

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) McGuire Nuclear Station, Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 7 1 0	PAGE (3) 1 OF 0 8
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TITLE (4)
An Inadvertent Engineered Safety Features Actuation Occurred when
An Incorrect Verbal Action was Taken

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 7	2 4	8 8	8 8	0 0 9	0 0	0 9	0 6	8 8				0 5 0 0 0
												0 5 0 0 0

OPERATING MODE (9) 3

POWER LEVEL (10) 0 0 0

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

20.402(b)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)
20.406(a)(1)(i)	<input type="checkbox"/>	50.73(a)(2)(v)	73.71(c)
20.406(a)(1)(ii)	<input type="checkbox"/>	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)
20.406(a)(1)(iii)	<input type="checkbox"/>	50.73(a)(2)(vii)(A)	
20.406(a)(1)(iv)	<input type="checkbox"/>	50.73(a)(2)(vii)(B)	
20.406(a)(1)(v)	<input type="checkbox"/>	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME Steven E. LeRoy, Licensing	TELEPHONE NUMBER AREA CODE 7 1 0 1 4 3 1 7 1 3 1 - 1 6 1 2 1 3 1 3
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

At 1740:34 on 07/24/88, a Main Feedwater (CF) Isolation occurred when Instrumentation and Electrical (IAE) personnel failed open valve 2SM-63, Main Steam Miscellaneous Drain Valve, during repair work. The Reactor Coolant (NC) system was subsequently cooled to the Low T-ave set point. The receipt of the Low T-ave signal coincident with a Reactor Trip signal generated the CF Isolation signal. The Reactor Trip signal was present because the Reactor Trip breakers were open. At 1741:03, Operations reset the CF Isolation signal and restored CF system flow. At approximately 1750, IAE closed valve 2SM-63, which mitigated NC system cool down. Operations stabilized NC system temperature and returned to unit start up activities. This event is assigned a cause Personnel Error because Operations Employee Training and Qualification System personnel had delayed training regarding a change of the Low T-ave set point from 564 degrees-F to 553 degrees-F. Therefore, Operations personnel were unaware that the CF Isolation would occur when NC system T-ave was lowered to 553 degrees-F. This event is also assigned a cause of Management Deficiency because IAE was not given sufficient information to know that failing valve 2SM-63 open for an extended time would cause fluctuations in the NC system temperature.

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TEXT (If more space is required, use additional NRC Form 3054's) (17)

INTRODUCTION:

At 1740:34 on July 24, 1988, a Unit 2 inadvertent Main Feedwater (CF) system [EIIS:SJ] isolation occurred when Instrumentation and Electrical (IAE) personnel failed open valve 2SM-63, Main Steam Miscellaneous Drain Valve [EIIS:V] during valve repair work. The Reactor Coolant (NC) system [EIIS:AB] was subsequently cooled to the Low T-ave set point. The receipt of the Low T-ave signal coincident with a Reactor Trip signal generated the CF Isolation signal; the Reactor Trip signal was present because the Reactor Trip breakers [EIIS:MJB] were open.

At 1741:03, Operations personnel reset the CF Isolation signal and restored CF system flow. At approximately 1750, IAE personnel closed valve 2SM-63, which mitigated NC system cool down. Operations personnel stabilized NC system temperature and returned to unit start up activities. At 1945, Operations personnel notified the NRC of the CF Isolation, which is an Engineered Safety Features [EIIS:JE] actuation.

Unit 2 was in Mode 3, Hot Standby, at the time of the event.

This event is assigned a cause of Personnel Error because Operations Employee Training and Qualification System personnel had delayed training concerning a change of the Low T-ave set point from 564 degrees-F to 553 degrees-F. Therefore, Operations personnel were unaware that the CF Isolation would occur when NC system T-ave was lowered to 553 degrees-F. This event is also assigned a cause of Management Deficiency because IAE personnel were not given sufficient information to know that failing valve 2SM-63 open for an extended time would cause fluctuations in the NC system temperature.

