

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 015
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TITLE (4) Unit 1 Unidentified Reactor Coolant System
Leakage in Excess of 1 GPM Due to Leaking Compression Fitting

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)
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OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)									
POWER LEVEL (10) 100	<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"/> 50.35(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)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)						
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input checked="" 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 Julio G. Torre - Licensing	TELEPHONE NUMBER AREA CODE: 7 0 4 3 7 3 - 8 0 2 9

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	
X	A B	P S F	P O 7 0	N						
X	A B	L T	B O 8 0	Y						

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<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)

On April 15, 1986, at 0120, a high makeup rate to the Volume Control Tank (VCT) indicated the presence of unidentified Reactor Coolant (NC) System leakage. Immediately, an NC System leakage calculation was performed, and the rate of leakage was determined to be 9 gpm. During the subsequent investigation, the source of the unidentified NC system leakage was determined to be a 1/2 inch straight union tubing compression fitting and a 1/2 inch elbow tubing compression fitting on the same impulse line to pressurizer (PZR) level transmitter INCLT-5160. The PZR impulse lines were isolated, and both compression fittings were replaced by 1755. Two NC system leakage calculations were performed, and the NC system leakage was determined to be less than 1 gpm. At 1800, it was determined that level transmitter INCLT-5160 was not operating properly. The level transmitter, which had been damaged by a high differential pressure across the transmitter bellows due to the leakage of the impulse line compression fittings, was replaced on April 16, at 0434. At 0957, Unit 1 entered Mode 1, Power Operation.

Unit 1 was in Mode 1 at 100% power at the time of the discovery.

This event has been attributed to the failure and subsequent leakage of two 1/2 inch tubing compression fittings on PZR level impulse lines. The cause of the compression fittings failures could not be determined. These compression fittings will be replaced with welded fittings at both McGuire Units.

The health and safety of the public were not affected by this incident.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

On April 15, 1986, at 0120, a high makeup rate to the Volume Control Tank (VCT) indicated the presence of unidentified Reactor Coolant (NC) System leakage. Immediately, an NC System leakage calculation was performed, and the rate of leakage was determined to be 9 gpm. During the subsequent investigation, the source of the unidentified NC system leakage was determined to be a 1/2 inch straight union tubing compression fitting and a 1/2 inch elbow tubing compression fitting on the same impulse line to pressurizer (PZR) level transmitter INCLT-5160. The PZR impulse lines were isolated, and both compression fittings were replaced by 1755. Two NC system leakage calculations were performed, and the NC system leakage was determined to be less than 1 gpm. At 1800, it was determined that level transmitter INCLT-5160 was not operating properly. The level transmitter, which had been damaged by a high differential pressure across the transmitter bellows due to the leakage of the impulse line compression fittings, was replaced on April 16, at 0434. At 0957, Unit 1 entered Mode 1, Power Operation.

Unit 1 was in Mode 1 at 100% power at the time of the discovery.

BACKGROUND:

NC system unidentified leakage is limited to 1 gpm by McGuire Nuclear Station Technical Specification 3.4.6.2 which is applicable during unit operation in Modes 1, 2, 3, and 4. With unidentified NC system leakage greater than 1 gpm, the leakage must be reduced to less than 1 gpm within 4 hours or the unit must be in at least Mode 3, Hot Standby, within the next 6 hours or the unit must be in at least Mode 3, Hot Standby, within the next 6 hours and in Mode 5, Cold Shutdown, within the next 30 hours.

PZR level control channels 1, 2, and 3 level transmitters INCLT-5150, 5160, and 5170, respectively, provide signals for use in the reactor control system [EIIS:JD] and the Chemical and Volume Control (NV) [EIIS:CB] system to maintain water level in the PZR within acceptable ranges under all load conditions during operation. Each transmitter provides an independent high water level signal that actuates an alarm, which upon the receipt of two out of three high water level signals will cause a reactor trip. The transmitters also provide independent low water level signals, which upon the receipt of one low water level signal will isolate letdown flow. Each transmitter provides a signal to a level indicator on the main control board. During normal operation, PZR water level is maintained automatically by the reactor control system and NV system.

There is a 3 position switch (PZR Level Control Select) on the control board used to designate PZR level control to channels 1 and 2 (which is normally used), 2 and 3, or 1 and 3. When any PZR water level control channel is removed from service, the PZR Level Control Select switch is set to an alternate position to select 2 operable channels for control action.

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

DESCRIPTION OF EVENT:

On April 14, 1986, at approximately 2155, PZR level control channel 1 failed low causing valve INV-2A (responsible for isolation of regenerative heat exchanger) to automatically close resulting in a loss of letdown flow and an increase in PZR water level. Station personnel changed the PZR Level Control Select switch from PZR level control channels 1 and 2 to channels 2 and 3 to open valve INV-2A for letdown flow. At approximately 2210, the Loss of Letdown, Charging, and Seal Injection procedure was implemented to realign and reestablish letdown flow to reduce the PZR water level to the programmed level. Station personnel then issued a work request to investigate and repair PZR level control channel 1 (level transmitter INCLT-5160). After the PZR level was returned to the programmed level and stabilized, the makeup rate to the VCT continued to be unusually high. On April 15, at 0120, as a result of this high makeup rate, unidentified NC system leakage was suspected. An NC system leakage calculation was then performed and the leakage rate was determined to be 9 gpm. At 0308, appropriate Duke Power personnel entered the containment building in an effort to identify the NC system leakage. PZR level transmitter INCLT-5160 was suspected of leaking but could not be accessed at 100% power operation. Although the level transmitter could not be seen, a leak was heard coming from its vicinity. At 0328, valve INV-1A (located upstream of valve INV-2A) was closed to determine if the leak might be coming from valve INV-2A. The makeup rate of the NV system did not decrease, and it was determined that valve INV-2A was not leaking. At 0440, the Notification of Unusual Event procedure was implemented, and at 0443, unit shutdown to Mode 3, Hot Standby, was initiated. At 0925, Unit 1 entered Mode 3.

