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November 19, 1992

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 369/92-10

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report 369/92-10 concerning Containment Integrity Technical Specification being violated because of a Design Deficiency, Equipment Failure, and an Unknown. 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.C. McMeekin

TLP/bcb

Attachment

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LICENSEE EVENT REPORT (LER)

FACILITY NAME(1)	DOCKET NUMBER(2)	PAGE(3)
McGuire Nuclear Station, Unit 1	05000 369	1 OF 7

TITLE(4) Unit 1 Containment Integrity Technical Specification Was Violated Because Of A Design Deficiency, Equipment Failure, And 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)
									N/A	05000
09	16	92	92	10	0	11	19	92		05000

OPERATING MODE(9)	1	THIS REPORT IS SUBMITTED PURSUANT TO REQUIREMENTS OF 10CFR (Check one or more of the following)(11)							
			20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
POWER LEVEL(10)	100%		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)
			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	
Terry L. Pedersen, Manager, Safety Review Group	704	875-4487

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	
RP	NM	PP		YES							

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 September 16, 1992, at 1300, McGuire Safety Review Group personnel were conducting an investigation to determine the root cause, corrective actions, and resolution of Problem Investigation Report (PIR) 0-M92-0119. During the investigation, it was discovered that Unit 1 Containment Structure mechanical penetration M-309 had developed a steam leak on July 20, 1984. Penetration M-309 is a flanged penetration that utilizes gaskets to seal the flange faces. The Containment Integrity Technical Specification, 3.6.1.1, requires the sealing mechanism associated with each penetration to be operable. McGuire Safety Review Group personnel initiated PIR 1-M92-0139 to document and track the potential past inoperability of penetration M-309. On October 19, 1992, Mechanical Nuclear Engineering personnel determined the sealing mechanism associated with penetration M-309 was past inoperable during the time the steam leak had existed. Therefore, the Containment Technical Specification was violated during the time period Containment Integrity was required and the sealing mechanism was inoperable. The penetration was not logged as inoperable during that time. Unit 1 was in Mode 1 (Power Operation) at 100 percent power at the time the leak occurred. This event is assigned causes of Design Deficiency, Equipment Failure, and Unknown.

EVALUATION:

Background

The Containment structure is designed to ensure that an acceptable upper limit of leakage of radioactive material is not exceeded under design accident conditions. For purposes of integrity, the Containment structure may be considered as the Containment Vessel [EIIS:VSL] and the Containment Isolation system. This structure and system are directly responsible for maintenance of Containment Integrity.

Technical Specification (TS) 3.6.1.1, Containment Integrity, requires Containment Integrity to be maintained in operational modes 1 (Power Operation), 2 (Startup), 3 (Hot Standby), and 4 (Hot Shutdown). Without Containment Integrity, restore Containment Integrity within 1 hour or the affected unit will be in at least Hot Standby within the next 6 hours and in Cold Shutdown (Mode 5) within the following 30 hours.

Containment mechanical penetration [EIIS:PEN] M-309 is a part of the Nuclear Sampling (NM) system [EIIS:KN]. The penetration consists of two motor [EIIS:MC] operated isolation valves [EIIS:ISV] inside of Containment, a relief valve [EIIS:RV] between the inside isolation valves and the Containment structure, one motor operated isolation valve outside of Containment, and a flanged flow orifice [EIIS:OR] with associated instrumentation located between the outside isolation valve and the Containment structure.

Description of Event

On September 16, 1992, at 1300, McGuire Safety Review Group personnel were conducting an investigation of the circumstances associated with an incident as documented on Problem Investigation Report (PIR) 0-M92-0118. The PIR documented an incident in which mechanical penetration M-309 did not receive a retest following maintenance. The investigation revealed that the failure to retest mechanical penetration M-309 did not violate TS requirements for Containment leakage or Containment Integrity. However, the investigation did reveal a potential to violate the Containment Integrity TS if the gaskets used to seal the flow orifice flange were to fail. Subsequently, PIR 1-M92-0139 was written to document and track these concerns.