EVALUATION:

Background

The CF Isolation signal can be generated by several inputs, one of which is a Reactor Trip signal (P-4) coincident with a NC system temperature Low T-ave signal. The P-4 signal is generated when the Reactor Trip breakers open. The CF Isolation signal can be blocked when the Reactor Trip breakers are opened by holding in the manual reset button located on the Main Control board. The blocking of the CF Isolation signal is sealed in after releasing the manual reset button, as long as the P-4 and Low T-ave signals remain.

The CF system provides feedwater flow to the four Steam Generators [EIIS:SG] for all unit operating conditions. Individual Steam Generator feedwater flow is controlled by air operated control valves [EIIS:V]. On loss of power, the air supply will be isolated and vented from the control valve actuator [EIIS:84], and the control valve will fail closed.

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

The Solid State Protection system [EIIS:JC] will automatically deenergize the solenoid [EIIS:SOL] valves located in the air supply lines on receipt of a Reactor Trip signal coincident with a Low T-ave signal, Safety Injection [EIIS:BQ] signal, High High Steam Generator Level signal, High High Doghouse Water Level signal, and on a manual initiation of a CF Isolation signal from the Control Room.

To prevent water induction to the Main Turbine [EIIS:TRB], the piping from the Steam Generators to the Main Turbine throttle valves [EIIS:V] and the piping from the Main Turbine governor valves [EIIS:V] to the high pressure turbine are supplied with low point drains. These drains prevent water accumulation and drain to the Main Condenser [EIIS:COND]. Valve 2SM-63 is located upstream of the Main Turbine throttle valves in a two inch drain line tapped off the 48 inch Main Steam system [EIIS:SB] header. This valve fails to the open position after a loss of air supply to the actuator.

Preventive Maintenance Incorporated (PMI) is a company contracted by McGuire Mechanical Maintenance (MNT) personnel to perform on-line leak sealant work on valves, flanges, and piping. The work is done by injecting a leak sealant material into the area of the leak. The sealant material flows into the leak opening where it solidifies and stops the leak. Some leaks require a clamp or other restrictive device be placed around the leak to prevent the sealant material from leaking or blowing out. The work is normally performed with the plant and/or system at operating temperature and pressure.

Description of Event

Operations personnel had experienced difficulty maintaining a heat rate to achieve the Unit 2 no-load NC system temperature of 557 degrees-F because of several secondary system leaks following the 1988 Refueling Outage. One of these leaks was believed to be valve 2SM-63. On July 23, 1988, Operations and MNT personnel attempted adjusting the travel stops to ensure valve 2SM-63 was seating completely. The adjustments did not stop the leakage, so Operations personnel instructed MNT personnel to contact PMI personnel and have them seal closed valve 2SM-63 and two other secondary valves.

On July 24, 1988, MNT personnel obtained written clearance from Operations Control Room personnel to begin sealing work on valve 2SM-63 according to outage Work Request 500912. A MNT General Supervisor contacted the Integrated Scheduling Shift Engineer who then contacted IAE personnel and instructed them to assist MNT personnel in placing a jumper to maintain valve 2SM-63 in the closed position. Operations personnel had informed the MNT General Supervisor of the importance of maintaining NC system temperature at 557 degrees-F because IAE personnel were waiting to start Resistance Thermal Detector (RTD) [EIIS:DET] cross-calibration testing. Operations personnel requested MNT personnel to expedite stopping the leaks so that more control of NC system temperature could be obtained and so IAE personnel could commence the test.

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TEXT (If more space is required, use additional NRC Form 388A's) (17)

The MNT General Supervisor instructed MNT personnel assigned to the job to contact Operations Control Room personnel prior to having PMI personnel start work on valve 2SM-63.

At approximately 1700 on July 24, 1988, MNT personnel contacted Operations Control Room personnel by phone and requested and received permission for IAE personnel to adjust the limit switch for valve 2SM-63 to show correct valve indication, which required opening and closing the valve. The Operations and MNT personnel who had worked on this valve on July 23, 1988 had misaligned the limit switch so that the valve indicated open even when the valve was closed. Operations Control Room personnel were contacted several times by MNT personnel to verify the valve position indication while IAE personnel attempted to adjust the limit switch. IAE personnel then noticed that a locking nut was missing from the valve stem, which was allowing the limit switch striker plate to flop loosely; therefore, correct indication could not be achieved.

