action will be the replacement of the ERCW containment isolation check valves with motor-operated butterfly valves.

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TEXT (If more space is required, use additional NRC Form 305A's) (17)

This LER is being reported as a voluntary report to inform NRC of a problem which has generic ramifications to the rest of the industry concerning check valves being used as containment isolation valves in raw water systems.

DESCRIPTION OF EVENT

On April 22, 1988, at approximately 0700 EDT with units 1 and 2 in mode 5 (0 percent power, 4 psig, 127 degrees F and 0 percent power, atmospheric pressure, 119 degrees F, respectively), the essential raw cooling water (ERCW) (EIIS Code KI) containment isolation valves (CIVs) 2-67-562A and 2-67-562C did not pass the Surveillance Instruction (SI)-158.1, "Containment Isolation Valve Leak Rate Test," test. These CIVs are check valves on the inboard side of the ERCW piping to the lower compartment coolers groups (EIIS Code VA). The leakage measured from each of the valves was 507.9 standard cubic feet per hour (SCFH). The allowable leakage for all the testable penetrations per Technical Specification (TS) 3.6.1.2 is 135.1 SCFH.

SI-166.23, "Essential Raw Cooling Water Check Valve Test During Cold Shutdown," is required to be performed by TS 4.0.5, the ASME Section XI TS, if the unit enters mode 5 for longer than 48 hours and the valves had not been tested in the last 92 days. This test ensures that normally open check valves will fulfill their safety-related function by performing this backseat test. If the SI-166.23 does not pass, a SI-158.1 leak rate test is performed. The subject valves did not pass either SI. Work Requests B200046 and B200047 were initiated to repair the valves. The valves were discovered to have a buildup of a mud-like substance on the seating surface of the valves. This prevented the valves from fully seating. The subject components were cleaned, and SI-158.1 was reperformed with acceptable results.

No TSs were entered as containment integrity (TS 3.6.1.1), and containment leakage rates (TS 3.6.1.2) are only applicable in modes 1, 2, 3, and 4. This condition also affects unit 1 as the same type of check valves are used in the same application in that unit.

CAUSE OF EVENT

This event was caused by sediment collecting on the seating surface of the subject valves. This prevented the valves from backseating and forming a tight seal.

The root cause of this event was allowing stagnant or low ERCW flow conditions to exist at the valves. This allowed suspended solids to settle out on the valve intervals and prevent the valve from performing its design intended function.

An additional root cause of the event is that swing check valves are not effective in raw water systems when low leakage rates are required. These type of check valves have an industry history of not passing leakage rate tests.

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

ANALYSIS OF EVENT

This LER is being reported as a voluntary report to inform NRC of a problem which has generic ramifications to the rest of the industry.

The check valves (2-67-562A and 2-62-562C) are inboard CIVs in the lower compartment cooler group ERCW line. These valves are part of the double isolation design required by General Design Criteria 56. A motor-operated flow control valve serves as the outboard CIV. The check valves were tested while the plant was in mode 5. Since there is no evidence indicating the valves did not function properly in modes 3 and 4, it was determined that the condition occurred in mode 5. This is supported by the fact that this ERCW line also supplies cooling to the control rod drive mechanism coolers and reactor coolant pump (RCP) motor coolers as well as the lower compartment coolers. The coolant capacity for the RCP motors and containment is greatly reduced in mode 5, thus, less flow is necessary and a greater possibility of sediment building up on the seating surface of the valves. TSs 3.6.1.1 and 3.6.1.2 involving containment integrity and containment leak rates, respectively, are applicable in modes 1, 2, 3, and 4 only. Hence, no TSs were entered for this event.

Had the plant been in a higher mode of operation and this condition was discovered, the subject outboard CIVs would have been deactivated and secured in the isolated position in order to reestablish containment integrity. This would have placed the plant in TS Limiting Condition for Operation (LCO) 3.6.2.2.b on lower containment coolers. This action requires the plant to reestablish the train of coolers within 72 hours or be in hot standby within the next 6 hours. However, the deactivated secured valve would have performed the containment isolation function.

CORRECTIVE ACTIONS

Once it was determined the subject check valves did not pass the SI-158.1 leak rate test, Work Requests B200046 and B200047 were initiated to repair the subject valves. The components were cleaned, and a subsequent SI-158.1 leak test was performed with acceptable results.

In order to prevent recurrence of this event, two actions will be initiated. The short-term action involves ensuring the valves to the lower compartment coolers remain full open in order to maintain sufficient flow through the check valves to help prevent buildup of foreign material on the seating surface of the valves. System Operating Instruction (SOI)-30.3, "Containment Upper and Lower Cooling, Heating and Ventilation System," and Operations Section Letter Administrative (OSLA)-99, "Assistant Unit Operator (AUO) Duty Locations and Responsibilities," have been revised to ensure the required flow is maintained through the remainder of this fuel cycle. The long-term action will be the replacement of the ERCW containment isolation check valves with motor-operated butterfly valves. This action will be completed before unit 2 restarts from the next refueling outage. The unit 1 valves will be replaced before the subject unit enters mode 4.

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

ADDITIONAL INFORMATION

The subject check valves are swing check valves manufactured by Atwood & Morrill Co.

COMMITMENTS

1. Replace the unit 2 ERCW CIV check valves in the lower compartment cooler line before unit 2 restarts from the next refueling outage.
2. Replace the unit 1 ERCW CIV check valves in the lower compartment cooler line before unit 1 enters mode 4.

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TENNESSEE VALLEY AUTHORITY
Sequoyah Nuclear Plant
Post Office Box 2000
Soddy-Daisy, Tennessee 37379

May 24, 1988

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 2 - DOCKET NO.
50-328 - FACILITY OPERATING LICENSE DPR-79 - REPORTABLE OCCURRENCE REPORT
SQRO-50-328/88020

The enclosed licensee event report is a voluntary report which provides details concerning check valves used as containment isolation valves in a raw water system.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


S. J. Smith
Plant Manager

Enclosure
cc (Enclosure):

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