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DUKE POWER

December 11, 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 369/91-14

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 369/91-14 concerning train A of the containment spray system being inoperable due to a mispositioned valve. This report is being submitted in accordance with 10 CFR 50.73(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,

Tony C. McMeekin for

T. C. McMeekin

LJK/cbl

Attachment

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LICENSEE EVENT REPORT (LER)

FACILITY NAME(1)

McGuire Nuclear Station, Unit 1

DOCKET NUMBER(2)

05000 369

PAGE(3)

1 OF 7

TITLE(4) Train A Of The Containment Spray System Was Inoperable Due To A Mispositioned Valve As A Result 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 | DOCKET NUMBER(8) |
| 10 | 4 | 91 | 91 | 14 | 0 | 12 | 11 | 91 | 05000 |

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|-------------------|----|---|-----------------|------------------|-------------------|------------------|-----------------|-----------|----------------|-----------------|------------------|-----------------|----------------|-----------------|---------------------|---------------------|-------------------|----------|----------|---|
| OPERATING MODE(9) | 6 | THIS REPORT IS SUBMITTED PURSUANT TO REQUIREMENTS OF 10CFR (Check one or more of the following)(11) | | | | | | | | | | | | | | | | | | |
| POWER LEVEL(10) | 0% | 20.402(b) | 20.405(a)(1)(i) | 20.405(a)(1)(ii) | 20.405(a)(1)(iii) | 20.405(a)(1)(iv) | 20.405(a)(1)(v) | 20.405(c) | 50.73(a)(2)(i) | 50.73(a)(2)(ii) | 50.73(a)(2)(iii) | 50.73(a)(2)(iv) | 50.73(a)(2)(v) | 50.73(a)(2)(vi) | 50.73(a)(2)(vii)(A) | 50.73(a)(2)(vii)(B) | 50.73(a)(2)(viii) | 73.71(b) | 73.71(c) | OTHER (Specify in Abstract below and in Text) |
| | | | | | | | | | | | | X | | | | | | | | |

LICENSEE CONTACT FOR THIS LER(12)

| | | | |
|------|---|------------------|--------------|
| NAME | ALAN R. SIPE, CHAIRMAN, MCGUIRE SAFETY REVIEW GROUP | TELEPHONE NUMBER | 704 875-4183 |
|------|---|------------------|--------------|

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

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NFRDS | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NFRDS |
|-------|--------|-----------|--------------|---------------------|-------|--------|-----------|--------------|---------------------|
| | | | | | | | | | |

SUPPLEMENTAL REPORT EXPECTED(14)

| | | | | | | |
|---|---|----|------------------------------|-------|-----|------|
| YES (If yes, complete EXPECTED SUBMISSION DATE) | X | NO | EXPECTED SUBMISSION DATE(15) | MONTH | DAY | YEAR |
|---|---|----|------------------------------|-------|-----|------|

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

On September 30, 1991, valve 1RN-951, Containment Spray (NS) System Pump 1A Air Handling Unit (AHU) Outlet Control, was found mispositioned in the closed position during maintenance activities. Unit 1 was in Mode 6 (Refueling), in day 10 of a projected 71 day outage at the time of discovery. The misposition of valve 1RN-951 was brought to the attention of Operations (OPS) Control Room personnel during discussion by OPS and Maintenance (MNT) personnel of valve 1RN-949, Residual Heat Removal (ND) System Pump 1A AHU Outlet Control, which was discovered mispositioned on October 4, 1991. During investigation of the event, it was determined that valve 1RN-949 was in the correct position during the time that the ND system was required to be operable. Valve 1RN-951 had been in the incorrect position for an unknown period of time after September 4, 1991. This resulted in Train 1A of the NS system being inoperable for an unknown period between September 4, 1991, and October 4, 1991. The NS system had been required to be operable September 4, 1991, through September 21, 1991, until Unit 1 entered Mode 5 (Cold Shutdown). Valves 1RN-949 and 1RN-951 were subsequently returned to the correct throttled position. This event is assigned a cause of Unknown because valve 1RN-951 was found in the closed position and no definite or probable cause could be determined.

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EVALUATION:

Background

The Containment Spray (NS) system [EIIS:BE] is an Engineered Safety Feature (ESF) system which serves to remove thermal energy from the Containment atmosphere in the event of a Loss Of Coolant Accident (LOCA). It performs this function in conjunction with the Emergency Core Cooling System (ECCS), which cools the Reactor [EIIS:RCT] Core by direct injection. After all the ice from the Ice Condenser [EIIS:BC] has melted, the heat removal capability of the NS system will keep the Containment pressure below the design limit of 15 psig. The NS system contains two parallel flow paths. Each flow path contains a pump [EIIS:P], heat exchanger [EIIS:HX] and the associated piping, valves [EIIS:V], and spray headers.