At approximately 1720, IAE personnel isolated and disconnected the air supply line to the actuator for valve 2SM-63 and found that the air supply regulator would not fully stop air flow. This required them to choose a new location to install the air line jumper. To do this they also needed more air line fittings, so while one person continued to disconnect the tubing between the regulator and the actuator, the other left to get the correct fittings. With the air supply isolated to the actuator for valve 2SM-63, it failed to the open position. It took approximately 25 minutes for IAE personnel to retrieve the correct fittings and get the air line jumper installed, so valve 2SM-63 was open for approximately 25 minutes. This time the valve was open resulted in additional cool down of the NC system temperature.

At approximately 1735, Operations Control Room personnel noticed the temperature decrease and tried to contact MNT personnel at the valve, but excessive noise in the area prevented successful communication with them. Operations Control Room personnel then contacted the MNT Supervisor and also dispatched Operations personnel to close the valve. At 1740:34, an inadvertent CF Isolation occurred when the Low T-ave set point of 553 degrees-F was reached coincident with a P-4 signal because the Reactor Trip breakers were open. By the time Operations personnel and MNT Supervisory personnel arrived, IAE personnel had the air line jumper installed and the valve closed.

At 1741:03, Operations Control Room personnel reset the CF Isolation and restored CF system flow. Operations personnel stabilized NC system temperature and returned to unit start up activities. At approximately 1745, Operations personnel notified the NRC of the CF Isolation, which is an Engineered Safety Features (ESF) actuation.

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

Conclusion

This event is assigned a cause of Personnel Error because Operations Employee Training and Qualification System (ETQS) personnel had delayed training concerning Nuclear Station Modification (NSM) MG-22062, which changed the Low T-ave set point from 564 degrees-F to 553 degrees-F. NSM work request 95742 had been signed "control accepted" on June 24, 1988 by Operations personnel, which provided ample time for information to be distributed to applicable Operations personnel prior to heat up of the NC system. Instead, Operations ETQS personnel decided to include information about NSM MG-22062 with other NSMs that had been completed during this refueling outage into one required reading package, and to distribute it at the end of the outage. Operations ETQS personnel who were responsible for ensuring that the required reading package was circulated were away from the station on company business at the time the event occurred, and did not make provisions to ensure that during their absence the training was given prior to heat up.

On July 23, 1988 at 0440, Unit 2 entered Mode 3 and Operations personnel proceeded with NC system heat up to a T-ave of 557 degrees-F without knowledge of the T-ave set point change to 553 degrees-F. When T-ave was raised above 553 degrees-F, the bistables (electronic switches) for Low T-ave were reset which re-armed the CF Isolation logic; therefore, when T-ave was lowered to 553 degrees-F, a CF Isolation signal was generated without Operations personnel understanding why.

The Required Reading package 88-014-LS, which included WSM MG-22062, was made available to Operations personnel by Operations ETQS personnel on July 26, 1988. If the training had been received prior to this event, Operations personnel would have realized that a CF Isolation would occur if NC system T-ave reached 553 degrees-F, and they would have given MNT personnel specific instructions to prevent a cool down and would have responded quicker to stop the cool down once it began.

This event is also assigned a cause of Management Deficiency, because MNT Supervisory personnel failed to ensure that IAE personnel were given sufficient information to know that failing valve 2SM-63 open for an extended time would cause fluctuations in the NC system temperature, which would affect RTD cross-calibration testing.

A review of the McGuire Licensee Event Reports (LER) for the past three years revealed that numerous ESP actuations have occurred because of Personnel Error, but none involved an action taken being incorrect because it was not the best alternative. Therefore, this event is not considered to be recurring. Also, several ESP actuations have occurred because of a Management Deficiency, but none involved insufficient verbal instructions given by Management personnel to workers. Therefore, this event is not considered to be recurring.

