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)
Unit 2 Reactor Trip (Reactor Protection System Actuation) Due to A Feedwater Transient

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 5	1 0	8 4	8 4	0 1 2	0 0	0 6	1 1	8 4		0 5 0 0 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)			
1	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 1 0 0	20.405(a)(1)(i)	50.36(c)(1)	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 3 7 0 — 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	S J	X C V	C 6 3 5	Y							

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 May 10, 1984 a reactor trip (and subsequent turbine trip) occurred at 1252 when steam generator (S/G) C level dropped below the S/G low-low level reactor trip setpoint. The S/G low-low level condition was caused by a main feedwater transient. The feedwater transient was suspected to be the result of D feedwater regulator valve closing abruptly.

Once the transient began, the four feedwater regulator valve controllers were placed in "Manual" to aid operators in the control of S/G levels. An attempt was made to avert a reactor trip by increasing S/G water levels but failed when S/G C reached its low-low level trip setpoint.

Unit 2 was in Mode 1 at 100% power at the time of this event. This event is attributed to Component Malfunction, although the exact cause of D feedwater regulator valve closing abruptly can not be reasonable ascertained.

The reactor tripped as designed, and the auxiliary feedwater pumps started on low-low S/G levels to ensure that the reactor coolant system could be cooled down to less than 350°F. The D feedwater regulator pilot valve stem was cleaned, and the Unit was back on line at approximately 2100 on May 10, 1984.

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

On May 10, 1984 a reactor trip (and subsequent turbine trip) occurred at 1252 when steam generator (S/G) [EIIS:GEN] C level dropped below the S/G low-low level reactor trip setpoint. The S/G low-low level condition was caused by a main feedwater transient. The feedwater transient was suspected to be the result of D feedwater regulator valve [EIIS:V] closing abruptly. Unit 2 was in Mode 1 at 100% Power at the time of this event.

Steam generator upper nozzle tempering flow was being isolated to each S/G, one at a time, to perform the periodic test "Reactor Coolant System Flow Calculation". At 1249, S/G D auxiliary nozzle tempering line was isolated by closing the D S/G CF Temper Isolation valve. At 1250 the main feedwater regulator valve for S/G "D" closed abruptly, and a "S/G D steam flow/feedwater flow mismatch" alarm was received in the control room. The upper nozzles [EIIS:PSP] are not used when feedwater flow is greater than 17% full flow, but are maintained at operating temperature to prevent thermal shock in the event that auxiliary feedwater [EIIS:BA] is needed following a reactor trip and main feedwater [EIIS:SJ] isolation. The tempering flow diverted approximately 150 GPM of feedwater, at operating temperature, to the upper nozzles for preheating purposes. Tempering flow was isolated and should have had little or no effect on main feedwater flow, or feedwater regulator valve setpoint.

With the S/G level control system [EIIS:JB] on automatic control, the feedwater regulator valves respond to match feedwater flow to main steam flow and a predetermined S/G water level for the reactor power level. Once the transient began, the four feedwater regulator valve controllers [EIIS:XC] were placed in "Manual" to aid operators in the control of S/G levels. An attempt was made to avert a reactor trip by increasing S/G water levels but failed when S/G C reached its low-low level trip setpoint [EIIS:JC].

The Auxiliary Feedwater Pumps [EIIS:P] started on two out of four low-low S/G levels to ensure that the reactor coolant system [EIIS:AB] could be cooled down to less than 350°F.

The cause of D feedwater regulator valve (12" pneumatically operated Copes-Vulcan valve) closing abruptly can not be reasonably ascertained. It is suspected that the pilot valve stem temporarily stuck when the supply air was attempting to adjust the feedwater regulator valve toward the closed position. Air pressure built up in the loading bellows. This broke loose the pilot valve stem, causing the feedwater regulator valve to overcompensate to the closed position. The feedwater regulator valve closed abruptly, reducing flow by 25%, resulting in a transient in the feedwater system that the automatic controller could not overcome. The controls repositioned the remaining three feedwater regulator valves in response to the accompanying increase in feedwater header pressure. Oscillations in feed flow, header pressure, and S/G level grew in magnitude until control for the feedwater regulator valves was transfered to manual. Operations personnel placed the system in "Manual" to maintain feedwater/steam/level control, but were unsuccessful in preventing a reactor/turbine trip before the oscillations could be stopped.

The feedwater regulator valve pilot valve [EIIS:XCV], manufactured by Bailey Meter Company, has a history of being sensitive to dirt, oil, and mositure. When dirt is introduced to the pilot valve, it will act as an abrasive and damage the pilot valve stem. The now damaged valve stem, when introduced to more dirt, oil, and moisture will cause the pilot valve to stick or bind.

Replacement parts for the Bailey positioner are no longer available because the present positioner is now obsolete. The D feedwater regulator pilot valve stem was cleaned, and

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

the Unit was back on line at approximately 2100 on May 10, 1984.

Duke Power and Westinghouse are pursuing the replacement of the feedwater regulator positioners. When a new positioner is placed on the feedwater regulator valves a high efficiency air filter [EIIS:FLT] will be considered.

The reactor tripped on low-low steam generator level, followed by the turbine trip. Reactivity was properly controlled by the reactor trip. Pressurizer pressure dropped to a minimum of ~2030 psig and then recovered to its expected no load value of 2235 psig. The pressurizer power operated relief valves and code safety valves were not challenged. Reactor coolant average temperature stabilized at ~558°F, near its expected no load value of 557°F. Pressurizer level responded normally, stabilizing at its expected no load target of 25%.

Steam generator pressure peaked at ~1130 psig. The power operated relief valves on steam generator's A and D opened to help control steam pressure. Pressure stabilized at ~1075 psig. The main steam safety valves were not challenged. Steam generator level was properly controlled post trip. Main feedwater was isolated shortly after the trip, as expected, on reactor trip with coincident low reactor coolant average temperature. Auxiliary feedwater initiated on low-low steam generator level and was used to restore level to its no load target of 38% narrow range.

Engineered Safety Features were not demanded. Pressurizer and steam generator levels remained on-scale. There was no abnormal primary leakage or release of radioactivity as a result of this event. The primary cooldown was within the Technical Specification Limit. The health and safety of the public were not affected by this incident.

DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

June 11, 1984

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

Subject: McGuire Nuclear Station, Unit 2
Docket No. 50-370
LER 370/84-12

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 370/84-12 concerning a Unit 2 reactor trip due to a feedwater transient 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 May 10, 1984. 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

Hal B. Tucker

PBN:glb
Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Records Center
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

Mr. W. T. Orders
NRC Resident Inspector
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