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**DUKE POWER**

DATE: October 30, 1995

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

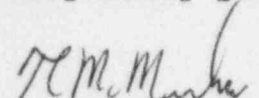
Subject: McGuire Nuclear Station Unit 1  
Docket No. 50-369

Licensee Event Report 369/95-06, Revision 0  
Problem Investigation Process No.: 1-M95-1793

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report 369/95-06 concerning the Unit 1 Reactor Trip that occurred October 1, 1995. This report is being submitted in accordance with 10 CFR 50.73 (a) (2) (iv). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

  
T.C. McMeekin

RJD/bcb

Attachment

cc: Mr. S.D. Ebnetter  
Administrator, Region II  
U.S. Nuclear Regulatory Commission  
101 Marietta St., NW, Suite 2900  
Atlanta, GA 30323

INPO Records Center  
Suite 1500  
1100 Circle 75 Parkway  
Atlanta, GA 30339

Mr. Victor Nerses  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, D.C. 20555

Mr. George Maxwell  
NRC Resident Inspector  
McGuire Nuclear Station

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NSRB Support Staff (EC05N)  
Kay Crane (MG01RC)  
Rich Casler (EC05N)

# LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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 1

DOCKET NUMBER (2)

05000369

PAGE (3)

1 of 5

TITLE (4)

A Unit 1 Reactor Trip Occurred Due To An Equipment 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 NAME	DOCKET NUMBER(S)																																					
10	01	95	95	06	0	10	30	95	N/A	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)		<table border="0"> <tr> <td>1</td> <td>20.402(b)</td> <td>20.405(c)</td> <td><input checked="" type="checkbox"/></td> <td>50.73(a)(2)(iv)</td> <td>73.71(b)</td> </tr> <tr> <td>49%</td> <td>20.405(a)(1)(i)</td> <td>50.36(c)(1)</td> <td><input type="checkbox"/></td> <td>50.73(a)(2)(v)</td> <td>73.71(c)</td> </tr> <tr> <td></td> <td>20.405(a)(1)(ii)</td> <td>50.36(c)(2)</td> <td><input type="checkbox"/></td> <td>50.73(a)(2)(vii)</td> <td>OTHER (Specify in Abstract below and in Text, NRC Form 366A)</td> </tr> <tr> <td></td> <td>20.405(a)(1)(iii)</td> <td>50.73(a)(2)(i)</td> <td><input type="checkbox"/></td> <td>50.73(a)(2)(viii)(A)</td> <td></td> </tr> <tr> <td></td> <td>20.405(a)(1)(iv)</td> <td>50.73(a)(2)(ii)</td> <td><input type="checkbox"/></td> <td>50.73(a)(2)(viii)(B)</td> <td></td> </tr> <tr> <td></td> <td>20.405(a)(1)(v)</td> <td>50.73(a)(2)(iii)</td> <td><input type="checkbox"/></td> <td>50.73(a)(2)(x)</td> <td></td> </tr> </table>										1	20.402(b)	20.405(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)	49%	20.405(a)(1)(i)	50.36(c)(1)	<input type="checkbox"/>	50.73(a)(2)(v)	73.71(c)		20.405(a)(1)(ii)	50.36(c)(2)	<input type="checkbox"/>	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)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)			20.405(a)(1)(iv)	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(viii)(B)			20.405(a)(1)(v)	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(x)	
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LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER	
	AREA CODE	
R.J. Deese, Manager, Safety Review Group	(704)	875-4065

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
F	CBH	MOTOR	W120	YES					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (if yes, complete EXPECTED SUBMISSION DATE)

X NO

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

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

**Unit Status:** Unit 1 - Mode 1 (Power Operation) at approximately 49 percent power.

**Event Description:** On October 1, 1995, at 1011, the Unit 1 Reactor tripped due to low Reactor Coolant (NC) system flow. A surge capacitor in NC Pump Motor 1D shorted to ground, causing the motor circuit breakers to trip on high ground fault current. Both the NC Pump Motor 1D supply breaker and safety breaker were tripped by their respective ground fault relays. Post trip conditions were normal. Unit 1 was returned to Mode 1 on October 2, 1995, at 1510.