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

PMI personnel, after looking at the piping arrangement around valve 2SM-63, noted that there existed a bypass line around the valve. Shortly after the incident occurred, they informed the MNT personnel that this line would have to be isolated to ensure that no sealant material would migrate into the line. When Operations personnel isolated the bypass line, the sound of leakage past valve 2SM-63 ceased. It was concluded then that valve 2SM-63 was stopping flow when closed and that the orifice in the bypass line was probably eroded and allowing excessive leakage. The orifice provides for equalization of pressure and temperature prior to the opening of valve 2SM-63. Operations personnel isolated the orifice and will have it inspected and repaired/replaced according to Work Request 135869.

NSM MG-12062 will change the Unit 1 Low T-ave set point from 564 degrees-F to 553 degrees-F, and is planned to be implemented during a refueling outage. Operations personnel will distribute training and implement procedure changes to those Unit 1 procedures affected at that time.

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

CORRECTIVE ACTIONS:

- Immediate:
- 1) Operations personnel reset the CF Isolation signal and restored CF system flow.
 - 2) IAE personnel placed the air line jumper on the actuator for valve 2SM-63, which failed the valve closed.
- Subsequent:
- 1) Operations personnel implemented the NRC Immediate Notification Requirements procedure, notifying them of the FSF actuation.
 - 2) Operations ETQS personnel distributed Required Reading package 88-014-LS to all applicable Operations personnel.
 - 3) Operations Procedure Group personnel implemented changes to procedures AP/2/A/5500/01, Reactor Trip, OP/2/A/6100/02, Controlling Procedure For Unit Shutdown, and OP/2/A/6100/10F, Annunciator Response For Panel 2AD5, reflecting the Low T-ave set point change to 553 degrees-F.
 - 4) Operations Management personnel reviewed this incident with Operations personnel involved and reiterated the importance of distributing training packages as NSMs are completed instead of compiling them into one reading package.

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

- 5) MNT Management personnel reviewed this incident with MNT personnel involved, and stressed the importance of ensuring good communication of job assignments, including related limitations or precautions.

Planned:

- 1) Operations Procedure Group personnel will revise OP/2/A/6100/01, Controlling Procedure For Unit Start up, to include information that a CF Isolation may occur if a cool down is initiated from 557 degrees-F, and instructions to block the CF Isolation signal if it is not warranted.
- 2) An inform bulletin will be distributed to all station first line supervision reiterating the importance of ensuring complete and thorough communication of job assignments.
- 3) A copy of the incident report will be sent to ETQS and Training personnel in all station work groups to emphasize the importance of timely follow up for training packages associated with NSMs.

SAFETY ANALYSIS:

Unit 2 was in Mode 3, and Steam Generator levels and pressures were normal for this mode of operation. NC system temperature was being held at the no-load point of 557 degrees-F, and IAE personnel were preparing to perform RTD cross-calibration checks. The conditions that generated the CF Isolation signal were the Reactor Trip breakers were open, which gave a P-4 signal, and at least 2 out of 4 channels of Low T-ave logic were completed when the NC system temperature was cooled to the Low T-ave set point of 553 degreeu-F by excessive leakage from the Main Steam system. Operations Control Room personnel reset the CF Isolation signal and restored the CF system flow. The inadvertent CF Isolation actuation did not cause any significant transients or operational problems to occur to Unit 2. The Auxiliary Feedwater system was available and operable to provide feedwater to the Steam Generators to maintain a heat sink if there had been a problem with the immediate restoration of the CF system.

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TEXT (if more space is required, use additional NRC Form 366A-2 (1/7))

If Unit 2 had been in Mode 1, Power Operation, or Mode 2, Start up, when valve 2SM-53 was failed open, the effect on NC system temperature would have probably been insignificant because the amount of steam being produced would be much greater than the amount of steam being lost through the 2 inch drain line.

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

This event is considered to be of no significance with respect to the health and safety of the public.



DUKE POWER

September 6, 1988

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

Subject: McGuire Nuclear Station, Unit 2
Docket No. 50-370
Licensee Event Report 370/88-09

Gentlemen:

Pursuant to 10CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 370/88-09 concerning an Engineered Safety Features Actuation. Note that this event was to have been submitted on August 23, 1988, but was delayed by my letter also dated August 23, 1988. This report is being submitted in accordance with 10CFR 50.73(a)(2)(iv). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

Hal B. Tucker

SEL/323/mmf

Attachment

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