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January 31, 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 369/90-26-01

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 369/90-26-01 containing additional information for LER 369/90-26 which was submitted on November 12, 1990. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(i)(B),(a)(2)(v) and (a)(2)(vii). 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 for

T.L. McConnell

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 8

TITLE (4): Removal Of The Emergency Air Penetration Access Plate Rendered The Annulus Ventilation System Inoperable Because Of A Design Deficiency

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	0 9	8 9	9 0	0 2 6	0 1	1 1	1 2	9 0	McGuire, Unit 2	0 5 0 0 0 3 7 0
										0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL (10): 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.36(c)(2)	X 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
Alan Sipe, Chairman, McGuire Safety Review Group	AREA CODE 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 October 12, 1990, Design Engineering determined that during performance of procedure PT/1,2/A/4200/01F, Lower Containment Personnel Air Lock Leak Rate Test, both trains of the Annulus Ventilation (VE) system were rendered inoperable and were judged to be unable to create the required negative pressure in the Annulus within the required time according to Technical Specifications. Also, the Annulus could not be maintained within the specified pressures for the required time with the VE system in the recirculation mode. To perform this procedure, Performance personnel were required to remove the Emergency Air Penetration Access Plate. Next, it was necessary for Performance personnel to open the Bypass Leakage Enclosure Control Access Door (CAD) to facilitate removal of the Emergency Air Penetration flange and install the leak rate test rig. Both trains of the VE system were determined to be inoperable during the subject testing due to excess inleakage through the open test port and access door. This event is assigned a root cause of Design Deficiency because of unanticipated interaction of systems due to a design oversight. Units 1 and 2 have been in various modes of operation during performance of the Personnel Air Lock (PAL) leak rate test. Appropriate modifications have been submitted to prevent recurrence of this event.

EVALUATION:

Background

The main purpose of the VE system [EIIS:VD] is to provide long term fission product removal of Containment leakage following a Loss of Coolant Accident (LOCA) by creating and maintaining a negative pressure zone of at least -0.5 inches water gauge (inwg) in the Annulus. The VE system has two trains. Each train consists of a filter package [EIIS:FLT], a fan [EIIS:FAN] which draws in approximately 8000 cubic feet per minute (cfm) +/- 10 percent of annulus air, dampers [EIIS:DMP], instruments, and ductwork [EIIS:DUCT]. The filter package is designed to help maintain the offsite radiation dose within the Code of Federal Regulations, Title 10, Part 100, (10CFR100) guidelines which states, in part, the thyroid and the whole body doses at the exclusion area boundary and the low population zone are not to exceed 300 rem and 25 rem, respectively. The Annulus is required to be sufficiently sealed so as to maintain its negative pressure between -3.5 and -0.5 inwg for 278 seconds while the VE system operates in the recirculation mode.

Technical Specification (TS) 3.6.1.8 requires both trains of the VE system to be operable in Mode 1 (Power Operation), Mode 2 (Startup), Mode 3 (Hot Standby) and Mode 4 (Hot Shutdown). The Action Requirement is that with one train of the VE system inoperable, the train must be restored to operable status within 7 days or the unit must be in at least Hot Standby within the next 6 hours and in Cold Shutdown within the following 30 hours. Surveillance Requirement 4.6.1.8.d.4 states that at least once per 18 months, it must be shown that each train of the VE system produces a negative pressure of greater than or equal to -0.5 inwg in the Annulus within 22 seconds after a start signal and that this negative pressure goes to -3.5 inwg within 48 seconds after the start signal. This requirement is periodically met by the VE system performance test procedure PT/1,2/A/4450/03C, Annulus Ventilation System Performance Test.

TS 3.6.1.3 requires that each containment air lock [EIIS:AL] be operable in Modes 1 through 4. Surveillance Requirement 4.6.1.3.b requires an overall air lock leak rate test at least once per 6 months. This test is performed using procedure PT/1,2/A/4200/01F, Lower Containment Personnel Air Lock Leak Rate Test. To pressurize the air lock for the lower air lock test, the Emergency Air Penetration [EIIS:PEN] Access Plate, located next to the Lower Bypass Leakage Enclosure CAD [EIIS:DR] is removed so that test equipment can be attached.

Description of Event

The Lower Containment PAL Leak Rate Test procedure has been performed every six months since initial startup on each unit. During this test, the Emergency Air Penetration Access Plate, a barrier between the Annulus and the Auxiliary Building [EIIS:NF], has always been removed. Also, the Lower Bypass Leakage Enclosure CAD has always been opened to facilitate the removal of the Emergency Air Penetration flange. Both units had been in various

modes of operation, requiring VE operability during performance of these tests.

On February 22, 1989, due to concerns raised by Station personnel on VE operability during the PAL leak rate test, Performance personnel enhanced procedure PT/1,2/4200/01F, Lower Containment Personnel Air Lock Leak Rate Test. These enhancements added statements requiring Performance personnel to remain at the job site while the Annulus boundary was breached. Also, to immediately close the Bypass Leakage Enclosure CAD and the Emergency Air Penetration Access Plate if directed by the Shift Supervisor. Since February 11, 1985, the following statement has been in the PAL leak rate test procedure: If the VE system starts up during the performance of the overall PAL leak rate test, Performance personnel were to immediately close the Bypass Enclosure CAD and the Emergency Air Penetration Access Plate.

