



Duke Energy Corporation

McGuire Nuclear Station
12700 Hagers Ferry Road
Huntersville, NC 28078-9340
(704) 875-4800 OFFICE
(704) 875-4809 FAX

H. B. Barron
Vice President

November 8, 2000

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

Subject: McGuire Nuclear Station, Unit 2
Docket No. 50-370
Licensee Event Report 370/00-01, Revision 0
Problem Investigation Process No. M-00-4132

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report 370/00-01, Revision 0, concerning an inadvertent start of a Turbine Driven Auxiliary Feedwater Pump. This report is being submitted in accordance with 10 CFR 50.73 (a) (2) (iv). The pump started during shutdown conditions with no significant effect on other plant structures, systems or components. This event is expected to have no quantifiable effect on core damage frequency and has no consequences with respect to public health and safety.

This letter and the attached Licensee Event Report do not contain any regulatory commitments.

H. B. Barron, Jr.
Site Vice President
McGuire Nuclear Station
Duke Energy Corporation

MTC

Attachment

cc: L. A. Reyes
U.S. Nuclear Regulatory Commission
Region II

Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30323

F. Rinaldi
U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

INPO Records Center
700 Galleria Parkway
Atlanta, GA 30339
(Sent Electronically)

S. Shaeffer
NRC Resident Inspector
McGuire Nuclear Station

IE22

Electronic Distribution:

Kay L. Crane (MG01RC)
Ronnie B. White (MG01VP)
Braxton L. Peele (MG01VP)
Barbara L. Walsh (EC11C)
Jimmy I. Glenn (MG02ME)
Richard T. Bond (ON03SR)
Gary D. Gilbert (CN01RC)
Gwynn H. Savage (EC06G)
Gregg B. Swindlehurst (EC11-0842)
Charles M. Misenheimer (EC08I)
Ronald F. Cole (EC05N)
Lee Keller (EC05N)
P.M. Abraham (EC08I)
Vickie McGinnis (MG05SE)
Randy Moose (MG01VP)
Mary J. Brown (PB02L)
Alan L. Hinchler (MG01B1)
Patrica H. Cox (NSRB Support) (EC05N)
Robert E. Riegel (MG03MT)
Charles J. Thomas (EC050)
Luellen B. Jones (EC050)
Mike Rains (MG01SR)
William B. Jackson (MG01VP)
Lisa Vaughn (PB05E)
H Duncan Brewer (EC08I)
Larry E Nicholson (ON03RC)

INPO

Paper Distribution:

Master File (3.3.7)
ELL (EC050)
Regulatory Compliance LER File

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) McGuire Nuclear Station, Unit 2	DOCKET NUMBER (2) 05000370	PAGE (3) Page 1 of 6
--	-------------------------------	-------------------------

TITLE (4)
Inadvertent Start of the Turbine Driven Auxiliary Feedwater Pump During Testing

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 NAME	DOCKET NUMBER(S)
10	10	00	00	- 01	- 0	11	08	00		05000

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (Check one or more of the following) (11)									
POWER LEVEL (10)	<input type="checkbox"/>	20.402(b)	<input type="checkbox"/>	20.405(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	<input type="checkbox"/>	73.71(b)		
	<input type="checkbox"/>	20.405(a)(1)(i)	<input type="checkbox"/>	50.36(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)	<input type="checkbox"/>	OTHER (Specify in Abstract below and in Text, NRC Form 366A)		
	<input type="checkbox"/>	20.405(a)(1)(iii)	<input 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							TELEPHONE NUMBER		
M. T. Cash							AREA CODE		
							(704)	875-4117	

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS*	
				No						

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/>	YES (If yes, complete EXPECTED SUBMISSION DATE)						

ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single-space typewritten lines) (16)
Unit Status: Unit 2 was in Mode 3 (Hot Standby) at 0% Rated Thermal Power at the time of occurrence.

Event Description: On October 10, 2000, there was an inadvertent start of the Unit 2 Turbine Driven Auxiliary Feedwater (TDCA) Pump. The start occurred during performance testing of the turbine driven pump. The testing procedure provides for installation of electrical jumpers to prevent the start of the pump during performance of the test. Personnel performing the test failed to correctly install all of the required jumpers. As a result, when the pump switch was placed in the start position, per the test procedure, the pump started and ran for approximately 3 minutes injecting water into all four Steam Generators.

