



**DUKE POWER**

November 13, 1989

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

Subject: McGuire Nuclear Station Units 1 and 2  
Docket No. 50-369  
Licensee Event Report 369/89-31

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 369/89-31 concerning both trains of the Control Area Ventilation System being declared inoperable because of an inappropriate action. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(i) and (a)(2)(v). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

*Tony L. McConnell*

T.L. McConnell

DVE/ADJ/cbl

Attachment

xc: Mr. S.D. Ebnetter  
Administrator, Region II  
U.S. Nuclear Regulatory Commission  
101 Marietta St., NW, Suite 2900  
Atlanta, GA 30323

INPO Records Center  
Suite 1500  
1100 Circle 75 Parkway  
Atlanta, GA 30339

M&M Nuclear Consultants  
1221 Avenue of the Americas  
New York, NY 10020

American Nuclear Insurers  
c/o Dottie Sherman, ANI Library  
The Exchange, Suit 245  
270 Farmington Avenue  
Farmington, CT 06032

Mr. Darl Hood  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, D.C. 20555

Mr. P.K. Van Doorn  
NRC Resident Inspector  
McGuire Nuclear Station

8911220005 891113  
FDR ADOCK 05000369  
S PDC

*Handwritten signature/initials*

bxcc: B.W. Bline  
A.S. Daughtridge  
J.S. Warren  
R.L. Gill  
R.M. Glover (CNS)  
T.D. Curtis (ONS)  
P.R. Herran  
S.S. Kilborn (W)  
R.E. Lopez-Ibanez  
J.J. Maher  
R.O. Sharpe (MNS)  
G.B. Swindlehurst  
K.D. Thomas  
L.E. Weaver  
R.L. Weber  
J.D. Wylie (PSD)  
J.W. Willis  
QA Tech. Services NRC Coordinator (EC 12/55)  
MC-815-04  
(20)

LICENSEE EVENT REPORT (LER)

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

TITLE (4) **Technical Specification 3.0.3 Was Entered On Unit 1 And Unit 2 Due To An Inappropriate Action During Maintenance On The Control Area Ventilation System**

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	0	12	8	9	8	9	0	3	1	00	11	13	8	9	McGuire Unit 2	0 5 0 0 0 3 7 1 0
																0 5 0 0 0 1 1 1

OPERATING MODE (9) **1** THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

20.402(b)	<input type="checkbox"/>	20.406(e)	<input type="checkbox"/>	80.73(a)(2)(iv)	<input type="checkbox"/>	73.71(b)	<input type="checkbox"/>
20.406(a)(1)(i)	<input type="checkbox"/>	80.38(e)(1)	<input checked="" type="checkbox"/>	80.73(a)(2)(v)	<input type="checkbox"/>	73.71(e)	<input type="checkbox"/>
20.406(a)(1)(ii)	<input type="checkbox"/>	80.38(e)(2)	<input type="checkbox"/>	80.73(a)(2)(vii)	<input type="checkbox"/>	OTHER (Specify in Abstract below and in Text, NRC Form 306A)	<input type="checkbox"/>
20.406(a)(1)(iii)	<input type="checkbox"/>	80.73(a)(2)(i)	<input checked="" type="checkbox"/>	80.73(a)(2)(viii)(A)	<input type="checkbox"/>		<input type="checkbox"/>
20.406(a)(1)(iv)	<input type="checkbox"/>	80.73(a)(2)(ii)	<input type="checkbox"/>	80.73(a)(2)(viii)(B)	<input type="checkbox"/>		<input type="checkbox"/>
20.406(a)(1)(v)	<input type="checkbox"/>	80.73(a)(2)(iii)	<input type="checkbox"/>	80.73(a)(2)(ix)	<input type="checkbox"/>		<input type="checkbox"/>

LICENSEE CONTACT FOR THIS LER (12)

NAME **Alan Sipe, Chairman, McGuire Safety Review Group** TELEPHONE NUMBER **71014 817151-1411813**

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS

SUPPLEMENTAL REPORT EXPECTED (14)  YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15) **0 3 0 1 9 0**