On August 18, 1989, a Station Report was written at Catawba Nuclear Station documenting an event where both trains of the VE system were unable to meet the Final Safety Analysis Report (FSAR) conditions due to the removal of the Bypass Leakage Enclosure Plate. This led Support Division Performance personnel located in the General Office to evaluate the problem of the VE system operability during the performance of the Lower Containment PAL Leak Rate Test procedure for McGuire. Then, on September 9, 1989, Support Division Performance personnel initiated Problem Investigation Report (PIR) 0-M89-0256. This PIR was initiated to address the potential consequences of performing the Lower Containment PAL Leak Rate Test with the Emergency Air Penetration Access Plate removed. The potential concerns were: 1) VE system operability and 2) The possibility of exceeding the FSAR on-site and off-site calculated dose values assuming LOCA conditions concurrent with the performance of the above test.

McGuire Compliance personnel performed an evaluation on September 25, 1989, based on Design Engineering's evaluation of the effect of the access plate removal on VE system operability for the on-site and off-site dose values to ensure these conditions did not exceed Chapter 15 FSAR, Accident Analysis, values. Design Engineering personnel were unaware at this time of the use of the Bypass Leakage Enclosure CAD to facilitate removal of the Emergency Air Penetration flange. Design Engineering personnel have had no opportunity to review the PAL Leak Rate Test procedure or changes to this procedure. The VE system operability concerns with the access plate removed during the PAL leak rate testing were reviewed by Maintenance, Performance, Operations, and Compliance personnel, and were provided to the NRC resident inspector. Based on these discussions, a decision was made to consider the VE system operable provided that the access plate could be restored immediately following VE system startup, or if directed by the Shift Supervisor. Administrative controls were to be placed in the PAL procedures to ensure that communication is established between the Control Room [EIIS:NA] and the technician at the lower PAL. When the access plate was removed, it was left hanging with one bolt still attached such that the test rig could be removed, the Emergency Air Penetration flange re-installed, and the access plate repositioned and secured in less than 15 minutes, if required.

NSMs MG-12335 and MG-22335 were requested on July 18, 1990, to add a pressure barrier (boot seal) to the access hatch enclosure which would allow testing of the PAL to occur without affecting VE operability.

On September 17, 1990, a Quality Assurance (QA) Audit was performed to assess the adequacy of Operability Evaluations, outstanding PIRs and proposed resolutions. The resolution of PIR No. 0-M89-0256 was included in this review. During this evaluation, further conversations between Design Engineering personnel and Station Performance personnel revealed that the Bypass Leakage Enclosure CAD must be opened to facilitate installation and removal of the test rig for the PAL leak rate test. This was not considered in the initial Design Engineering evaluation.

The method used by Performance personnel to perform the Lower PAL Leak Rate Test has been to leave the Emergency Air Penetration Access Plate hanging on one bolt and just swing it out of the way. Then the flange was removed. However, to remove the flange, because of the bolt arrangement on the flange and the physical restrictions to the flange, the Bypass Leakage Enclosure CAD door had been opened for access to remove the nuts from the bolts and to install the test rig. The Bypass Leakage Enclosure CAD was opened again to remove the test rig and re-install the Emergency Air Penetration flange (see page 7 of 7).

On October 12, 1990, subsequent evaluation by Design Engineering, taking into account the Bypass Leakage Enclosure CAD being opened during the PAL Leak Rate Test, revealed the VE system was inoperable during performance of this test. Also, the VE system was judged to be incapable of creating a negative pressure in the Annulus within the required time and the Annulus could not be maintained within the specified pressures for the required time with the VE system in the recirculation mode. Both trains of the VE system were inoperable during the subject testing due to excess inleakage through the open test port and access door. A review of the test recovery procedures estimated that the system would be operable within 15 minutes. Using this estimate and the licensing assumptions for offsite dose calculations, the guidelines of 10CFR100 would be exceeded.

Conclusion

This event is assigned a cause of Design Deficiency because of an unanticipated interaction of systems due to a design oversight. The Emergency Air Penetration flange is physically located flush with the Bypass Leakage Enclosure wall. The access plate opening into the Annulus physically restricts personnel from reaching through to place a tool on the bolt heads on the backside of the air lock flange (see page 7 of 7). Therefore, personnel were required to access the Annulus to hold the bolts in place. When station personnel performed this task, the Bypass Leakage Enclosure CAD door was used as access to the Annulus to perform this function. This also required the Bypass Leakage Enclosure CAD to be held open because of the physical location of the Emergency Air Penetration flange. When this

enclosure was designed, the affect on VE system operability was not taken into account for indeterminate reasons.