Event Cause: Personnel Error due to Deficient Communications and Inappropriate Procedure Use and Adherence.

Corrective Action: Individualized coaching of the individuals involved on the importance of effective communications and the importance of strict procedure adherence during testing of plant equipment.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

McGuire Nuclear Station, Unit 2

05000 370

00

01

0

2 OF 6

BACKGROUND:

The Auxiliary Feedwater (CA) system [EIIS:BA] provides feedwater in the event of a loss of Main Feedwater (CF) [EIIS:SJ]. The CA system can also be used in normal plant startup and shutdown as main feedwater, when required flow is less than 3 percent maximum designed feedwater flow. The CA system is not required to function during normal plant operation, and is normally aligned in standby readiness to respond to events involving the loss of main feedwater. The CA system provides feedwater to all four steam generators and as such its primary safety function is the removal of decay and residual heat from the reactor coolant system.

The CA system contains 2 motor [EIIS:MO] driven pumps [EIIS:P], 1 turbine [EIIS:TRB] driven (TD) pump and associated piping, valves [EIIS:V] and controls. The TD pump is capable of supplying feedwater to all four steam generators (SGs) [EIIS:SG]. The McGuire Updated Final Safety Analysis Report (UFSAR) and facility Technical Specifications identify the CA system as one of the Engineered Safeguards Systems (ESFs).

The TD pump is powered by a turbine independent of the main electrical generator and main feedwater pump turbines. The steam supply to this turbine flows through two steam lines. These steam lines branch from the main steam lines prior to the main steam isolation valves. This design ensures that the steam supply is not interrupted in the event of a main steam isolation. Each steam supply line to the turbine includes a control valve that opens on a TD CA pump start signal. The valves are piston operated and designated as 2SA-48 from the C steam line and 2SA-49 from the B steam line. Each steam line also contains manual isolation valves designated as 2SA-1, for the C steam line and 2SA-2 for the B steam line. Condensation drain lines with isolation valves (2SA-77 and 2SA-78) are installed between the piston operated valves and the manual isolation valves.

Surveillance Requirements for Technical Specification 3.7.5 (Auxiliary Feedwater System), require that certain tests be performed within 24 hours of reaching a steam pressure of 900 psig in the steam generators. There are four tests included in these surveillances which can typically be completed well within 24 hours of reaching the 900 psig testing pressure.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

McGuire Nuclear Station, Unit 2

05000 370

00

01

0

3 OF 6

EVALUATION:

Description of Event

On October 10, 2000, Unit 2 was in Mode 3 (Hot Standby) returning to service from a refueling outage. Operations Test Group (OTG) personnel were performing procedure PT/2/A/4252/007, CA System Turbine Driven Train Performance Test. This procedure is required to be performed within 24 hours of reaching 900 psig steam pressure in the Steam Generators.

Sections 12.6 and 12.7 of this procedure verify that the isolation valves¹ prevent steam flow to the turbine while opening the piston operated control valves.² Section 12.6 addresses opening 2SA-48 and Section 12.7 addresses opening 2SA-49. Each piston operated valve is isolated from steam flow and then actuated from the control room in order to test the isolation capability of the respective upstream manual isolation valve.

Sections 12.6 and 12.7 require installation and removal of six jumpers of which four are switch jumpers. By proper configuration of the jumpers, the piston operated valves can be opened individually, thus ensuring the opposite piston operated valve remains closed in order to prevent introduction of steam to the turbine.

Sequence Of Events

10/10/2000
1845 hours

Step 12.6.16 directed OTG personnel performing the procedure to remove the two jumpers without switches that had been installed in step 12.6.8. Step 12.6.16 was performed exactly as written. Step 12.6.17 directed that the switches be opened on the four jumpers with switches. This step was performed as written. Step 12.6.18 directed the removal of these four switch jumpers. Since the switches had been opened in 12.6.17, accomplishing the same functional purpose as removal, step 12.6.18 was signed off as complete indicating "intent of step met". The next section of the procedure requires re-installation of the same four jumpers.