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On October 12, 1989, Instrumentation and Electrical (IAE) personnel were performing maintenance on the Chlorine Detectors for the Control Area Ventilation (VC) System. At 1435, IAE personnel were returning the Chlorine Detectors to service by reconnecting power leads. One of the power leads was accidentally dropped and touched the grounding screw. This caused the AC power supply fuse to blow, resulting in the automatic isolation of the four outside air intakes on the VC system. This resulted in Units 1 and 2 entering Technical Specification (TS) 3.0.3. Operations personnel removed power from the outside air intake valves and then manually opened the valves, thereby exiting TS 3.0.3. However, Units 1 and 2 then entered TS 3.3.3.1 which requires that two channels of the VC Air Intake Radiation Monitors be operable. The Radiation Monitors could still detect radiation; however, they could not close the VC system outside air intake valves because the power had been removed. IAE personnel replaced the fuse. The intake valves were returned to service, and TS 3.3.3.1 was exited. Unit 1 and Unit 2 were in Mode 1 (Power Operation) at 100 percent power at the time of this event. This event is assigned a cause of Inappropriate Action because the action taken was accidental. Maintenance Engineering Services (MES) personnel will evaluate adding a terminal strip with sliding links and another fuse for the VC Chlorine Detectors.

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TEXT (If more space is required, use additional NRC Form 306A's) (17)

EVALUATION:

Background

There are two independent trains of the VC [EIIS:VI] System which are designed to maintain a habitable environment in the Control Room [EIIS:NA], Control Room Area, and Switchgear Rooms, during normal and accident conditions. Based on these criteria, the system is designed as an Engineered Safety 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 greater than or equal to 0.125 inches water gauge (w.g.), relative to outside atmosphere during an accident to prevent entry of contaminants.

Chlorine Detectors [EIIS:DET] monitor the outside air intake structure of the VC system for the presence of chlorine gas. Each train has two intake structures. Each structure is monitored by one detector and has two redundant isolation valves [EIIS:ISV]. If gas is detected by either detector of the train, the train intake structures will be automatically secured by means of closing four intake isolation valves and a local/remote alarm [EIIS:ALM] will be generated. The major parts of a chlorine detector are the electrolyte tank [EIIS:TK] that houses a wick, a blower [EIIS:BLO] unit, and an electronic unit.

TS 3.0.3 states that when a Limiting Condition of Operation is not met, except as provided in associated Action Statements, within one hour action must be initiated to place the affected units in a mode in which the specification does not apply.

TS 3.3.3.1 states for the VC Outside Air Intake Radiation Monitors [EIIS:MON], EMF 43a and 43b, a minimum of two operable channels [EIIS:CHA] are required. With the number of operable channels less than the minimum requirement, the VC system outside air intakes which contain the inoperable instrumentation must be isolated within one hour.

The Operability Evaluation for PIR 0-M89-0163, Revision 1 dated September 14, 1989 and expiring February 19, 1990, states:

In order to achieve acceptable pressure in the Control Room, the doors [EIIS:DR] in the Control Room were sealed with tape, with the exception of the two doors leading to the Service Building [EIIS:MF], and all four outside air intakes were opened. Based on the test results and the conditions required to achieve the test results, the VC system is Conditionally Operable, with the conditions of operability being:

- Maintain a tight seal on all the doors in the Control Room. All of the seams of the Control Room doors (except the two doors leading to the Service Building, which are pressure doors) are to be taped. Tape can subsequently be removed as long as Control Room pressurization requirements are met.

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

- All four outside air intakes are to stay open except when testing pursuant to TS 4.3.3.1. The operating procedure for the VC system is to be modified to specify all four intakes to be open during normal and accident conditions. The operator will be required to reopen all intakes if they are closed due to the radiation monitor detecting contaminated air in the duct.

The doors which are required to be sealed with tape to maintain an acceptable pressure in the Control Room have been subsequently sealed with a high quality RTV sealant.

