NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
McGuire Nuclear Station, Unit 2	0 5 0 0 0 3 7 0	1 OF 0 3

TITLE (4)
Reactor Coolant System Sight Glass Failure

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 8	2 0	8 4	8 4	0 1 9	0 0	0 9	1 9	8 4		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	3	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	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Phillip B. Nardoci, Licensing Engineer	AREA CODE 7 0 4 3 7 3 - 7 4 3 2

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	
X	B P	V	K 0 8 5	N							
B	A B	X I	J 0 0 1	N							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

On August 20, 1984, during the filling and venting of the Upper Head Injection (UHI) system, the reactor vessel head vent sight glass failed, releasing Reactor Coolant (NC) system water into the containment building. The sight glass failed when reactor coolant water, at a temperature and pressure greater than the design limit of the sight glass, leaked by the UHI Line High Point Vent valve and flowed through the sight glass. Approximately 1000 gallons of primary coolant leaked through the damaged sight glass into lower containment. An unusual event was declared, and the unit was reduced to Mode 4. The leaking sight glass was isolated after four hours. Unit 2 was in Mode 3 at the time of the incident.

This event is attributed to Design Deficiency because the sight glass was not designed to withstand a high enough temperature and pressure. A Component Failure also contributed to the event because the UHI line high point vent valve did not fully seat when a nominal amount of torque was applied.

The sight glass was replaced and the unit returned to Mode 3. Electrical equipment near the leak was inspected with no problems found. Duke Power will evaluate replacing the sight glass with one that has higher temperature and pressure limits, and procedures will be revised. The leak was well within the capacity for makeup by the charging pumps, and no radioactive fluids were released to the environment.

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

On August 20, 1984, during the filling and venting of the Upper Head Injection (UHI) (EIIS:BP) system, the reactor vessel head vent sight glass (EIIS:XI) failed (at 0716 hours), releasing Reactor Coolant (NC) (EIIS:AB) system water into the containment building. The sight glass failed when reactor coolant water, at a temperature and pressure greater than the design limit of the sight glass, leaked by UHI Line High Point Vent valve (EIIS:V) 2NI-341 and flowed through the sight glass. Approximately 1000 gallons of primary coolant leaked through the damaged sight glass into lower containment. Unit 2 was in Mode 3 at the time of the incident.

The event is attributed to Design Deficiency because the sight glass was not designed to withstand a high enough temperature and pressure. A Component Failure also contributed to the event because valve 2NI-341 did not fully seat when a nominal amount of torque was applied.

The sight glass (Jacoby Tarbox type XX37N) design limits are as follows: Teflon rotor-450°F; Neophrene gasket-180°F; Stainless steel housing-800°F; Glass-850°F at 100 psig. The UHI injection lines on the reactor vessel head are vented per procedure "Filling and venting the reactor coolant system". During this venting on August 19, 1984, valve 2NI-341 was manually opened and then closed, but did not fully seat when closed. 2NI-341 is a Kerotest valve with internals that are easily damaged when they are overtorqued. To prevent seat damage, operators are trained to close the valves handtight, as was the case for 2NI-341.

After the NC system pressure exceeds 1600 psig, the UHI accumulator discharge lines are vented per the procedure "Upper Head Injection". Three UHI system vent isolation valves are opened, and then the UHI accumulator discharge lines are normally filled with water from the refueling water storage tank (FWST). This water has a temperature range between 70°F and 100°F, and is well within the design limits of the sight glass.

With valve 2NI-341 not fully closed after being cycled on August 19, 1984, a flow path existed from the NC system directly to the pressurizer relief tank (PRT) through the sight glass. The NC system water was at approximately 450°F and 1700 psig. The water was throttled as it flowed through a 0.375" orifice, valve 2NI-341 (which was almost closed), and piping before reaching the sight glass. This decreased the temperature and pressure of the water, but it was still above the design limits for the sight glass. (Note: The pressure of the water at the sight glass could only exceeed 100 psig (PRT rupture disk setpoint) by the pressure drop between the glass and the tank. Therefore, the maximum the pressure at the sight glass could be is 100 psig plus the flow loss pressure drop). Approximately one minute after opening the UHI line vent isolation valves on August 20, 1984, the operators heard a loud blast and a rush of steam. They promptly left containment. An unusual event was declared at 0735 due to an estimated 40 GPM leak inside containment (the leak was calculated later to be approximately 5 GPM), and the unit was reduced to Mode 4 at 1047. Four hours after the break, the leak was isolated (by closing the three UHI vent isolation valves), and 2NI-341 identified as the valve that leaked by.

The sight glass was replaced, and Unit 2 returned to Mode 3 at 1650 the same day. Electrical equipment that was close to the leak was inspected for evidence of possible degradation and meggered (tested for grounds or electrical shorts). No degradation was found. The alarm typer printout was reviewed for equipment problems due to high

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

humidity (such as high temperature or fire alarms). No alarms were found.

Unit two's sight glass has experienced one previous failure. Unit one's sight glass has experienced five failures. Three of the unit one failures occurred while filling and venting the UHI and NC system during plant startup. The other unit one failures were discovered while the plant was shutdown. The other unit two failure was discovered prior to plant operation. During venting of the UNI injection lines, the NC system water is at approximately 50 psig and can be up to 200°F. NC water will be cooled some (as it passes through the vent piping), but it may be close to the design temperature limit of the neophrene gasket of 180°F. This may be a contributing factor to some of the previous sight glass failures.

Duke Power Company will evaluate replacing the Unit 1 and 2 sight glasses with ones that have higher temperature and pressure limits. A procedure change will be made to Unit 1 and 2 operating procedures to have personnel monitor the temperature of the vent piping while venting the UHI lines.

Although the broken sight glass posed a burn and contamination hazard for personnel working in containment, no one was actually injured or contaminated. The leak was well within the capacity for makeup by the charging pumps (EIIS:P) and posed no hazard to reactor core cooling. No radioactive fluids were released to the environment, and the health and safety of the public were not affected.

DUKE POWER COMPANY
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HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

September 19, 1984

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

Subject: McGuire Nuclear Station, Unit 2
Docket No. 50-370
LER 370/84-19

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 370/84-19 concerning a reactor coolant system sight glass failure which is submitted in accordance with §50.73 (a)(2)(v)/(vi). Initial notification of this event was made (pursuant to §50.72 Section (a)(3)) with the NRC Operations Center via the ENS on August 20, 1984, and an unusual event was declared. This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

H.B. Tucker /BW

Hal B. Tucker

PBN/mjf

Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
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Atlanta, Georgia 30323

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cc: Mr. W. T. Orders
NRC Resident Inspector
McGuire Nuclear Station

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