Investigation associated with PIR 1-M92-0139 revealed that Unit 1 mechanical penetration M-309 had developed a steam leak on July 20, 1984. Work Request No. 119683 was initiated by Operations (OPS) personnel to repair the steam leak. The work was performed on December 6, 1984. Maintenance personnel determined that the leak was due to a small hole in the gaskets sealing the flange surfaces for the flow orifice. The flange was broken apart, both seating surfaces cleaned as well as the flow orifice, and new gaskets installed. The work was

completed and control of the penetration was accepted by OPS personnel on December 13, 1984. The penetration was not logged as inoperable during that time.

Since TS 3.6.1.1 requires the sealing mechanism associated with each penetration to be operable, and Unit 1 mechanical penetration M-309 was not logged as inoperable when the leak was discovered, McGuire Safety Review Group personnel posed the following questions to Design Engineering Department personnel:

ITEM 1: Are the gaskets and flange associated with M-309 considered to be a sealing mechanism?

ITEM 2: Are the flange/gaskets pressure retaining or leak tightness devices?

ITEM 3: How much leakage, if any, is acceptable, in this application?

ITEM 4: Was mechanical penetration M-309 operable during the time the leak existed?

On October 19, 1992, Mechanical Nuclear Engineering personnel determined that the sealing mechanism associated with Unit 1 mechanical penetration M-309 was past inoperable for the time period from discovery of the steam leak on July 20, 1984, until the repair of the penetration on December 13, 1984. The summary conclusions voiced by Mechanical Nuclear Engineering personnel in response to the questions posed by McGuire Safety Review Group personnel were as follows:

ITEM 1: According to ASME Code Section III, NC-2100, flanges are considered to be pressure retaining boundaries and gaskets are sealing mechanisms.

ITEM 2: As stated in item 1 above, the flange is considered to be a pressure retaining mechanism and the gasket is considered to be a sealing mechanism.

ITEM 3: The leakage criteria is stated in Technical Specification 3/4.6.1.2 and Performance Test Procedure PT/1/A/4200/01C, Isolation Valve Leak Rate Test.

Technical Specification 3/4.6.1.2 leakage is as follows:

c. A COMBINED BYPASS LEAKAGE RATE of less than 0.07 Total Leakage Allowed (La) for ALL PENETRATIONS identified as secondary Containment bypass leakage paths when pressurized to Acceptable

Design Test Pressure (Pa).

NOTE: La = 134,667.4 Standard Cubic Centimeters Per Minute (sccm)
Pa = 14.8 psig (per TS 3/4.6.1.2)

Performance Test Procedure PT/1/A/4200/01C leakage is as follows:

Acceptance Criteria:

Leakage Failure at 147.5 sccm

ITEM 4: Item 4 was previously addressed in PIR 0-M92-0118 and remains applicable. The conclusion is restated as follows: Since the flange steam leak was never quantified, it is not possible to determine if this leakage would have been acceptable (per TS 3/4.6.1.2 and Performance Test Procedure PT/1/A/4200/01C) therefore, mechanical penetration M-309 and gasket are considered past inoperable.

The investigation of PIR 0-M92-0118 addressed a concern of failure to retest mechanical penetrations M-309 on both units after maintenance had been performed. The resulting conclusion was that the cause of the failure to retest the penetrations after maintenance was a Management Deficiency due to failure to identify a retest requirement for the penetrations. The operability evaluation for PIR 0-M92-0118 concluded that no violation of TS occurred because the Leak Rate Test performed for each unit included total leakage for all penetrations, and that total was well within the acceptance criteria for the TS. However, the investigation revealed a potential to violate the Containment Integrity TS if the gaskets used to seal the flow orifice flange were to fail. Therefore, it was determined that the Containment Integrity TS was violated during the time period in which Unit 1 mechanical penetration M-309 was required operable and the sealing mechanism (gaskets) were determined to be inoperable.

Conclusion

This event is assigned a cause of Design Deficiency due to Equipment Configuration or Functional Mechanical Design Deficiency because the use of a bolted connection within the Containment boundary of a penetration subject to these conditions is not a good practice.