**Event Cause:** A cause of Equipment Failure has been assigned due to a surge capacitor failure in the NC pump motor connection enclosure. Subsequent testing of the capacitor confirmed the capacitor had failed.

**Corrective Actions:** Maintenance personnel replaced the failed capacitor and tested associated circuits and equipment. Engineering personnel will evaluate the expected service life of these capacitors and determine if a replacement program is needed. Engineering personnel will also review current testing to determine if testing is adequate.

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

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FACILITY NAME (1)  McGuire Nuclear Station, Unit 1	DOCKET NUMBER (2)  05000 369	LER NUMBER (6)			PAGE (3)  2 OF 5
		YEAR 95	SEQUENTIAL NUMBER 06	REVISION NUMBER 0	

**EVALUATION:**

**Description of Event**

On October 1, 1995, Unit 1 was in Mode 1 (Power Operation) at approximately 49 percent power.

- Unit 1 Reactor [EIIS:RCT] tripped at 1011 due to low Reactor Coolant (NC) [EIIS:AB] system flow.
- The Reactor Trip was due to NC flow coastdown when the NC Pump Motor 1D [EIIS:MO] tripped on a 50G ground fault relay [EIIS:RLY] actuation with Unit 1 > Permissive [P-8] (48 percent Rated Thermal Power).
- Both the NC Pump Motor 1D feeder breaker and safety breaker were tripped by their respective ground fault relays. A neutral high current alarm [EIIS:IA] was also received on Transformer 1ATB [EIIS:XFMR].
- Operations (OPS) personnel entered procedure EP/1/A/5000/E0, Reactor Trip or Safety Injection, and then entered procedure EP/1/A/5000/ES-0.1, Reactor Trip Response.
- Both Motor Driven Auxiliary Feedwater (CA) [EIIS:BA] pumps [EIIS:P] started on low-low level in Steam Generator (S/G) [EIIS:SG] 1B.
- The required 4 hour notification to the NRC was made at 1141 in accordance with procedure RP/0/A/5700/10, NRC Immediate Notification Requirements.
- An extensive investigation was performed by Engineering and Maintenance (MNT) to identify a viable failure scenario. A detailed listing of possible failure modes was developed using the Failure Investigation Process.
- A Failure Mode Troubleshooting Plan was developed to support or eliminate the proposed failure modes identified.
- MNT personnel performed tests/inspections on the NC Pump 1D motor, supply and safety breakers, all associated power cables [EIIS:CBL] and penetrations [EIIS:PEN], and ground fault relays. All possible failure modes were systematically investigated.

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		YEAR 95	SEQUENTIAL NUMBER 06	REVISION NUMBER 0	

- Ground resistance checks identified a surge capacitor [EIIS:CAP] failure in the NC pump motor connection enclosure.
- MNT personnel replaced the failed capacitor.
- On October 2, 1995, at 0316, NC Pump 1D was started. All indications were normal.
- On October 2, 1995, at 0900, a Plant Operating Review Committee (PORC) meeting was held to discuss the Unit 1 restart. The PORC approved the decision to restart the Unit.
- On October 2, 1995, at 1510, Unit 1 was returned to Mode 1.

