

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) McGuire Nuclear Station - Unit 1

DOCKET NUMBER (2)

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

TITLE (4)
Solenoid Valves Not Properly Sealed

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	9	1985	85	028		0	1	1985		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	<table border="1"><thead><tr><th>20.402(b)</th><th>20.405(c)</th><th>50.73(a)(2)(iv)</th><th>73.71(b)</th></tr></thead><tbody><tr><td>20.405(a)(1)(i)</td><td>50.36(c)(1)</td><td>50.73(a)(2)(v)</td><td>73.71(c)</td></tr><tr><td>20.405(a)(1)(ii)</td><td>50.36(c)(2)</td><td>50.73(a)(2)(vii)</td><td>OTHER (Specify in Abstract below and in Text, NRC Form 366A)</td></tr><tr><td>20.405(a)(1)(iii)</td><td>50.73(a)(2)(i)</td><td>50.73(a)(2)(viii)(A)</td><td></td></tr><tr><td>20.405(a)(1)(iv)</td><td>50.73(a)(2)(ii)</td><td>50.73(a)(2)(viii)(B)</td><td></td></tr><tr><td>20.405(a)(1)(v)</td><td>50.73(a)(2)(iii)</td><td>50.73(a)(2)(ix)</td><td></td></tr></tbody></table>	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)	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)	
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20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)																							

LICENSEE CONTACT FOR THIS LER (12)
NAME Jerry Day - Licensing
TELEPHONE NUMBER 7 0 4 3 7 3 - 7 0 3 3

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	

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)

On September 19, 1985, it was determined that an environmentally sealed solenoid valve located inside the containment building had failed due to moisture entering the electrical cover. The moisture had entered the enclosure by seeping between the electrical conductors and through the potting seal. The potting compound had not sealed around each of the ten individual conductors because of the arrangement of the wire bundle. The failed solenoid valve is required to be operable after a Loss of Coolant Accident (LOCA) to obtain containment gas samples.

Further investigation into similar solenoid valve applications revealed three other valves on Unit 1 that may also have been inadequately sealed. The three valves are in the same system as the original failed solenoid and involve both trains of the Post Accident Containment Hydrogen Analyzer System.

All four Unit 1 valves were repaired, resealed, and returned to service by September 21, 1985. The Unit 2 valves were inspected and found to be adequately sealed.

Unit 1 was in Mode 1 at 50% power and increasing load at the time of the discovery.

This incident is classified as Personnel Error because the installation of the affected solenoid valves did not conform to the applicable installation specification.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/88

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

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

On September 19, 1985, it was determined that an environmentally sealed solenoid valve located inside the containment building had failed due to moisture entering the electrical cover. The moisture had entered the enclosure by seeping between the electrical conductors and through the potting seal. The potting compound had not sealed around each of the ten individual conductors because of the arrangement of the wire bundle. The failed solenoid valve is required to be operable after a Loss of Coolant Accident (LOCA) to obtain containment gas samples. The failed solenoid valve was declared inoperable pursuant to Technical Specification 3.6.4.1.

Further investigation into similar solenoid valve applications revealed three other valves on Unit 1 that may also have been inadequately sealed. These three valves are in the same system as the original failed solenoid and involve both trains of the Post Accident Containment Hydrogen Analyzer System.

All four Unit 1 valves were repaired, resealed, and returned to service by September 21, 1985. The Unit 2 valves used in this application were inspected and found to be adequately sealed.

Unit 1 was in Mode 1 at 50% power and increasing load at the time of the discovery.

This incident is classified as Personnel Error because the installation of the affected solenoid valves did not conform to the applicable installation specification.

Background

The Post Accident Sample Panel provides a convenient location to obtain containment atmosphere samples from three locations during postulated pipe break incidents. The information obtained from the samples is used to determine containment ventilation and purge data necessary for offsite dose calculations during this type of incident. The system consists of redundant trains to ensure operation of one system upon failure of the other. Each train has two inside containment isolation valves which are "energized to open" solenoid valves. These valves must be environmentally sealed to ensure proper operation during post accident environments. The solenoid valves in this application are manufactured by Valcor Engineering Corporation, Model 526-5295-45. This solenoid valve is unique in this application because it is required to operate during an accident situation. The valve is equipped with limit switches to provide remote valve position indication. These switches are not used in this installation.