At 1030, Station personnel entered the containment building and discovered leakage from a 1/2 inch straight union tubing compression fitting on the impulse line to PZR level transmitter INCLT-5160. At 1328, the appropriate Duke Power personnel entered the containment building and isolated PZR level transmitter INCLT-5160 and associated impulse lines.

At 1415, the containment building was reentered, and the 1/2 inch straight union tubing compression fitting was repaired. While performing these repairs, personnel were required to wear self contained breathing apparatuses (SCBA) for protection from airborne contamination. When the repairs were completed, there was not enough air supply remaining in the SCBAs to allow time to valve in the impulse line before personnel exited containment. At 1441, an NC system leakage calculation was performed, and the unidentified NC system leakage was determined to be less than 1 gpm.

At 1512, the impulse line to PZR level transmitter INCLT-5160 was valved in. At this time, a 1/2 inch elbow tubing compression fitting was also discovered to be leaking on the same PZR impulse line, and the impulse line was isolated for a second time. At 1630, personnel entered the containment building and repaired the 1/2 inch elbow tubing compression fitting. The impulse lines and PZR level transmitter INCLT-5160 were then valved in and both tubing compression fittings were verified not to be leaking.

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At approximately 1800, the PZR Level Control Select switch was changed to PZR level control channel 1 but it failed low. At approximately 1830, a new transmitter was calibrated to replace PZR level transmitter INCLT-5160. At 2009, two NC system leakage calculations were performed and the unidentified NC system leakage was determined to be less than 1 gpm. At 2310, the PZR level transmitter was being replaced in the containment building. While replacing the transmitter, a wiring connector broke, so all personnel exited the containment building at 0056 on April 16, to obtain a new wiring connector. At 0434, on April 16, replacement of PZR level transmitter INCLT-5160 was resumed. After the level transmitter was replaced, the PZR Level Control Select switch was changed from PZR level control channels 2 and 3 to channels 1 and 2 and was determined to be operating properly. Unit startup began at this time.

At 0957, Unit 1 entered Mode 1, Power Operation.

CONCLUSION:

The source of the unidentified NC system leakage was a 1/2 inch straight union tubing compression fitting and a 1/2 inch elbow tubing compression fitting on the impulse lines to PZR level transmitter INCLT-5160. The impulse lines were isolated and Duke Power personnel replaced both impulse line compression fittings. The compression fittings were verified not to be leaking after the impulse lines were valved in. Two NC system leakage calculations were also performed and verified that NC system leakage was less than 1 gpm. At this time, it was determined that PZR level control channel 1 still failed low. This indicated that level transmitter INCLT-5160 was not operating properly. The damaged level transmitter was then replaced.

This incident has been attributed to the failure and subsequent leakage of two 1/2 inch tubing compression fittings manufactured by the Parker Hannifin Corporation on the PZR level impulse lines. The cause of the compression fittings failures could not be determined. PZR level transmitter INCLT-5160 was damaged by a high differential pressure across the transmitter bellows due to the leakage of the impulse line compression fittings. This level transmitter was manufactured by the Barton Instrument Division of ITT.

A review of past incident reports revealed that 12 incidents involving unidentified NC system leakage have occurred at McGuire Nuclear Station. However, leaking impulse line compression fittings have not been involved in any of the previous incidents. Therefore, this is considered an isolated event.

There were no personnel injuries, radiation overexposures, or releases of radioactive materials as a result of this incident.

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

CORRECTIVE ACTIONS:

Subsequent:

- 1) Unit shutdown to Mode 3, Hot Standby, was initiated to investigate PZR level transmitter INCLT-5160 and its associated impulse lines.
- 2) PZR level transmitter INCLT-5160 and its associated impulse lines were isolated.
- 3) Two 1/2 inch impulse line compression fittings were replaced.
- 4) PZR level transmitter INCLT-5160 was replaced.

Planned:

- 1) Units 1 and 2 PZR pressure and level instrumentation impulse line compression fittings will be replaced with welded fittings.

SAFETY ANALYSIS:

When the unidentified NC system leakage occurred, one operating NV charging pump continued to supply makeup water to the NC system as designed. Letdown flow was isolated and PZR water level started increasing. When valve LNV-2A closed isolating letdown flow, PZR water level started increasing. If valve LNV-2A could not have been opened and PZR water level had continued to increase, an annunciator (PZR HI ALARM) would have alarmed on the control board when PZR water level reached 70%. If PZR water level had continued to increase and reached 92%, a reactor trip would have occurred. Pressurizer pressure and water level were maintained within the acceptable program range throughout the incident.

The leakage was in the reactor building where the containment floor and equipment sumps collect liquid waste. It was then pumped to the Liquid Waste system for processing.

The health and safety of the public were not affected by this incident.

DUKE POWER COMPANY

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CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

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May 15, 1986

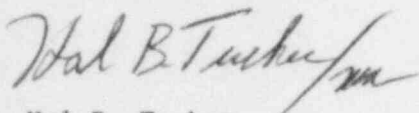
Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: McGuire Nuclear Station, Unit 1
Docket No. 50-369
LER 369-86-08

Gentlemen:

Pursuant to 10 CFR 50.73 Section (a)(2)(i), attached is Licensee Event Report 369-86-08 concerning McGuire Unit 1 Reactor Coolant System Leakage in Excess of 1 gpm Due to Leaking Compression Fittings. 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

JGT/jgm

Attachment

xc: Dr. J. Nelson Grace
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