Technical Specification (TS) 3.6.2 specifies the requirements for operation of the NS pumps with respect to their ECCS function. Both pumps are required to be operable in Modes 1 (Power Operation), 2 (Startup), 3 (Hot Standby), and 4 (Hot Shutdown). During operation in Modes 1, 2, 3, or 4, when one train of ECCS becomes inoperable, the inoperable train must be returned to operable status within 72 hours, or the unit must be shutdown to Mode 3 within the next six hours and Mode 4 within the following six hours. The inoperable NS train must be restored to operable status within the next 48 hours or be in Mode 5 (Cold Shutdown) within the following 30 hours.

If the associated Air Handling Unit (AHU) [EIIS:AHU] is incapable of providing adequate cooling in the pump room, that train of the NS system shall be declared inoperable.

The Nuclear Service Water (RN) system [EIIS:SI] provides normal cooling water and assured cooling water for various Auxiliary Building [EIIS:NF] and Reactor Building heat exchangers and coolers [EIIS:CLR] during all phases of station operation including anticipated transients and accident conditions.

Throttle valve 1RN-951, NS System Pump 1A AHU Outlet Control, is located on the outlet of the ESF AHU for NS Pump Motor [EIIS:MO] 1A. This valve is administratively controlled or locked in position once the required flow rates are met. Valve 1RN-951 does not perform any safety-related functions related to the safe shutdown of Unit 1.

NS Pump Motor 1A ESF AHU cooling water flow is monitored by flow switch [EIIS:FS] 1RNFS5750, NS System Pump Motor 1A Essential Air Cooler Flow. Flow switch 1RNFS5750 provides local flow indication and alarms [EIIS:ALM] at the local NS pump panel [EIIS:PL] on low flow conditions. A status light is also provided in the Control Room [EIIS:NA] which illuminates only when a low RN system flow condition is present and the NS Pump Motor 1A AHU is running.

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Description of Event

On September 30, 1991, Maintenance (MNT) Technicians A, B, and C were assigned to torque the bonnet on valve 1RN-951 as directed by work request 890163PRJ. Several work requests had been written by a Projects Engineer to verify the bonnet torque on RN system valves which had been replaced by Nuclear Station Modification (NSM) MG1-1889. Operations (OPS) Control Room personnel had already granted clearance to begin work on work request 890163PRJ when it was received by the MNT Technicians. MNT Technician B telephoned OPS Senior Reactor Operator (SRO) A to inform Control Room personnel that they were about to commence work on valve 1RN-951 per work request 890163PRJ. OPS SRO A then told MNT Technician B that they should find the valve locked open and it was okay to change the valve position as needed for maintenance.

MNT Technicians A, B, and C went to NS Pump Room 1A where valve 1RN-951 is located. The access door [E11S:DR] to the room was locked due to being a high radiation area. MNT Technician C stayed outside the room to act as runner while MNT Technicians A and B went inside the room. MNT Technician A climbed the scaffold to access valve 1RN-951 while MNT Technician B remained on the floor. Work request 890163PRJ specified procedure MP/O/A/7700/34, Disassembly and Reassembly of Kerotest Y-Type Throttling Valves, be used to control the work. This procedure requires the valve to be in mid-position before torquing to ensure that the valve disc is not damaged. MNT Technician A found a chain and lock draped over the valve. The lock was not open, but the lock/chain assembly was not attached in a method that would prevent valve handle movement without removing the lock. He, therefore, removed the chain from the valve without having to unlock the lock. He then saw a yellow plastic tag on valve 1RN-951 that stated: "CAUTION DO NOT REPOSITION THIS VALVE THROTTLED PER PERFORMANCE FLOW BALANCE. CONTACT PERFORMANCE RETEST ENGINEER PRIOR TO WORK." MNT Technician A then asked MNT Technician B to call the Performance (PRF) Duty Engineer for notification prior to starting work. The PRF Duty Engineer then gave permission to operate the valve, since he knew a PRF retest evaluation would be done following completion of the maintenance work. MNT Technician A then attempted to verify that the valve was open by moving the handwheel. He discovered that the valve was closed. He then moved the valve to mid-position and proceeded to torque the valve bonnet as directed by work request 890163PRJ. Upon completion of the job, he returned the valve to the closed position and placed the locked chain assembly on the valve handwheel, since standard MNT practice is to return repaired components to the "as found" condition. Since the MNT Technicians found the chain and lock assembly not attached to the valve and the unit was in an outage, they did not realize the significance of finding the valve in the closed position. There was no followup, at that time, to reposition the valve or report the as found position to OPS personnel.

