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January 14, 1991

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

Subject: McGuire Nuclear Station Unit 1 and 2
Docket No. 50-369
Licensee Event Report 369/90-35

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 369/90-35 concerning Insulation being inadvertently installed on the Pressurizer Code Safety valves loop seal piping. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(i). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

T.L. McConnell

DVE/ADJ/cbl

Attachment

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1/1

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
McGuire Nuclear Station, Unit 1	0 5 0 0 0 3 6 9	1 OF 6

TITLE (4) Insulation Was Installed On Pressurizer Code Safety Valve Loop Seal Piping In Error Because Of An Unknown

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)
1 1	0 1	9 0	9 0	0 3 5	0 0	0 1	1 4	9 1	McGuire Unit 2	0 5 0 0 0 3 7 0
										0 5 0 0 0

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	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)	X 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
	AREA CODE
Alan Sipe, Chairman, McGuire Safety Review Group	7 0 4 8 7 5 - 4 1 8 3

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	

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 November 1, 1990, at approximately 1300, while performing an inspection of piping for a modification, Maintenance Engineering Services (MES) personnel discovered that the loop seal piping to each of the Unit 2 Pressurizer (PZR) code safety valves had been insulated. Upon further investigation, Maintenance (MNT) personnel discovered that the loop seal piping to the Unit 1 PZR code safety valves had also been insulated. This piping must not be insulated to allow the loop seal to remain at ambient temperature. Units 1 and 2 were in Mode 5 (Cold Shutdown) at the time the insulation was discovered. The insulation on the Unit 1 and 2 PZR code safety valve loop seal piping was subsequently removed. This event is assigned a cause of a possible Management Deficiency or a possible Inappropriate Action since neither the date of installation nor the personnel who installed the insulation could be specifically determined.

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	9 0	— 0 3 5	— 0 0	2 OF 6

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

EVALUATION:

Background

The Pressurizer (PZR) [EIIS:PZR] code safety valves [EIIS:RV] operate to prevent the Reactor Coolant (NC) [EIIS:AB] system from being pressurized above its Safety Limit of 2735 PSIG. Each safety valve is designed to relieve 420,000 lbs per hour of saturated steam at the valve setpoint. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown.

The combined capacity of the PZR code safety valves is designed to accommodate the maximum surge resulting from a complete loss of load assuming no Reactor [EIIS:RCT] Trip until the first Reactor Trip System Setpoint is reached (i.e., no credit is taken for a direct Reactor Trip on the loss of load) and also assuming no operation of the power operated relief valves or steam dump valves.

Technical Specification (TS) 3.4.2.1 requires that in Modes 4 (Hot Shutdown) and 5 (Cold Shutdown) a minimum of one PZR code safety valve be operable with a lift setting of 2485 PSIG, +/- 1 percent. In the event that no safety valves are operable, an operating Residual Heat Removal (ND) [EIIS:BP] system loop connected to the NC system, provides overpressure relief capability and will prevent NC system overpressurization. In addition, the Overpressure Protection System provides a diverse means of protection against NC system overpressurization at low temperatures.

TS 3.4.2.2 requires that in Modes 1 (Power Operation), 2 (Startup) and 3 (Hot Standby) all PZR code safety valves be operable with a lift setting of 2485 PSIG, +/- 1 percent. During operation, all PZR code safety valves must be operable to prevent the NC system from being pressurized above its safety limit of 2735 PSIG.

The lift setting pressure of the PZR code safety valves shall correspond to ambient conditions of the valve at nominal operating temperature and pressure.

The pressurizer safety valves are of the totally enclosed pop type relief valve. The valves are spring loaded, self-activated with back pressure compensation features.

The six-inch pipes connecting the pressurizer nozzles [EIIS:NZL] to their respective code safety valves, are shaped in the form of a loop seal [EIIS:SEAL]. Condensate, as a result of normal heat losses to the ambient, building environment, accumulates in the loop. The water prevents any leakage of hydrogen gas or steam through the safety valve seats. If the pressurizer pressure exceeds the set pressure of the safety valves, they start lifting.

