

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) McGuire Nuclear Station- Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 3 6 9				PAGE (3) 1 OF 5			
TITLE (4) Failure to Comply with Wiring Separation Criteria/ESF Actuation																	
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	2	0	6	8	5	8	5	0	0	8	0	0	0	5	0	0	0
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)																	
OPERATING MODE (9)		3		20.402(b)		20.405(c)		<input checked="" type="checkbox"/>		50.73(a)(2)(iv)		73.71(b)					
POWER LEVEL (10)				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)(ix)							
LICENSEE CONTACT FOR THIS LER (12)																	
NAME Scott Gewehr - Licensing										TELEPHONE NUMBER AREA CODE 710 431 731-1715181							
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																	
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS								
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR			
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)										<input checked="" type="checkbox"/> NO							

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

On February 6, 1985, it was discovered that the Unit 1 reactor trip switchgear wiring did not satisfy separation criteria required for safety-related circuits. A single wire of Train "A" was routed with Train "B" wiring during the installation of a modification in March, 1984. While this error was being corrected, an electrician accidentally actuated a limit switch inside the reactor trip breaker cabinet ("A"), and initiated a feedwater isolation signal. The cause of the wiring error has been attributed to an administrative/procedural deficiency, while the feedwater isolation (ESF) signal was caused by personnel error. Corrective actions will address procedural enhancements to better control wiring changes.

The health and safety of the public were not affected.

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## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  McGuire Nuclear Station, Unit 1	DOCKET NUMBER (2)  0 5 0 0 0 3 6 9	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 5	- 0 0 8	- 0 0	0 2	OF	0 5

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

INTRODUCTION

On February 6, 1985, station Instrument and Electrical (IAE), Quality Assurance (QA) and Design Engineering (DE) personnel discovered an electrical separation criteria deficiency in the Unit 1 Reactor Trip Switchgear cabinets. The error involved a single train "A" wire which had been routed with the train "B" wiring during a previous electrical modification. The modification had been installed on March 26, 1985. The installation did not conform to the McGuire Installation Specifications Manual/Electrical Separation Criteria which requires a six inch free air space between redundant safety devices, in separate trains, when barriers are not used.

While corrections were being made to the wire routing, an electrician accidentally depressed a limit switch inside the reactor trip breaker "A" (RTA) cabinet which initiated a main feedwater isolation signal.

Unit 1 was in Mode 3 at the time of this discovery and had operated at 100 percent power for approximately 65 percent of the period between March, 1984 and the discovery.

An Administrative and Procedure Deficiency is the cause of this incident due to: 1) The "wiring changes" procedure used did not refer the technicians to the "wiring separation criteria" procedure or installation specifications. 2) The technicians involved in the physical modification had not been trained on the McGuire Installation Specifications Manual. A personnel error caused the unplanned actuation of a main feedwater isolation signal.

EVALUATION

This modification to the reactor trip breaker cabinets was a result of an NRC evaluation of another previously installed modification which had added a shunt trip actuation circuit to the automatic breaker trip circuits. The specific problem with the original shunt trip installation was that the safety related shunt trip circuits shared a common fuse with non-safety related auxiliary circuits. The shunt trip circuit requires power to operate. If the single fuse had blown due to an auxiliary circuit compo-

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/85

FACILITY NAME (1)  McGuire Nuclear Station, Unit 2	DOCKET NUMBER (2)  0 5 0 0 0 3 6 9 8 5 - 0 0 8 - 0 0 0 3	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
					OF		

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

ment failure, then the shunt trip circuit would be inoperable. The shunt trip circuit is a back-up for the undervoltage (UV) trip circuit.

The modification made in this event was to add a separately fused power source to the shunt trip circuitry. The modification did not involve extensive wiring changes but did require internal cabinet wiring changes. IAE personnel had implemented the changes on the Unit 1 circuits during the 1984 refueling outage. The Unit 2 modification was in progress when the IAE specialist doing the work identified a problem with the physical wire routing and questioned how the electrical separation criteria could be maintained. The technicians identified the train separation problem when they noticed the different colored cables (red, yellow) entering the bottom of the cabinet.

QA and DE personnel were contacted for information on the correct way to install the wiring. The Unit 1 wiring was inspected to see if correct separation had been maintained. It was determined that the channel separation criteria had not been maintained during the Unit 1 installation. The reactor trip breakers were declared inoperable.