Work request 890163PRJ was subsequently forwarded to PRF for retest. However, at the time,

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The NS system was not required to be operable. Therefore, there was no urgency by PRF personnel to verify the position of valve 1RN-951. The verification was scheduled to be completed prior to Unit 1 entering Mode 4 at the end of the refueling outage.

On October 4, 1991, MNT Technicians A and D were assigned to torque the bonnet on valve 1RN-949, Residual Heat Removal (ND) System Pump 1A AHU Outlet Control, as directed by work request 890164PRJ for NSM MG1-1889. MNT Technician A telephoned OPS SRO B and informed Control Room personnel that they were about to commence work on valve 1RN-949 per work request 890164PRJ. OPS SRO B told MNT Technician A that they should find the valve locked open and it was okay to change the valve position as needed for maintenance. MNT Technicians A and D then went to ND Pump Room 1A, where valve 1RN-949 is located. They observed a yellow tag on valve 1RN-949 that was identical to the tag on valve 1RN-951. MNT Technician A then asked MNT Technician D to call the PRF Duty Engineer for notification prior to starting work. The PRF Duty Engineer gave permission to operate the valve. MNT Technician A then observed that the valve was closed. He then directed MNT Technician D to call OPS Control Room personnel and inform them that they had found valve 1RN-949 mispositioned. He proceeded to torque the valve bonnet as directed by work request 890164PRJ. Upon completion of the job, valve 1RN-949 was left 1.5 turns open as required. MNT Technician A then went to the Control Room to discuss the mispositioned valve with OPS SRO B. During this discussion, MNT Technician A also informed OPS SRO B about the job on valve 1RN-951 that had previously been performed, and that it had been left in the closed position. OPS SRO B then directed other OPS personnel to verify the position of all other Unit 1 ND and NS pump AHU outlet valves. The remaining Unit 1 ND and NS pump AHU outlet throttle valves were determined by OPS personnel to be in the correct positions. Valve 1RN-951 was subsequently returned to 1 turn open as directed by procedure OP/1/A/6100/22, Unit 1 Data Book.

During the event investigation, it was discovered that ND Pump 1A was started at 0600 on September 21, 1991, for unrelated activities. The pump and its associated AHU were run continuously until 1200 on September 26, 1991. Data from this time period proved that there was adequate flow through the AHU to maintain the room temperature at acceptable levels. Therefore, the ND system was operable during the required time period prior to September 21, 1991.

Conclusion

This event is assigned a cause of Unknown because valve 1RN-951 was found in the closed position by MNT personnel and no definite or probable cause could be determined. The required position of this valve during normal plant operation is throttled to an open position. No documentation could be found to show that the valve was closed and the administrative controls in place failed to document the repositioning of the valve. Unit 1

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entered Mode 5 on September 21, 1991. Valve 1RN-951 is not required to be in service when the Unit is below Mode 4. On June 26, 1991, procedure PT/1/A/4403/07, RN Train 1A Flow Balance Test, was performed by PRF personnel. This test verified that valve 1RN-951 passed flow of approximately 36 gallons per minute (GPM). The minimum required flow is 21 GPM. Therefore, it is concluded valve 1RN-951 must have been in the correct position on that date and the valve must have been closed sometime after June 26, 1991.

Train 1A of the NS system cannot be shown to have been operable during an unknown period from September 4, 1991, through September 21, 1991, thereby violating TS 3.6.2. During the event investigation, it was discovered that NS Pump 1A and its associated AHU were started at 0950 on August 2, 1991, and ran continuously until 1030 on August 2, 1991. NS Pump 1A and its associated AHU were also started at 1040 on September 4, 1991, and ran continuously until 1115 on September 4, 1991. Data from this time period proved that there was adequate flow through the AHU to maintain the room temperature at acceptable levels. Therefore, it is concluded valve 1RN-951 was open during this time period. It also is assumed valve 1RN-951 was closed after 1115 on September 4, 1991. It is also possible that valve 1RN-951 was closed after September 21, 1991, when the system was no longer required to be operable.