Description of Event

On November 1, 1990, at approximately 1300, while performing an inspection of piping for a modification, MES personnel discovered the loop seal piping from the Unit 2 PZR to the PZR code safety valves had been insulated with a blanket type insulation [EIIS:ISL]. This piping is the inlet from the PZR to the PZR code safety valves. The loop seal piping, by design, must not be insulated. This allows the loop seal piping to remain at ambient temperature, approximately 140 degrees F, which causes the steam from the PZR to condense and fill the loop seal. After the insulation was discovered on Unit 2, MES personnel requested that MNT personnel investigate for the presence of insulation on the loop seal piping to the Unit 1 PZR code safety valves. This investigation revealed that the Unit 1 loop seal piping was also insulated.

The insulation on the Unit 2 PZR code safety valve loop seal piping was removed shortly after discovery, on November 1, 1990. The insulation on the Unit 1 PZR code safety valve loop seal piping was removed within two days of the discovery.

Conclusion

This event has been assigned a cause of a possible Management Deficiency or a possible Inappropriate Action, because it could not be specifically determined either when or by whom the loop seal piping was insulated.

Insulation of the PZR code safety loop seal piping is not desirable, as this could result in a heatup of the piping. This heatup could result in a lowering of the safety valve setpoint in excess of the allowed 2485 PSIG +/- 1 percent. If the heatup were substantial, the water seal could evaporate.

There is a possibility the loop seal piping was insulated as early as 1985. During refueling outages in 1985, mirror insulation on top of the PZR was removed to facilitate ASME Section XI required Inservice Inspections (ISI). Upon completion of the ISI activities, the mirror insulation was replaced with the blanket type insulation. During the re-insulation process of various NC system piping on top of the PZR, the loop seal piping for the PZR code safety valves may have been inadvertently insulated. However, documentation for change out of the mirror insulation for blanket type insulation does not address insulation of this particular piping. The possibility also exists that the insulation on the PZR code safety valve loop seal piping may have been installed following subsequent ISI activities on NC system piping on the PZR. Insulation on all PZR code safety valve loop seal piping on Unit 1 and Unit 2 was subsequently removed. From the time the insulation was discovered until the insulation was removed, Unit 1 and Unit 2 remained in Mode 5.

A review of the equipment histories for the Unit 1 and Unit 2 PZR code safety valves, along with the Unit 1 and 2 Transient Cycle Reports, revealed only one occasion on which a PZR code safety valve was actuated since January 1,

1985. On September 1, 1986, 1NC-1, Pressurizer No. 1 Safety Relief, lifted prematurely at approximately 2370 PSIG. Unit 1 was in Mode 3 (Hot Standby) with NC system pressure elevated for a leak test. During the repair of the valve, it was determined the cause for this premature lifting was incorrect adjustment. This event was documented in LER 369/86-16.

There have been no indications of either a loss of the water in the loop seal or overheating of the PZR code safety relief valves.

A review of the Operating Experience Program (OEP) database for the past twenty-four months prior to this event revealed two events; LER 369/89-12 and 370/90-10, that identified TS violations due to a possible Management Deficiency or a possible Inappropriate action. Neither the equipment nor the activities involved are the same as this event; therefore, this problem is not considered to be recurring.

This event is not Nuclear Plant Reliability Data System (NPRDS) reportable.

There were no personnel injuries, radiation overexposures, or uncontrolled releases of radioactive material as a result of this event.

CORRECTIVE ACTIONS:

Immediate: MNT personnel removed the insulation from the Unit 1 and Unit 2 PZR code safety valve loop seal piping.

Subsequent: CMD-N management personnel reviewed this event with CMD-N insulators.

Planned: Nuclear Production Department (NPD) management personnel will review this event with the MNT personnel responsible for removal/installation of insulation.

SAFETY ANALYSIS:

During the time the PZR code safety valves were inoperable, the setpoint for the valves was 2485 PSIG +1 percent / -4 percent instead of the TS required 2485 PSIG +/-1 percent. Therefore the valve may have opened at approximately 2385 PSIG instead of approximately 2460.2 PSIG. The PZR code safety valves are provided to prevent overpressurization of the NC system so the NC system pressure does not exceed its safety limit of 2735 psig. If an overpressure event had occurred during the time the PZR code safety valves were inoperable, the valves may have opened earlier than expected; however, they would have opened and provided pressure relief to prevent overpressurization of the NC system.

