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October 31, 1990

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 370/90-09

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 370/90-09 concerning the Emergency Core Cooling Systems not meeting the requirements of Technical Specifications. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(i)(B) 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,

Tony L. McConnell

T.L. McConnell

DVE/ADJ/cbl

Attachment

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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 2	0 5 0 0 0 3 7 0	1 OF 6

TITLE (4) The Unit 2 Emergency Core Cooling System Would Not Have Met The Requirements Of Technical Specification 4.5.2 Due To A Management 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 7	9 0	9 0	— 0 0 9	— 0 0	1 0	3 1	9 0		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	5
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)		20.405(c)		50.73(a)(2)(iv)
	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)
	20.405(a)(1)(ii)		50.36(c)(2)	X	50.73(a)(2)(vii)
	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)

	73.71(b)
	73.71(c)
	OTHER (Specify in Abstract below and in Text, NRC Form 366A)

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 September 7, 1990, Performance personnel discovered that the Unit 2 Chemical and Volume Control (NV) system flow balance was not within the requirements of Technical Specification (TS) 4.5.2. Flow to NC loop D was only 70.3 gallons per minute (gpm), while flow to NC loops A, B, and C were 118.9 gpm, 123.4 gpm, and 122.9, respectively. The work request history of throttle valve 2NI-483 (BIT to NC Loop D Throttle) indicates the valve position may have been altered while repacking the valve on July 23, 1989. Subsequent investigation by Performance personnel revealed that valve 2NI-483 was in fact mispositioned. Valve 2NI-483 was repositioned and a flow balance was performed which confirmed this valve as the source of the imbalance. The positions of the other three valves, 2NV-480, 481, and 482 (BIT to NC Loop A, B and C) were also verified and the NV system flow balance was then readjusted. Unit 2 was in Mode 5 (Cold Shutdown) at the end of Fuel Cycle Six at the time of the discovery. The event has been assigned a cause of Management Deficiency since there was no adequate mechanism to ensure the throttle valve was reset properly after maintenance.

EVALUATION:

Background

The Emergency Core Cooling System (ECCS) is designed to cool the Reactor [EIIS:RCT] core as well as provide additional shutdown capability following initiation of certain specified accident conditions. The Chemical and Volume Control (NV) system [EIIS:CB], Safety Injection (NI) system [EIIS:BQ], and Residual Heat Removal (ND) system [EIIS:BP] form the ECCS.

The centrifugal charging pumps [EIIS:P] in the NV system serve as the high head safety injection pumps in the ECCS. During a loss-of-coolant accident, the NV system is isolated except for the centrifugal charging pumps and the piping in the safety injection path.

Emergency cooling is provided for small ruptures primarily by the high head injection pumps. The centrifugal charging pumps deliver borated water at the prevailing Reactor Coolant (NC) system [EIIS:AB] pressure to the cold legs of the NC system. During the injection mode, the charging pumps take suction from the Refueling Water Storage Tank (FWST) [EIIS:TK] and discharge directly into the NC system.

The two centrifugal charging pumps have the capability of supplying borated water to the cold leg connections on all four NC system loops.

TS 4.5.2 requires in part that each ECCS subsystem shall be demonstrated operable:

h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying that:

1) For centrifugal charging pump lines, with a single pump running:

a) The sum of the injection line flow rates, excluding the highest flow rate, is greater than or equal to 345 gpm, and

b) The total pump flow rate is less than or equal to 565 gpm.

Description of Event

On January 5, 1983, approved procedure TP/2/A/1200/36, NI System and NV System Flow Balance II Functional Test, was completed. During the test NV flow from each of the centrifugal charging pumps to the four NC system cold legs was balanced. Final flow from 2A NV pump to the respective (A, B, C and D) NC system loops were 120.09 gpm, 121.77 gpm, 121.35 gpm and 118.39 gpm.

The flow from 2B NV pump to the NC system loops was 116.45 gpm, 116.23 gpm, 116.23 gpm and 116.23 gpm, respectively.

Upon completion of testing, the respective throttle valve [EIIS:V] to each NC system cold leg was locked in the throttled position with the handwheel removed to prevent repositioning of these valves. The position of these valves, as adjusted during the NI System and NV System Flow Balance II Functional Test was documented to be:

Valve 2NI-480 (BIT to NC Loop A Throttle), 1.5 turns open
Valve 2NI-481 (BIT to NC Loop B Throttle), 3.0 turns open
Valve 2NI-482 (BIT to NC Loop C Throttle), 1.75 turns open
Valve 2NI-483 (BIT to NC Loop D Throttle), 1.5 turns open.