2SA-1, 2SA-2, 2SA-77, and 2SA-78
2SA-48 and 2SA-49

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		00	01	0	
McGuire Nuclear Station, Unit 2	05000 370				4 OF 6

Operations work practices permit signing off steps as "having met the intent" of the procedure. For example, if a procedure directs a valve be closed that is already closed the step can be signed off as complete.

1900 hours

The OTG technical specialist directing the performance of the test was relieved in the control room by the OTG supervisor. The two field technicians remained on the job.

During turnover the OTG supervisor asked about the status of the jumpers. The OTG supervisor's intention was to check on the status of all six jumpers. The OTG technical specialist indicated that the jumpers were installed and opened. The OTG technical specialist intended to communicate the status of the four switch jumpers that had been signed off as "having met intent". As a result of this miscommunication, the OTG supervisor mistakenly assumed that steps 12.7.7 and 12.7.8 (which install all six jumpers) had been completed.

Follow up communication between the OTG supervisor and the technicians in the field involving jumper positions resulted in similar miscommunication. References to "jumpers installed" were taken generically by the supervisor to refer to all jumpers but by the technicians to refer only to the four jumpers with switches. As a result of this continued miscommunication, the jumpers became misconfigured for completion of section 12.7.

1907 hours

The OTG supervisor requested that the control room operator perform procedure step 12.7.10. This step directed the control room operator to place the TDCA Pump switch in the 'Start' position. When the control room operator placed the switch in 'Start', the TDCA Pump started.

1911 hours

The TDCA pump was secured after a small amount of condensate water was injected into the four steam generators. The pump operated for less than four minutes.

Cause

The primary cause of this event is deficient communication and inappropriate procedure use and adherence. Test personnel communication

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

McGuire Nuclear Station, Unit 2

05000 370

00

01

0

5 OF 6

regarding specific jumpers and specific procedure steps was not sufficient. The procedure was not performed in accordance with Operations Management Procedure OMP 4-1, Use of Operating and Periodic Test Procedures, in that the steps were not read individually and performed sequentially. Specifically, step 12.6.18 should have been performed as written and not signed off as complete indicating "intent of step met". Subsequently, the OTG supervisor mistakenly assumed that steps 12.7.7 and 12.7.8 had been completed.

CORRECTIVE ACTION:

Immediate

1. The control room operator stopped the TDCA Pump after consulting with the Operations control room supervisor and the OTG supervisor.
2. All switch jumpers closed in procedure step 12.7.9 were opened and the jumpers were removed.

Subsequent

1. The Shift Operations Manager held a 'Time Out' with the OTG crew to discuss what had happened, lessons learned, the importance of detailed communication, and strict procedural compliance.
2. Appropriate NRC Notifications were made due to an inadvertent Engineered Safeguard Feature Actuation.
3. Procedure PT/2/A/4252/007 was completed with satisfactory results.
4. Individuals involved were coached on the importance of effective communications and strict procedural compliance during testing of plant equipment.

SAFETY ANALYSIS:

Based on this analysis, this event is not considered to be significant. At no time were the safety or health of the public or plant personnel affected as a result of the event.

The actuation of the TDCA Pump and the conditions associated with this actuation are not considered significant. The plant condition was not

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
McGuire Nuclear Station, Unit 2	05000 370	00	01	0	6 OF 6

degraded as a result of this event. The AFW System remained available to perform its safety function.

The analyzed design basis event of a Feedwater System malfunction causing an increase in feedwater flow is described in chapter 15 of the McGuire Nuclear Station, Updated Final Safety Analysis Report. The accident analysis demonstrates that the power increase from the excessive feedwater flow event would not lead to a departure from nucleate boiling ratio less than the limit value. The analysis for the excessive feedwater flow event assumes at full power the opening of all feedwater control valves to 142 percent of nominal feedwater mass flow for all four Steam Generators. The excessive feedwater flow accident analysis concludes that the maximum neutron power increase is to approximately 118 percent of nominal. The safety analysis concludes that for feedwater flow rates below 126 percent of nominal feedwater flow, a feedwater isolation and turbine trip will prevent a power increase requiring tripping the reactor on over power delta temperature limits.

This inadvertent actuation of the TDCA Pump is bounded with significant margin by the accident analysis for an excessive feedwater flow event.