The reactor trip breaker cabinets are supplied with internal wiring troughs to provide electrical separation for the internal wiring. Wiring troughs are located at the top of the cabinet and provide a wiring path from the enclosed back of the cabinet to operating components located in the front of the cabinet. On the front side of the cabinet, the "A" train wiring is routed from the outside edges of the cabinets into the operating components. The "B" train wiring is routed down the center of cabinets 1 and 2 and is routed outward to the components.

The IAE personnel were not aware of the wiring trough routing path in the top of the cabinets when the Unit 1 modification was being made. The "A" train trough is difficult to access and requires removing cabinet panels when routing new wires. The procedures used by the technicians did not reference the installation specifications or proper electrical separation criteria. An IAE procedure, IP/O/A/3250/54 (Separation Requirements for Cables and Associated Equipment), did exist to provide the extensive details and signoffs for this

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/85

FACILITY NAME (1)  McGuire Nuclear Station, Unit 1	DOCKET NUMBER (2)  0 5 0 0 0 3 6 9	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 5	- 0 0 8	- 0 0	0 4	OF	0 5

TEXT (If more space is required, use additional NRC Form 365A's) (17)

type of electrical modification. This procedure was not referenced by either the procedure IP/O/A/3090/04 (Wiring Changes on Systems and Components), which was used as the implementation procedure for the modification, or the NSM work request. The cabinet internal wiring troughs and wiring are not color coded or identified as train-related. Quality Control (QC) inspections during the Unit 1 modification did not reveal the error at the time of installation.

Station Support Division (SSD) electricians were contacted to help determine the proper wire routing on the reactor trip breaker cabinets. It was at this time that SSD electricians identified the wiring trough arrangement and corrected the separation problem.

While the SSD electricians were completing the wiring corrections on the Unit 1 cabinets, one of the workers accidentally pressed a limit switch lever which initiated a main feedwater isolation signal. This limit switch (cell switch) normally operates when the breaker is removed from the breaker compartment. The signal generated by the switch actuation was the Reactor Trip (P-4) signal to the Solid State Protection System (SSPS). The cell switch bypasses the reactor trip signal in the associated breaker compartment when the breaker is "racked out" of the cubicle.

The SSD electrician did not know he had actuated the switch until Operations personnel came to the job area and told him. The close working conditions inside the breaker cubicle contributed to this event. Operations personnel verified that the switch had caused the event by actuating it again after the event and observing the associated alarms.

CORRECTIVE ACTIONS

Immediate: The Reactor Trip Breakers were declared inoperable and the NRC notified.

Subsequent: The wiring was corrected to comply with appropriate Installation Specifications and cable separation criteria.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
8/5	0148	010

McGuire Nuclear Station, Unit 1

0 5 0 0 0 3 6 9 8 5 - 0 1 4 8 - 0 1 0 0 5 OF 0 5

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

## Planned:

IAE procedure, IP/O/A/3090/04 (Wiring Changes on Systems and Components), will be enhanced to become either a controlling procedure or installation procedure to cover the full scope of NSM work.

The McGuire IAE Training Section is reviewing the installation specifications and has plans to develop the necessary training on the applicable specifications. The Training Section personnel began meetings with Design Engineering on March 28, 1985 to develop the training guidelines.

SAFETY ANALYSIS

The shunt trip circuitry that would be affected by a postulated cable fire or damage in the opposite train was adequately fused to protect against short circuit faults. Had the shunt trip circuitry been disabled by a blown fuse, the UV trip function would have operated to provide the reactor trip function.

The health and safety of the public were not affected by this incident.



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May 9, 1985

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

Subject: McGuire Nuclear Station  
Docket Number 50-369  
LER 369/85-08

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is License Event Report 369/85-08 concerning a Failure to Maintain Separation Criteria, which is submitted in accordance with §50.73 (a)(2)(v). This event was considered to be of no significance with respect to the health and safety of the public.

Due to an administrative oversight, this report was not submitted within the allotted 30 days.

Very truly yours,

*H.B. Tucker / HT*

Hal B. Tucker

SAG:smh

Attachment

IE22  
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Document Control Desk  
May 9, 1985  
Page 2

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