Description of Event

On August 16, 1989, a monthly Preventative Maintenance (PM) was completed on the VC system OMVCMT5010 Chlorine Detector according to work request 03167A. During this PM, which was to check the electrolyte level for the Chlorine Detector, the proper response was received from the appropriate alarms and valves. However, it was discovered that the blower unit and wick needed replacing. Since the monthly surveillance was required to be completed on August 17, 1989, and the alarms and valves operated appropriately, work request 69489 was written to replace the blower unit and wick. On October 10, 1989, work request 69489 was signed by Operations personnel for IAE personnel to start work on the OMVCMT5010 Chlorine Detector. IAE personnel were using procedure IP/0/B/3012/14, VC System Chlorine Detectors, to perform the maintenance. On October 12, 1989, at 1435, IAE Technician A was reconnecting the power leads according to step 10.7.1 in the Return to Service section of the VC System Chlorine Detectors procedure. While IAE Technician A was trying to place the power lead on the terminal strip using a screw starter or holding screwdriver, the screw and power lead fell from the screw starter and landed on the grounding screw in the terminal strip box. This caused a short to ground to occur, which then blew the AC power supply in-line fuse [EIIS:FU]. When this fuse blew, power was lost to all four Chlorine Detectors. This caused all four VC system outside air intakes to isolate. According to the Condition of Operability for the VC system (Operability Evaluation for PIR 0-M89-0163, Revision 1), Units 1 and 2 then entered TS 3.0.3.

IAE Technician A immediately called the Control Room and notified Operations personnel of what had happened. Operations personnel saw that there was a chlorine detection alarm and by looking at the indications for the valve positions they saw that all four VC system outside air intakes had isolated.

At 1510, Operations personnel removed power from the VC system outside air intake valves and manually opened the valves. This enabled Unit 1 and Unit 2 to exit from TS 3.0.3. It also placed Units 1 and 2 under another one hour action statement as required by TS 3.3.3.1. With the intake valves manually opened, EMF43 would not be able to perform its intended function of closing the intakes if a radiation alarm occurred. Operations personnel were placed on standby at the breakers for the outside air intake valves, to close the valves in case of a high radiation alarm.

By 1600, IAE personnel had replaced and functionally tested the in-line fuse, and Operations personnel had restored power to the VC system Outside Air Intake Valves.

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Operations personnel had to manually close the valves and then close the breakers to return the intake valves to their full open position. This allowed Unit 1 and Unit 2 to exit TS 3.3.3.1.

On November 3, 1989, Operations personnel notified the NRC of a single failure that caused both trains of VC to become inoperable.

Conclusion

This event is assigned a cause of Inappropriate Action because the action taken was accidental. While IAE Technician A was placing the power lead on the terminal, the power lead fell from the screw starter and touched ground. This in turn blew the 120V AC power supply to the chlorine detectors in-line fuse, closing all four VC outside air intakes. The procedure requires the power leads to be removed for testing the Chlorine Detectors. Power cannot be isolated by opening a breaker because of other equipment required to be operable. Lifting power leads to test unisolable low-voltage equipment is an accepted industry practice. This event occurred while the power leads were being replaced to return the OMVCMT5010 Chlorine Detector to service. IAE Technician A was performing this VC system Chlorine Detectors procedure for the first time as on-the-job training and was not Employee Training and Qualifications System (ETQS) qualified to this task. However, the IAE Technician A was performing this procedure under supervisory direction. This event will be covered with all IAE crews.

A mitigating circumstance is that the terminal box is small which does not allow personnel to hold the power lead in place while terminating it. The use of a holding screwdriver to place a power lead is standard practice for the IAE section. MES will evaluate adding a terminal box with sliding links in line with existing wiring and take appropriate actions as necessary.

The AC power supply to the chlorine detectors in-line fuse was added recently during the Unit 2 End of Cycle 5 Outage according to Nuclear Station Modification (NSM) MG-1-0071. This NSM modified the 125 VDC Auxiliary Control Power System by adding miscellaneous fuses to make the non-essential controls powered from the KXA Inverter [EIIS:INVT] to power panelboard [EIIS:BD] KXA more reliable. A 5 Amp fuse was added to protect the Radiation Monitor and Chlorine Monitor circuits for the VC System. If this event had occurred prior to this NSM being implemented several other systems in addition to the VC system would have become inoperable (e.g. Reactor Building Purge System [EIIS:VA]). MES personnel will evaluate adding another fuse for the Chlorine Detectors circuitry to ensure train separation and redundancy and will take appropriate action as necessary. This event is still being investigated and an addendum will be written with the results of the investigation.

