

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) McGuire Nuclear Station - Unit 1 DOCKET NUMBER (2) 0 5 0 0 0 3 6 9 PAGE (3) 1 OF 0 3

TITLE (4) Valve Drift to Closed Position

EVENT DATE (6)			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)
07	23	84	84	023	000	08	22	84			05000
											05000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

OPERATING MODE (9) 1	20.402(b)	20.406(c)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 100	20.406(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
	20.406(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)
	20.406(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME: Scott Gewehr - Licensing TELEPHONE NUMBER: 7104 3731-7581

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
B	S J	V	B 3 5 0	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15)

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

At 6:00 a.m. on July 23, 1984, Unit 1 tripped from 100% power on a lo-lo Steam Generator Level indication. A solenoid valve in the feed water system failed, allowing hydraulic fluid to leak past; thus causing the associated containment isolation valve to drift closed.

The resultant transient was controlled properly, with no safety injection, abnormal release of radioactivity, or abnormal reactor coolant leakage.

Corrective action to date includes addition of a chart recorder to the feedwater valves' hydraulic pump motor, to detect abnormal hydraulic fluid makeup requirements. The failure of the solenoid valve is being investigated by Duke and the valve manufacturer.

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		8 4	0 2 3	0 0	0 2	OF	0 3

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

EVENT DESCRIPTION

Unit 1 tripped on lo-lo Steam Generator level on July 23 at 6:02 a.m. A Steam Generator Feedwater Isolation Valve failed closed, causing a lo-lo level indication. The isolation valve closed because a failed solenoid valve allowed hydraulic fluid to leak, and close the isolation valve.

The mechanics of the solenoid valve are such that the valve is held closed by hydraulic fluid (which is under pressure from the nitrogen accumulator) pressing a ball bearing into a plastic seat with about 3000 psig pressure. This results in a deformation of the plastic seat. The valve opens when the solenoid actuates a plunger assembly, which pushes through the plastic seat to act on the ball bearing in the opposite direction from the hydraulic pressure. In this incident, the amount of deformation of the plastic seat exceeded the distance that the ball bearing-plunger assembly could travel in the "close" direction. As a result, the ball bearing could not seat properly against the plastic; this allowed hydraulic fluid to leak into the valve pilot lines. The pilot lines go to pilot check valves PCV1 and PCV2. When the pressure in the pilot line reached approximately 300 psig, PCV2 opened and started dumping hydraulic fluid to the reservoir. This hydraulic fluid was the same fluid holding the isolation valve open. The pressure switch PS3 sensed the pressure drop and started the hydraulic pump motor to increase the open pressure. Pilot pressure continued to build in the pilot lines from the leaking solenoid valve. When the pressure reached approximately 1000 psig, check valve PCV1 opened.

After check valve PCV1 opened, the hydraulic fluid was forced to the close side of the cylinder. Pressure switch PS2 sensed a pressure loss and caused solenoid valve SV2 to move to the charging position. At this point all of the hydraulic fluid was being used to charge the accumulator and close ICF-28AB instead of holding the valve open. This caused the valve to drift closed.

ANALYSIS AND CORRECTIVE ACTION

This failure probably did not occur immediately. The hydraulic pump probably cycled on and off several times and was able to overcome the pressure losses due to the small leaks. The cycling increased as the check valves gradually opened instead of popping open. If monitoring equipment had been installed, the problem may have been discovered before the isolation valve started to close. It was also determined that it was harmful to cycle the hydraulics of the valve when the valve is closed. The solenoid valves plunger was adjusted back far enough to allow the bearing to seat properly; however, this will not prevent the plastic seat from deforming further. A solution to this problem may be identified in the analysis being performed by Duke and the valve manufacturer. A modification has been initiated which will monitor the feedwater valves' hydraulic pump cycle and run time, and alarm at the appropriate time. Until that modification is complete, a chart recorder will monitor the pump run time. The recorder will be checked daily. Another modification will block the cycling of the hydraulic system when the valve is closed.

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

TRANSIENT ANALYSIS

Reactivity was properly controlled by the reactor trip, as the control rods inserted into the core. Pressurizer pressure response was normal after control was placed in manual. Pressure was controlled at approximately 2245 psig 30 minutes after reactor trip. The pressurizer PORVs or code safety valves did not lift during the transient.

Pressurizer level response was as it should be for a reactor trip. Level remained above the low-low setpoint of 17% at all times and settled out at the no-load target value of 25% ( $\pm 5\%$ ).

NC temperature response was normal for a reactor trip with forced circulation available. NC temperature converged to the no-load temperature of 557°F ( $\pm 5^\circ\text{F}$ ) following reactor trip.

The condenser dump valves relieved steam pressure following reactor trip. Steam generator PORVs SV7 (S/G C) and SV1 (S/G D) also lifted, although only the D loop relieved steam, as the A and C PORVs were isolated when the transient occurred. The atmospheric dump valves did not lift; neither did the main steam safety valves.

A spike in feedwater flow for Loop A following reactor trip was noted. Other than this, main feedwater flow response was normal. Feedwater was automatically isolated shortly after reactor trip on low Tave. The main feedwater pumps then tripped on high discharge pressure.

Auxiliary feedwater was automatically initiated following CF pump trip. Both motor-driven pumps and the single turbine-driven pump started. Post-trip control of auxiliary feedwater was good. Level never encountered the post-trip low-low level setpoint of 12%, and was recovered to the no-load target of 38% ( $\pm 5\%$ ) within 30 minutes after the trip.

Main steam flow response was normal for a reactor trip, as the flow dropped to near zero.

No safety injection actuation occurred during this event. Letdown was not isolated. Indication pressurizer and steam generator levels remained on scale. The primary temperature decrease was within the Technical Specification limits. There was no abnormal release of radioactivity during this event, and no abnormal reactor coolant leakage.

DUKE POWER COMPANY

P.O. BOX 33189  
CHARLOTTE, N.C. 28242

HAL B. TUCKER  
VICE PRESIDENT  
NUCLEAR PRODUCTION

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August 22, 1984

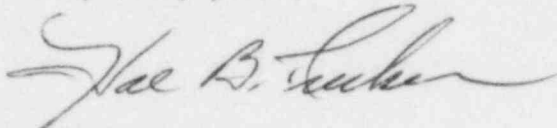
Document Control Desk  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Subject: McGuire Nuclear Station, Unit 1  
Docket No. 50-369  
LER 369/84-23

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 369/84-23 concerning a containment isolation valve which drifted closed which is submitted in accordance with §50.73(a)(2)(iv). Initial notification of this event was made pursuant to §50.72 Section (b)(2)(ii) with the NRC Operations Center via the ENS on July 22, 1984. This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,



Hal B. Tucker

SAG:glb

Attachment

cc: Mr. James P. O'Reilly  
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