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February 28, 1991

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 369/90-23-01

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 369/90-23-01 transmitting additional information as committed in LER 369/90-23 dated September 20, 1990. 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,

Tony 2. McConnell

T.L. McConnell

DVF/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): Both Trains Of The Control Room Ventilation System Were Inoperable Because Of An Equipment Failure/Malfunction

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 8	2 1	9 0	9 0	— 0 2 3	— 0 1	0 9	2 0	9 0	McGuire Unit 2	0 5 0 0 0 3 7 0
										0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 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 August 20, 1990, at 0230, Train B of the Control Room Ventilation (VC) System was declared inoperable for modification and functional testing. Mechanical Maintenance (MNT) personnel conducted a check of the Train A VC Air Handling Unit (AHU) at approximately 1630, in preparation for modification of that train. Train A VC was in service at this time. This check revealed that the Train A VC AHU motor base tensioning bolts were sheared off. The Train A VC AHU was subsequently declared inoperable at 1705. At that time, both trains of the VC system were inoperable and TS 3.0.3 was entered. Work on Train B VC system was completed and the train was declared operable on August 21, 1990, at 1755. Repairs were made to the Train A VC system and it was declared operable on August 22, 1990, at 1845. Units 1 and 2 were in Mode 1 (Power Operation) at 100 percent power at the time of this event. This event is assigned a cause of Equipment Failure/Malfunction. Production Support Department (PSD) personnel conducted an analysis of the failed parts to determine the cause of the failure. Design Engineering (DE) personnel will evaluate this failure and recommend solutions to this problem.

EVALUATION:

Background

There are two independent trains of the Control Area Ventilation [EIIS:VI] system which are designed to maintain a habitable environment in the Control Room [EIIS:NA], Control Room Area, and Switchgear [EIIS:SWGR] Rooms during normal and accident conditions. Based on these criteria, the system is designed as an Engineered Safeguards Features [EIIS:JE] system with absolute and carbon filtration [EIIS:FLT] in the outside air intakes and with equipment redundancies for use as conditions require. The Control Room is designed to be maintained at a positive pressure of >/= 0.125 inches water gauge (w.g.), relative to outside atmosphere during an accident to prevent entry of contaminants. Two 100 percent capacity Outside Air Pressure Filter Trains pressurize the Control Room by providing approximately 1000 cubic feet per minute (cfm) of filtered outside air in addition to approximately 1000 cfm of filtered recirculated Control Room air.

Technical Specification (TS) 3/4.7.6 includes requirements that in Mode 1 (Power Operation), Mode 2 (Startup), Mode 3 (Hot Standby), and Mode 4 (Hot Shutdown), with one train of the VC system inoperable, the inoperable train must be restored to operable status within seven days or be in at least Hot Standby within the next six hours, and in Mode 5 (Cold Shutdown) within the next thirty hours. With both trains of VC inoperable and the unit in Mode 1, the specified action is to comply with TS 3.0.3. TS 3.0.3 requires that within 1 hour action must be initiated to place the unit in a mode in which the TS does not apply. TS 3.7.6 applies to Unit 1 and Unit 2 because the VC system is shared by both units.

Description of Event

On August 20, 1990, at 0230, the Train B VC system was declared inoperable for implementation of Nuclear Station Modification MG-53370, Revision 0.

On August 21, 1990, at approximately 1630, MNT personnel performed a check of the Train A VC AHU [EIIS:AHU], while preparing to implement the same modification on that train. The Train A VC system, which was inservice at the time, was found to be damaged. The tensioning bolts on the Train A VC AHU motor [EIIS:MO] base plate were sheared off.

MNT personnel then informed the Shift Supervisor (SS) of the damage to the Train A VC AHU. Work Request 141514 was written to repair the damage to the Train A VC AHU motor base plate tensioning bolts. The SS contacted the Maintenance Engineering Services (MES) personnel responsible for ventilation systems. Upon examination of the damaged component, the Train A VC system was declared inoperable at 1705 and TS 3.0.3 was entered. Initial examination of the damaged parts indicated that the probable cause of this failure was fatigue.

The work on the Train B VC system was subsequently completed and Train B was declared operable on August 21, 1990, at 1755 and TS 3.0.3 was exited.

Repairs were started on the Train A VC AHU. MNT personnel contacted the onsite Design Engineering (DE) staff to determine what type/grade of materials to use. DE personnel determined that the tensioning bolts and base plate material type were not specified on the manufacturers drawings. A McGuire Exempt Variation Notice (MEVN 2444) was originated to fabricate the new bracket to the original design, using A-36 type carbon steel.

While these repairs were being completed, an additional problem was discovered regarding the Train A VC AHU. Inleakage was identified on the AHU housing. This event is addressed in LER 369/90-24, which is presently under investigation.

Repair of the Train A VC AHU, including the sealing of inleakage, was completed on August 22, 1990. The Train A VC system was declared operable at 1845.

DE personnel are evaluating the failure of the tensioning bolts, applicability of this problem to the Train B VC AHU, and applicability to other ventilation systems. Analysis of the failed parts by PSD personnel was requested by DE.

Conclusion

This event has been assigned a cause of Equipment Failure/Malfunction. The tensioning bolts were damaged such that the only tension being maintained on the Train A VC AHU belts was the weight of the motor itself.