The event investigation did not reveal any reason that would support the valves being inadvertently closed. Valve 1RN-951 is located near the ceiling in the associated pump room. There is no equipment above valve 1RN-951 that would need to be accessed by personnel climbing on the valve. Also, MNT Technician A stated the valve disc was found hard against the seat. This would suggest valve 1RN-951 was intentionally closed. A thorough search of work request history on this valve failed to produce any work requests documenting work performed on valve 1RN-951 from June 26, 1991, through October 4, 1991. Also, an investigation of the OPS Red Tag logs failed to produce any record of valve 1RN-951 having been tagged in the open or closed position during this same period of time. The work specified on work request 890163PRJ did not require the valve to be manipulated or tagged prior to maintenance. Therefore, it is reasonable to surmise that no documented maintenance or operational activity was performed on valve 1RN-951 between June 26, 1991, and the event discovery. The work performed on valve 1RN-951 on September 30, 1991, was well documented and independently verified to be correct. No procedure problems or inappropriate actions were identified. No other anomalies were identified by OPS, MNT or PRF personnel that would explain this event. Therefore, it is theorized that the valve was intentionally closed, but no documentation of this could be found, nor can any reason to close this valve be determined.

A mitigating circumstance to the event is that PRF personnel are scheduled to run procedure PT/1/A/4403/07 before Mode 4 is entered at the end of the outage. Had valve 1RN-951 not been discovered closed prior to that time, low flow through NS Pump 1A AHU would have been

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detected during the RN system flow balance test and the valve positions would be correctly set at that time. Also, the valve was scheduled to be evaluated for PRF retest per work request 890163J. Therefore, valve 1RN-951 would have been returned to the correct position before Unit 1 entered Mode 4.

A review of the Operating Experience Program Database for the twenty four months prior to this event revealed one IS violation event that had a root cause of Unknown, which was related to the Control Room Area Ventilation system [E1IS:VI]. This event was documented in LER 369/91-02. The circumstances for that event involved different equipment and work groups than this event. Therefore, this event is not considered recurring.

This incident is not reportable to the Nuclear Plant Reliability Data System (NPRDS).

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

CORRECTIVE ACTIONS:

Immediate: None

- Subsequent:**
- 1) OPS personnel opened valve 1RN-951 to the correct throttled position per procedure OP/1/A/6100/22, Unit 1 Data Book.
 - 2) The remaining Unit 1 ND and NS pump AHU out throttle valves were verified by OPS personnel to be in the correct position.

- Planned:**
- 1) PRF personnel will ensure that the valve stem lock nuts are tightened on all Unit 1 and 2 throttled RN system flow balance related valves.
 - 2) OPS personnel will revise Station Directive 3.1.5, Activities Affecting Station Operations or Operating Indications to add a requirement for station personnel to notify the Control Room SRO if a plant device is found mispositioned or misaligned.
 - 3) MNT Management personnel will cover this event with all MNT Technicians. The importance of notifying OPS Control Room personnel if a plant device is found mispositioned or misaligned will be stressed.

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SAFETY ANALYSIS:

This event resulted in Unit 1 Train A of the NS system being inoperable because the AHU associated with Unit 1 Train A of the NS pump potentially not being able to mitigate a post accident heat load because a throttle valve in the cooling water flow path was found closed. Therefore, the cooling water was not available to the cooling coils [E11S:COL] in the AHU.

If the Unit 1 Train A of the NS system was needed due to an accident and if room temperature had exceeded acceptable limits, a high temperature alarm would be received in the Control Room. OPS personnel would have been able to open the valve as necessary to mitigate the heat buildup in the room(s). In addition, the other ECCS systems were unaffected and would have been able to perform their safety function in addition to the flow that would have been provided by the Unit 1 Train B of the NS system. During the time prior to the event, when Unit 1 Train A of the NS system was inoperable, no events occurred which required the actuation of the ECCS.

The NS system is not required to be operable during Mode 5 and below because the Unit 1 NS Pump AHUs do not serve to mitigate the consequences of an accident with the unit in cold shutdown or a lower mode. A mitigating circumstance to the event is that PRF personnel are scheduled to run procedure PT/1/A/4403/07 before Mode 4 is entered at the end of the outage. Had valve 1RN-951 not been discovered closed prior to that time, low flow through the NS pump 1A AHU would have been detected during the RN system flow balance test and the valve position would be correctly set at that time. Also, valve 1RN-951 was scheduled to be evaluated for PRF retest per work request 890163PRJ. Therefore, valves 1RN-949 and 1RN-951 would have been returned to the correct position before Unit 1 entered Mode 4. This event did not cause any operational problems, disturbances, or damage to Unit 1. OPS personnel took action to restore the valve to the correct throttled open position.

This event did not affect the health and safety of the public.