In the McGuire Final Safety Analysis Report (FSAR), there are two events described in which the PZR code safety valves opening early may have impacted the analysis: Inadvertent opening of the PZR code safety or relief valve event; and, Turbine [EIIS:TRB] Trip event.

During an inadvertent opening of PZR code safety or relief valve event, depressurization of the NC system would occur. A PZR code safety valve is sized to relieve approximately twice the steam flow rate of a relief valve, and will allow a much more rapid depressurization upon opening. The most severe Reactor [EIIS:RCT] core conditions resulting from an accidental depressurization of the NC system are associated with the inadvertent opening of a PZR code safety valve. The system response to an inadvertent opening of a PZR code safety valve is shown in McGuire FSAR Figures 15.6.1-1 and 15.6.1-2. Figure 15.6.1-1 illustrates the nuclear power transient following depressurization. Nuclear power increases slowly from the initial value until Reactor Trip occurs on overtemperature delta-T. The pressure decay transient and average temperature transient following the event are presented in Figure 15.6.1-2. Pressure drops more rapidly while core heat generation is reduced by the trip, and then slows once saturation temperature is reached in the hot leg. The Departure From Nucleate Boiling Ratio (DNBR) decreases initially but increases rapidly following the trip, as shown in Figure 15.6.1-1. The DNBR remains above the limit value throughout the transient. The PZR low pressure and the overtemperature delta-T RPS signals provide adequate protection against the NC system depressurization in the event the PZR code safety valve opened unexpectedly.

During a Turbine Trip event, steam flow to the Turbine is abruptly stopped by closure of the stop valves resulting in an almost immediate rise in secondary system temperature and pressure with an accompanying primary system transient. In the event a safety limit is approached, protection would be provided by the high PZR pressure and overtemperature delta-T signals. In the event the steam dump valves fail to open following a loss of load, the SG safety valves may lift and the Reactor may be tripped by the high PZR pressure signal, the high PZR water level signal, or the overtemperature delta-T signal. The PZR code safety valves and SG safety valves are sized to protect the NC system against overpressure for all load losses without assuming the operation of the steam dump system, PZR spray, PZR Power Operated Relief Valves (PORVs), or automatic rod cluster control assembly control. The PZR code safety valve capacity is sized based on a complete loss of heat sink [EIIS:SNK] with the plant initially operating at the maximum calculated Turbine load along with operation of SG safety valves. The PZR code safety valves are then able to relieve sufficient steam to maintain the NC system pressure within 110 percent of the NC system design pressure. If a Turbine Trip had occurred while the PZR code safety valves were inoperable as previously described, during operation at less than 48 percent power, an RPS runback would have occurred and the resultant NC system pressure increase would not be expected to reach the range at which the PZR code safety valve would open. If such an event had occurred, the PZR spray and PORVs were operable and capable of relieving NC system pressure at approximately 2260 PSIG to 2335 PSIG, respectively. In such an event, the PZR code safety valves would not be challenged. When operating at greater than 48 percent power, had a Turbine Trip occurred, an RPS initiated Reactor

Trip would also occur. Although the FSAR takes no credit for a Reactor Trip on a Turbine Trip, the RPS would trip the Reactor on overtemperature delta-T, high PZR water level, or PZR overpressure (With a lower setpoint of approximately 2385 psig, it is possible the PZR code safety valve would open before a high pressure Reactor Trip). For this type case where the PZR code safety valve prevented a high PZR pressure Reactor Trip, the overtemperature delta-T Reactor Trip would have provided adequate DNBR protection.

In conclusion, had the PZR code safety valves opened at a setpoint less than that specified by the McGuire TS, the RPS and the PZR protection system (PZR PORVs and spray valves) would have functioned to provide adequate protection to prevent depressurization or overpressurization of the NC system and fuel or fuel clad damage. This event did not effect the health and safety of the public.