Discussions with MES and DE personnel indicate that the Train A VC AHU has previously experienced higher vibration than exhibited by the Train B VC AHU. Pending the results of the analysis of the failed parts, it appears that the tensioning bolts may have failed due to fatigue caused by vibration. It has been determined that this problem does not represent an operability concern on the other redundant train because of the lower vibration levels experienced by Train B VC AHU. MEVN 2359, completed August 9, 1990, addressed the vibration problem on Train A VC AHU. Although the Train A VC AHU motor continues to exhibit some high vibration, initial feedback on the effectiveness of this modification indicates that vibration levels have been considerably reduced.

During the repair of the Train A VC AHU, DE personnel discovered that the manufacturer's drawings did not specify the material type used in the motor base plate/tensioning bolt assembly. Per MEVN 2444, MNT personnel used type A-36 materials. The materials used were also of a larger physical size (i.e. larger diameter).

This failure is believed to have been caused by a vibration problem unique to the Train A VC AHU, and the motor base plate design used on the VC system, which is not commonly used on other ventilation systems.

DE personnel will evaluate this failure and make recommendations as to the best possible solution to this problem.

A review of the Operating Experience Program data base for the past twenty-four months prior to this event revealed one event involving TS violations because of Equipment Failure/Malfunction of the VC system. This problem was documented in LER 369/89-18. Both trains of the VC system were made inoperable when a Nuclear Service (RN) [EIIS:BI] system valve [EIIS:FCV], 1RN-460, Control Room Air Conditioning Condenser B Control No. 2, failed to open. Since both trains of the VC system were made inoperable due to an equipment failure, the problem is considered to be recurring. Corrective actions for LER 369/89-18 would not have prevented this problem 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 material as a result of this event.

CORRECTIVE ACTIONS:

Immediate: Actions were taken to restore the Train 'B' VC system to an operable status.

Subsequent:

1) Train A VC system was repaired under Work Request No. 141514.

2) DE personnel evaluated the applicability of this failure to the Train B VC system and other ventilation systems and determined that this failure was not applicable to those systems due to their lower vibration levels.

3 PSD personnel analyzed the failed parts to determine the failure mode.

Planned:

1) DE personnel will evaluate this failure and make recommendations as to the best possible solution to this problem.

2) McGuire Safety Review Group (MSRG) personnel will submit an addendum to this report upon completion of the DE evaluation.

SAFETY ANALYSIS:

The design requirements of the VC system are to supply filtered air at a controlled temperature and humidity and to pressurize the Control Room to 0.125 inches w.g. A positive pressure of 0.05 inches w.g. is considered sufficient to prevent inleakage in excess of 10 cfm, which is the assumed leakage value used for radiation dose calculations in Chapter 15 of the Final Safety Analysis Report (FSAR).

Failure of the tensioning assembly could very likely have resulted in the belt jumping off the AHU or motor pulley. This would have resulted in a loss of air flow in that train. With the other train inoperable, Control Room temperature would rapidly increase and exceed the TS limit of 90 degrees F.

Normal Control Room temperature is 75 degrees F. The Control Room temperature is verified to be </= 90 degrees F once every 12 hours per procedure PT/A/4600/03A, Semi-Daily Surveillance Items. Loss of both trains of VC would likely result in the Control Room temperature exceeding 90 degrees F in less than the 12 hour surveillance cycle. Operators would notice such an increase. The operators would also receive alarms indicating problems with the VC system. Operator response to an increasing control room temperature would include implementation of procedure AP/0/A/5500/38, Control Room Hi Temperature, which specifies actions to be taken to mitigate the consequences of a high control room temperature. Operator action under TS 3.0.3 would commence as soon as both trains of the VC system were determined to be inoperable. Sufficient time would exist to bring the units down to Mode 3 and subsequently, Mode 5 (Cold Shutdown).

Although the Train A VC AHU was declared inoperable due to the sheared tensioning bolts, this AHU continued in service during the 50 minute interval until Train B VC system was returned to operability. During this time, Train A VC AHU continued to provide air flow to the Control Room.

During this event, there were no accidents that would have required operation of the VC system to maintain habitability of the Control Room.

The principle contaminant contained in air leaking into the Control Room is assumed to be radioactive Iodine. Very low amounts of Iodine would be expected to reach the area around the Control Room since this requires passage through either Auxiliary or Turbine Building Ventilation systems [EIIS:VF,VK] or passageways first.

Control Room Operator dose would be further reduced by operation of the Auxiliary Building Ventilation system. No credit is taken for the VA filtration, with regard to Control Room dose calculation, in mitigating the Emergency Core Cooling System leakage source. However, this system is automatically switched to the filtered exhaust mode of operation on an accident or Blackout signal or if radiation is detected by the exhaust monitor [EIIS:MON]. The VA system has two trains (Unit 1 and Unit 2) which respond to an accident on either unit thus providing essentially redundant

protection. Operation of the VA system in the filtered exhaust mode by either train of the system would serve to reduce the calculated dose to Control Room personnel.

In the event the Control Room atmosphere became unbreathable, self contained breathing apparatus (SCBA) provided in the Control Room area could be employed. Radiation monitors in the Control Room would alert Control Room personnel of high radiation levels.

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

ADDITIONAL INFORMATION:

Evaluation of this failure by DE personnel resulted in two additional corrective actions to resolve the problem.

The first corrective action requires the redesign of the Train A VC AHU motor base plate to use a slide rail type arrangement. The second corrective action involves the replacement of the existing drive belt on the Train A VC AHU with a Browning or Gates model 112 belt. The combination of these corrective actions will enhance the capability to align the motor to its proper position.