During the investigation of the circumstances associated with PIR 0-M92-0118, Mechanical Nuclear Engineering personnel noted that the configuration of mechanical penetration M-309 was not appropriate for this application. Therefore, Station Problem Report (SPR) 4925 was

initiated to propose removal/relocation of the flow orifice from within the boundaries of mechanical penetration M-309 on both units. The proposed modification will eliminate a possible leak path from Containment and prevent future violations of Containment Integrity due to degradation of the flow orifice flange gaskets. Until such time as the modifications are completed, periodic surveillance of the flanges are being performed as a part of the monthly walkthrough inspection performed by Radiation Protection personnel. If any leakage is detected, Radiation Protection personnel have been instructed to notify the Control Room [EIIS:NA] Senior Reactor Operator to ensure the Containment Integrity TS is satisfied. This should provide adequate inspection of the flanges for leakage until the next outages.

A cause of Equipment Failure is also assigned due to failure of the gaskets sealing the flange faces for mechanical penetration M-309 on Unit 1.

Failure of the gaskets caused violation of TS 3.6.1.1, Containment Integrity, because the gaskets are defined as a sealing mechanism associated with penetration M-309. The leak was not recognized as a violation of the TS at the time it occurred. Therefore, no action was taken at that time to log the penetration into the TS Action Item Logbook. The corrective actions as previously stated should prevent recurrence of this problem with regard to the penetration.

A cause of Unknown is assigned due to failure [illegible] the penetration as inoperable when the leak was discovered because it is not possible to determine what evaluation of operability was performed [illegible] that time or why the penetration was not logged as inoperable. Any speculation as to the thought processes used to make the determination can not be validated by existing documentation.

A review of the Operating Experience Program (OEP) Data Base for the 24 months prior to this event revealed no events involving Containment penetrations or violation of Containment Integrity due to Design Deficiency, Equipment Failure, or Unknown. Therefore, this event is not considered recurring.

This event is Nuclear Plant Reliability Data System (NPRDS) reportable because of the failed gaskets in the penetration.

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

CORRECTIVE ACTIONS:

Immediate: 1) None

Subsequent: 1) Radiation Protection personnel began periodic surveillance of the flanges during the monthly walkthrough inspection performed by Radiation Protection personnel.

Planned: 1) None

SAFETY ANALYSIS:

Valves 1NM-36B (Reactor Coolant Hot Legs Sample Header Outside Containment Isolation), 1NM-25A,C (Reactor Coolant Hot Leg 1D Sample Line Containment Isolation), 1NM-22A,C (Reactor Coolant Hot Leg 1A Sample Line Containment Isolation), 1NC-112 (Reactor Coolant Loop 4 Sample), and 1NC-37 (Primary Shield A Hot Leg Junction) provide a means of isolating the associated sample line that passes through mechanical penetration M-309. TS 3.6.1.1, Containment Integrity, requires that all penetrations required to be closed during accident conditions are either capable of being closed by an operable Containment automatic isolation valve system, or operator action during periods where Containment Isolation valves may be opened under administrative controls. During the time period associated with this event, the Containment Isolation valves remained in the normally open position but were capable of being closed by one of the above listed methods. This would ensure integrity of the Containment during a design basis event. Additionally, on receipt of a Safety Injection Signal, OPS personnel must verify all Phase A components to be properly aligned per existing emergency procedures. If such an event had occurred during the time period associated with this event, OPS personnel would have noted any misalignment of these valves and taken appropriate action to close them. For most accident sequences, there is significant time for such action to be taken before any release of radioactivity from the Containment could occur.

The leakage from the flow orifice gaskets was assumed to be small because of the small (1 inch) pipe size. The basis for TS 3.6.1.2, Containment Leakage, states that enough conservatism is factored into the leakage calculation to allow for normal degradation of leakage barriers for the periods of time between periodic leak rate tests. All periodic leak rate testing required by TS 3.6.1.2 Surveillance requirements had been satisfied and found to be in conformance with the criteria specified in 10CFR50, Appendix J.

During the time period associated with this event, the Auxiliary Building Ventilation (VA) system [EIIS:VF] was fully operable. Although no credit is taken for operation of the VA system during accident situations, the system is designed to stop all supply fans and place the filtered exhaust fans inservice to ensure any inleakage to the Auxiliary Building is filtered prior to discharge to the environment.

The Containment system was not challenged during the time period associated with this event

nor was there any required safety function.

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