Description of Event

The four solenoid valves affected in this incident were originally installed by the Construction department. The installation was to be in accordance with the McGuire Installation Specification "Cable Termination Sealing Inside Containment and Doghouse". The valves are shipped by the manufacturer with test leads provided for bench testing only. These leads are not intended for final installation. To utilize all of the valve limit switches and functions, ten wires would have to be connected to the valve.

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

In the first case of the solenoid valve 1MISV6880 failure, the vendor supplied wiring had been removed and replaced with approved control cable wiring connected to all ten terminals. The ten wires passed out through a 3/4 inch conduit fitting where the Scotchcast 9 epoxy resin had been filled in around the conductors. The wires had formed a bundle in the center of the potting material and did not allow the resin to seal around each conductor in the center of the bundle. The installation specification states "Ensure that the Scotchcast 9 completely seals around each individual conductor in the cable". This deficient seal was not detected by either the installers or the Quality Control (QC) inspectors. The ten wires ran to a pull box where only two coil wires were actually connected.

The water which entered 1MISV6880 came from a leaking pressure transducer fitting. The water was praying down directly into the improperly sealed wiring bundle. A flexible conduit connector cover was missing from the top of the 90° elbow connector which could have deflected some of the water away from the entrance fitting had it been installed.

Valve 1MISV6870 was connected the same as 1MISV6880 with ten wires going to a pull box and only two wires being used. There was no moisture located near this valve and the only repair action taken was to replace the seal and wiring and install only two wires into the solenoid housing.

The Train B solenoid valves 1MISV6910 and 1MISV6920 were apparently connected to the vendor supplied leadwires. These leadwires were not intended for final installation according to the vendor's manual but the Duke drawings used by the installers did not indicate that these wires were not suitable for use. The seals around these solenoid valves were rewired and resealed with only two wires entering the enclosure. There were no signs of moisture in or around these two valves.

The Unit 2 solenoids used in this application were visually inspected to determine if they were correctly sealed. These four solenoid valves did not have pull boxes installed. The three conductor field cables connected to the valves were routed directly into the top of the solenoids which means that only three wires entered the electrical enclosure. With this method of cable termination, Duke believes that an adequate seal was made around the three wires. No further immediate action was necessary, but in order to make the installation identical for both units, a work request was written to install pull boxes and quick-disconnect wiring devices on the Unit 2 solenoid valves.

This installation and inspection problem has been isolated to a particular model valve used in only five applications inside the Unit 1 Containment Building. The technique of installation used by a particular crew or foreman contributed to the lack of an adequate seal around the electrical conductors.

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

CORRECTIVE ACTIONS:

- Subsequent:
1. The Train A solenoid 1MISV6880 was repaired and returned to service with a new environmental seal. The leaking transducer fitting was repaired.
 2. The other Train A solenoid was resealed to provide an adequate environmental seal.
 3. Both Train B solenoids were resealed.
 4. The Unit 2 solenoid valves were inspected and determined to have adequate seals.
 5. Design Engineering performed an Operability Determination of all Valcor Model 526 solenoid valves used inside containment.

Planned: Work requests have been written to upgrade the wiring on all Valcor Model 526 solenoid valves. During this change, all of the seals will be replaced using approved procedures.

SAFETY ANALYSIS:

A postulated line break accident could have caused both trains of the Post Accident Sample Panel to be inoperable due to improper solenoid valve sealing. During this type of accident, there would be no convenient means of obtaining containment atmospheric samples. The offsite dose rates from containment purge operations would have to be calculated based on conservative post accident assumptions. Containment samples may have been obtained through Radiation Monitoring (EMF) lines if the EMF isolation valves were defeated.

The solenoid valves used in other applications were determined not to have any significant safety related concerns involving a coil failure.

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

October 18, 1985

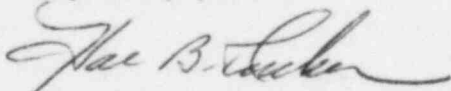
Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: McGuire Nuclear Station, Unit 1
Docket No. 50-369
LER 369/85-28

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 369/85-28 concerning solenoid valves associated with the hydrogen monitoring system not being properly sealed. This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,



Hal B. Tucker

JBD/hrp

Attachment

cc: Dr. J. Nelson Grace, Regional Administrator
U. S. Nuclear Regulatory Commission
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McGuire Nuclear Station

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