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 1	0 5 0 0 0 3 6 9	1 OF 0 3

TITLE (4)

Postulated Overpressurization of Component Cooling Water Surge Tank

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 7	1 2	8 4	8 4	0 2 5	0 0	1 1	0 9	8 4	MNS - Unit 2	0 5 0 0 0 3 7 0
										0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	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
	AREA CODE
Scott Gewehr - Licensing	7 0 4 3 7 3 - 7 5 8 1

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	

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 July 12, 1984, Westinghouse Electric Corporation (W) reported, under the criteria of 10CFR 21, a design deficiency associated with the component cooling water (KC) system. This deficiency involves a potential overpressurization of the KC surge tank, in the event of a tube rupture in the reactor coolant pump thermal barrier heat exchanger. In this event, the tank vent would isolate on high radiation, and the large difference between the inleakage to the KC system and the relief capability of the surge tank relief valve could lead to tank overpressurization and possible rupture, with consequences involving loss of cooling to, and subsequent failure of, equipment required to achieve and maintain safe shutdown. Temporary corrective actions, while permanent additional relief capacity is designed and implemented, consists of the partial removal of manway covers of each KC surge tank, to provide relief capacity equivalent to a 6 inch line.

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Westinghouse has identified a design deficiency in the component cooling water (KC) system with respect to the possible overpressurization and rupture of the KC surge tank. This item was reported to NRC under 10 CFR21 as a Substantial Safety Hazard on July 12, 1984, and Duke was notified by letter of July 19, 1984 of possible applicability to McGuire and Catawba. This postulated overpressurization has been evaluated for applicability to McGuire, and found to indeed be applicable. A description of the postulated scenario, and the associated safety analysis, are presented below.

The design pressure of the KC system and the KC surge tank are 150 and 15 psig, respectively. The surge tank is normally vented to atmosphere via a one inch vent line. This vent is isolated by a high radiation signal at the discharge of each KC heat exchanger, in order to avoid a radioactive release. A relief valve on the surge tank is set to lift at 10 psig with a relief capacity of 60 gpm. A relief valve on the KC system is set to lift at 150 psig with a relief capacity of approximately 280 gpm.

A scenario utilizing only safety-grade equipment which could potentially result in KC surge tank overpressurization proceeds as follows. The initiating event is a tube rupture in a reactor coolant pump thermal barrier heat exchanger. A worst case inleakage of 260 gpm into the KC system would result. The inleakage of primary coolant would be detected by the KC system radiation monitors and the surge tank vent would be isolated. The insurge would result in a pressure increase and lift the relief valve. Since the inleakage (260 gpm) exceeds the surge tank relief valve capacity (60 gpm), KC surge tank pressure would increase to an equilibrum pressure determined by the KC pump developed head and the combined relief capacity of the surge tank and system relief valves. The resulting pressure is well in excess of the surge tank design pressure, and a failure of the surge tank could result. The rupture of the KC surge tank could lead to a loss of cooling to many safety-related systems and equipment and could impact the capability to achieve and maintain the plant in a safe shutdown condition. Assuming that only safety-grade equipment is available to mitigate the event, this scenario identifies a design deficiency and a need for an increase in the relief capacity of the KC surge tank.

Due to the existence of additional non-safety grade equipment which was incorporated in the design with the intent of mitigating the scenario of concern, the consequences, in a realistic sense, of the initiating failure are much less severe. The additional mitigating equipment detects a reactor coolant pump thermal barrier heat exchanger tube rupture by monitoring KC system flow downstream of the heat exchanger. Should the flowrate increase from the normal value of 40 gpm to 60 gpm, a valve is actuated

to isolate the downstream flowpath. The upstream flowpath includes check valves that would seat in response to the pressure increase due to inleakage in the isolated piping. Pressure would increase until an equilibrium with Reactor Coolant System pressure is reached, thereby terminating inleakage. The KC surge tank would be isolated from the thermal barrier heat exchanger rupture and no pressurization would result. Also, any small ruptures less than 20 gpm (60-40 gpm) that would not result in isolation of the flowpath are well within the relief capacity of the surge tank relief valve. From a realistic perspective there is a high likelihood that the additional non-safety grade equipment available would successfully mitigate the scenario of concern, and that no challenge to the integrity of the KC surge tank would result.

In summary, from a design-basis perspective a design deficiency in the relief capacity of the KC surge tank was identified. However, existing non-safety grade equipment would have detected and mitigated the failure of concern. The integrity of the KC system would have been maintained.

Corrective Actions will include the addition of increased relief capacity for the KC surge tanks. Until those modifications are designed and implemented, relief will be provided by partially removing the manway covers on each KC surge tank, to provide a relief path way equivalent to a 6 inch pipe.

DUKE POWER COMPANY
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HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

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November 9, 1984

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

Subject: McGuire Nuclear Station, Unit 2
Docket No. 50-370
LER 370/84-25

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report 370/84-25 concerning a potential overpressurization of the component cooling water storage tank, which is submitted in accordance with §50.73 (a)(2)(v).

Very truly yours,

Hal B. Tucker

SAG/mjf

Attachment

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