Operations personnel prepared for the possibility of the replacement of this in-line fuse taking over an hour, by securing the four intakes in an open position. With the intakes secured open, if a high radiation alarm on EMF 43 had occurred, the outside intake valves could not automatically close. Therefore, TS 3.3.3.1 was entered because EMF 43 was rendered inoperable. Operations personnel were on

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standby at the outside air intake valve breakers to be ready to close the breakers if a radiation alarm was received.

Both one hour TS Action Statements, TS 3.0.3 and 3.3.3.1, were met.

A review of the past 12 months using the Operating Experience Program data base for McGuire revealed 9 TS violation events or entry into TS 3.0.3 events with a general cause of Inappropriate Action. However, there were no TS related events with a cause of accidental Inappropriate Action. Therefore, this event is not considered recurring.

There have been two events at McGuire in the past 18 months that documented Inappropriate Actions that caused Engineering Safety Features Actuations (ESFA). Licensee Event Report (LER) 360/88-8 involved Performance personnel performing a valve [EISS:V] stroke timing test where a power lead inadvertently made contact with the electrical circuitry of the Turbine Driven Auxiliary Feedwater Pump. This caused a fuse to blow and an ESFA to occur. LER 369/89-25 involved Performance personnel performing a valve stroke timing test where a jumper placed across a sliding link came loose and inadvertently made contact with another sliding link, thereby, causing a fuse to blow and an ESFA to occur. Based on the above events the problem of Inappropriate Actions because of dropping power leads or jumpers is considered 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:
  - 1) Operations personnel removed power to the VC system Outside Air Intake valves and manually opened the valves, thereby, exiting TS 3.0.3 and entering TS 3.3.3.1.
  - 2) Operations personnel were placed on standby at the Outside Air Intake valve breakers to close the valves in case of a high radiation alarm.
- Subsequent:
  - 1) IAE personnel replaced and functionally checked the in-line fuse on the Chlorine Detectors.
  - 2) Operations personnel returned the VC System Outside Air Intakes to service by restoring power to them and returning them to the full open position thereby exiting TS 3.3.3.1.
- Planned:
  - 1) This event will be covered with all IAE crews.
  - 2) MES personnel will evaluate adding a terminal box with sliding links in line with existing wiring and take appropriate action as necessary.

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

- 3) MES personnel will evaluate adding another fuse for the Chlorine Detectors to have a fuse for each train and will take appropriate action as necessary.
- 4) An addendum will be written on the results of the investigation of the blown fuse causing both trains of VC to become inoperable.

SAFETY ANALYSIS:

The design requirements of the VC system are to supply filtered air at a controlled temperature and humidity to the Control Room and to pressurize the Control Room to prevent inleakage of unfiltered air. The VC system helps ensure that doses to Control Room personnel are As Low As Reasonably Achievable and remain below Code of Federal Regulations, Title 10, Part 50 (10CFR50), Appendix A, Criteria 19 (GDC-19) limits.

The TS 4.7.6 requirement specifies that a Control Room positive pressure of greater than or equal to 0.125 inches w.g. relative to outside atmosphere during system operation must be demonstrated at least once every 18 months. A positive pressure of 0.05 inches w.g. is considered sufficient to prevent inleakage in excess of 10 cubic feet/minute, which is the assumed leakage value used for radiation dose calculations in Chapter 15 of the Final Safety Analysis Report (FSAR).

The Operability Evaluation for PIR 0-M89-0163 results showed that both outside air pressurization filter trains were able to pressurize the Control Room greater than the 0.125 inches w.g. with all four outside air intakes open. With two intakes open, the Control Room pressure was still positive but less than the required 0.125 inches w.g.

The principle contaminant contained in air leaking into the Control Room is assumed to be Iodine which is very conservatively modeled in dose calculations. 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 or passageways.

Control Room Operator dose would be further reduced by operation of the Auxiliary Building Ventilation system which is not safety related but has been maintained to safety standards.

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

During this event, Operations personnel had manually opened the VC system outside air intake valves; therefore, the Control Room pressurization would have been maintained had it been necessary.

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