**Conclusion**

**There were no personnel injuries, radiation overexposures, or uncontrolled releases of radioactive material resulting from this event. This event is Nuclear Plant Reliability Data System (NPRDS) reportable.**

- A cause of Equipment Failure due to the failure of the surge capacitor on Y-Phase of NC Pump Motor 1D has been assigned to this event. A ground fault alarm on Y-Phase of Transformer 1ATB with ground fault overcurrent trips of both motor breakers initiated the Reactor Trip.
- The Failure Investigation Process was used to identify all possible failure modes and then to systematically eliminate each failure possibility until the root cause was identified. The possible failure modes identified were cable/connector failure, penetration failure, relay/breaker failure, and motor or associated surge capacitor failure.
- MNT personnel performed tests/inspections on the NC Pump 1D motor, supply and safety breakers, all associated power cables and penetrations, and ground fault relays. Ground resistance checks led MNT personnel to a shorted surge capacitor in the NC pump motor connection enclosure. Upon investigation, the Y-Phase surge capacitor was found to have shorted to ground.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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YEAR	SEQUENTIAL NUMBER	REVISION NUMBER							
95	06	0							

- All three surge capacitors on NC Pump Motor 1D were checked for capacitance. The surge capacitor on the Y-Phase was found to have zero capacitance and failed to ground, causing the breakers to trip as designed.
- A review of the Operating Experience Program (OEP) and Problem Investigation Process (PIP) databases for the past 24 months did not reveal any reportable events involving Reactor Trips due to failed surge capacitors in Westinghouse Reactor Coolant pump motors.
- One reportable event occurred at McGuire Nuclear Station in 1987, LER 369/87-04, which was caused by the failure of a surge capacitor on Unit 1 NC Pump Motor 1C. Corrective actions from this event were all completed by mid 1988 and included Failure Analysis of the capacitor, ordering replacement capacitors for stock at all three sites, evaluating whether or not capacitors could be eliminated from the NC pump motors, and developing and scheduling an annual testing program.
- The testing program that was established is performed every refueling outage and checks the capacitors to determine if they show signs of degradation. Testing has been performed for the last 8 years.
- The capacitor that failed on October 1, 1995, was last tested on August 31, 1994, and the capacitance was within the acceptable limits. The failure of this capacitor represents the first and only known failure since implementing the testing program.

### CORRECTIVE ACTION:

#### Immediate:

OPS personnel entered procedure EP/1/A/5000/E-0, Reactor Trip or Safety Injection, and then entered procedure EP/1/A/5000/ES-0.1, Reactor Trip Response.

#### Subsequent:

1. OPS personnel were dispatched to observe the relaying for the NC pump supply and safety breakers.
2. OPS personnel notified Engineering and Maintenance personnel that the respective 50G ground relays had tripped the breakers.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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YEAR	SEQUENTIAL NUMBER	REVISION NUMBER							
95	06	0							

3. Personnel from Engineering, Maintenance, Operations, and other site groups met and a more detailed investigation of possible failure modes was initiated.
4. Maintenance personnel performed tests/inspections on the NC Pump 1D motor, supply and safety breakers, all associated power cables and penetrations, and ground fault relays.
5. Maintenance personnel replaced the failed surge capacitor.
6. Engineering personnel determined that corrective actions from the 1987 event had been fully implemented.

#### Planned:

1. Engineering personnel will re-evaluate the expected service life of these capacitors and determine if a replacement program is needed.
2. Engineering personnel will review current capacitor testing to determine if testing is adequate.

#### SAFETY ANALYSIS:

**The health and safety of the public and plant personnel were not affected as a result of this event. Therefore, this event is not considered significant.**

The accident description for the loss of one NC pump with four loops in operation has been analyzed in Section 15.3.1, "Partial Loss Of Forced Reactor Coolant Flow", of the Final Safety Analysis Report (FSAR). Above P-8, a partial loss of Reactor Coolant flow in any loop would result in a Reactor Trip and Turbine Trip. The analysis shows core flow will reach a new equilibrium value corresponding to the number of pumps still in operation. With the Reactor tripped, a stable plant condition will eventually be obtained. Therefore, this incident is bounded by the accident analysis of FSAR Section 15.3.1.

The Unit responded to the Reactor Trip as expected. The key primary and secondary parameters were at their approximate no-load value 30 minutes after the trip. Adequate core cooling was maintained throughout the transient and the NC system pressure boundary was not challenged.