McGuire Exempt Change Variation Notices (MEVNs) 2547 and 2548 were written on the Unit 1 and Unit 2 Emergency Air Penetration flanges to weld the bolt heads to the backside (Annulus side) of the flanges; thereby, eliminating the need to open the Bypass Leakage Enclosure CAD during the performance of the leak rate test. Although the system will remain inoperable during testing, the dose consequences is below 10CFR100 guidelines. NSMs 12335 and 22335 are still being pursued to install a pressure barrier (boot seal) in Unit 1 and Unit 2 Emergency Air Penetration Access Areas, respectively.

Prior to this event, Duke Power began a training program called "Please Listen". This training stresses enhanced communication between groups. This training is still ongoing and will be given to Nuclear Production McGuire site personnel.

Performance Managers will cover this event with all appropriate Performance personnel. Performance personnel will ensure that when pertinent, complete test methods are covered with Design Engineering personnel. his will ensure that Design Engineering personnel understand the test methods used.

A review of the Operating Experience Program data base for McGuire TS violations for the previous twenty-four months revealed one event with a cause of Design Deficiency involving the VE system. Therefore, this event is considered recurring. Licensee Event Report (LER) 360/90-10 documented that the VE system and Control Room Ventilation System [EIIS:VI] filter train heaters [EIIS:HTR] were inadequately sized because of a Design Deficiency. Corrective actions as a result of LER 369/90-10 would not have prevented this event from occurring.

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

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

CORRECTIVE ACTIONS:

Immediate: None

Subsequent: MEVNs 2547 and 2548 ... Unit 1 and Unit 2, respectively, were implemented by welding the bolt heads on the Annulus side of the penetration flange.

Planned: 1) NSMs MG-12335 and 22335 for Unit 1 and Unit 2, respectively, will be implemented by Construction and Maintenance Department (CMD) personnel to add boot seals in the Emergency Air Penetration Access Areas.

2) Performance personnel will evaluate the Lower Containment Personnel Air Lock Leak Rate Test procedure for any enhancements in the depressurization of the PAL.

3) Performance Management will cover this event with all appropriate Performance personnel. When pertinent, Performance personnel will cover complete test methods with Design Engineering personnel.

SAFETY ANALYSIS:

The VE system is an accident mitigation system. The VE system is only required to function following a LOCA and is actuated by a Containment Hi-Hi pressure signal of 3 psig. The purpose of the VE system is to create and maintain a negative pressure zone in the Annulus, to minimize the release of radioactive material, and to provide long term fission product removal. With the Emergency Air Penetration Access Plate open, the VE system would be able to function but the negative pressure required would be degraded. Assuming LOCA conditions with the Emergency Air Penetration access plate removed, the Design Engineering dose assessment produced values exceeded the FSAR offsite and Control Room Operator dose values. Under these condition, these dose values were still within the NRC dose guidelines. However, with the access plate removed and the Bypass Leakage Enclosure CAD open, the Design Engineering dose assessment produced values exceeded the NRC dose guidelines. NRC dose guidelines are calculated based on instantaneous release of fission products following a LOCA. The assumption is extremely conservative. The VE system would not be able to maintain the negative pressure zone. At this point, radioactivity could leak into the Auxiliary Building. However, the Auxiliary Building Ventilation (VA) system [EIIS:VF] should be able to handle this inleakage. This system consists of two redundant trains and automatically switches to the filtered exhaust mode of operation on a Blackout or LOCA, or if radiation is detected by the exhaust radiation monitor. When the VA system switches to the filtered exhaust mode, the supply units and unfiltered exhaust units are secured. Operation of the filtered exhaust units without the benefit of the supply units allows a negative pressure to be pulled on the Auxiliary Building, thereby, facilitating the removal of radioactivity from the Annulus.

According to the Lower Containment PAL Leak Rate Test procedure, Performance personnel are required to immediately close the Bypass Leakage Enclosure CAD door and replace the Emergency Air Penetration Access Plate should the VE system start up during the performance of any section of this test, or if directed to do so by the Shift Supervisor, to ensure the Annulus integrity is maintained. Performance personnel demonstrated that without opening the Bypass Leakage Enclosure CAD they could depressurize the airlock through the test rig, remove the test rig and re-install the Emergency Air Penetration Access Plate within 7 minutes. Had the VE system started up, Performance personnel could have closed the Bypass Leakage Enclosure CAD door, had it been open, and secured the Emergency Air Penetration Access Plate within seven minutes, thereby, mitigating an Offsite dose release.

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 2 6	— 0 1	7 OF 8

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

The VE system was not challenged nor required to perform the safety function required under accident conditions during performance of any of the Lower Containment Personnel Air Lock Leak Rate Tests.

For most accident sequences, there is significant time between when Operations Control Room personnel would be aware that they had a situation which would lead to core damage, and the time that large fission product release would actually occur. The source term used for the offsite dose calculations is currently recognized to contain conservatism with respect to both timing and composition of radioactive releases following a design basis accident. For the highest frequency core damage sequences, one to two hours would be available for Operations Control Room personnel to diagnose the situation and take the appropriate actions required by the emergency procedures. Some very unlikely accident sequences exist, however, that could result in core damage in a 30 minute time period. This still reflects significant margin to the expected 15 minute reaction time provided by the steps included in the emergency procedures.

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

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 2 6	— 0 1	8 OF 8

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

EMERGENCY AIR PENETRATION