On July 23, 1989, per work request 136737, valve 2NI-483 was repacked using approved procedure MP/0/A/7600/57, Borg-Warner Y Globe Valve Corrective Maintenance. Step 11.3.6.1 of this procedure directs Maintenance personnel to fully open the valve prior to repacking the valve, but does not specify any method for determining the initial position of the valve, or restoring the valve to the proper throttled position. In accordance with sequence 1 of the work request Maintenance personnel checked the position of the valve and recorded this data in section V of the work request. Per job sequence 2 Maintenance personnel then removed the stem locking device and repacked the valve. The method used to record this initial position was to measure the exposed portion of the valve stem with a six inch scale. The initial position recorded was 1.1875 inches. Upon completion of the repacking job the Maintenance personnel returned the valve to this position, however different personnel took the initial measurement and final measurement. After the original valve position was reestablished, the stem locking device was reinstalled by the Maintenance crew as specified by job sequence 4. The final position recorded in section V of the work request was identical to the initial dimension, indicating that valve 2NI-483 should have been restored to the correct position.

The job sequences specified on work request 136737, by the Planner, were done so in accordance with Station Directive 3.2.2, Identifying and Performing Plant Retesting, and Maintenance Management Procedure 2.0, Planning of Work Requests, Section 1.2, Retest.

On September 7, 1990, Performance personnel were conducting a test of 2A NV pump per approved procedure PT/2/A/4209/12A, NV Pump 2A Head Curve Verification. During the course of this testing it was noted that the NV flow to the NC system cold legs was not balanced. The flow to NC loops A, B, and C were, respectively 118.9 gpm, 123.4 gpm, and 122.9 gpm; however, NC loop D was only receiving 70.3 gpm. A similar imbalance was found with 2B NV pump. It was suspected that valve 2NI-483 might have been the problem.

A review of the equipment history for valve 2NI-483 revealed the valve had been repacked during two successive refueling outages. The records for the first repacking on work request 132929 indicate the valve position was not

disturbed; however, the records for work request 136737 did indicate the valve position had been disturbed.

Equipment histories for the other three BIT to NC Loop Throttle valves indicate that valve 2NI-480 has never been repacked and valves 2NI-481 and 482 have been repacked on several occasions, but their positions were recorded as not having been changed.

On October 2, 1990, subsequent investigation of the positioning of valve 2NI-483 by Performance personnel confirmed the valve was not in its original throttled position. The valve was found to be opened only 0.75 turns, whereas the valve position after the 1983 flow balance was recorded as 1.5 turns open.

Upon completion of Unit 2 core reloading, Performance personnel conducted further testing with valve 2NI-483 restored to approximately 1.5 turns open, to confirm the mispositioning of the valve as the problem. Performance personnel also completed a new NI system and NV system flow balance.

Conclusion

The event has been assigned a cause of Management Deficiency. No adequate mechanism was in place to ensure the throttle valve was properly reset after maintenance.

The methodology used by Maintenance personnel to restore valve 2NI-483 to its initial position differed from that used to record the position in the previous test procedure, NI System and NV System Flow Balance II Functional Test. This difference led to valve 2NI-483 being restored to a position of 0.75 turns open versus the previously established 1.5 turns open. This new position, being more restrictive, led to decreased flow to the NC loop D cold leg.

As a result of this event, the position of valves 2NI-480, 481, 482 and 483 will be included in the Unit 2 Data Book. The position of valves 1NI-480, 481, 482, and 483 will be included in the Unit 1 Data Book after completion of a new flow balance. Maintenance, Planning, and Performance personnel will evaluate the process for identification of correct position requirements for throttle valves or any components having special position requirements and make appropriate changes, as necessary, to ensure proper repositioning after maintenance is performed. The equipment histories for valves 1NI-480, 481, 482, and 483 were reviewed and no maintenance activities on these valves were identified.

An Operating Experience Program (OEP) Data Base search for the previous 24 months for equipment mispositioning due to a Management Deficiency revealed one other event. Licensee Event Report 369/88-45-01, which involved the travel stops for valve 1CA-44B not being reset after maintenance. In addition, Problem Investigation Report 1-M90-0222 documented the

mispositioning of valve 1RN-89. As a result of these items, this problem is considered to be 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: None

Subsequent:

1) Performance personnel confirmed that valve 2NI-483 was mispositioned.

2) Performance personnel returned valve 2NI-483 to the 1.5 turns open position and rechecked the NV flow balance to confirm this was the problem.

3) Performance personnel completed a new flow balance on the NV system.

4) Performance personnel reviewed the equipment histories for the Unit 1 BIT To NC Loop Throttle valves. No corrective maintenance of the valves was identified.

Planned:

1) Valve positions established during flow balance testing will be included in the Unit 2 Data Book by Performance personnel.

2) Valve positions established for the Unit 1 BIT To NC Loop Throttle valves will be included in the Unit 1 Data Book after completion of a new flow balance.

3) Maintenance, Planning, and Performance personnel will evaluate the process for identification of correct position requirements for throttle valves or any components having special position requirements and make appropriate changes as necessary to ensure proper repositioning after maintenance is performed.

SAFETY ANALYSIS:

The operability of two independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a Loss of Coolant Accident (LOCA) assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the accumulators is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest NC system cold leg

pipe downward. In addition, each ECCS subsystem provides long-term core cooling capability in the recirculation mode during the accident recovery period.

With the NC system temperature below 350 degrees F, one operable ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

The Surveillance Requirements provided to ensure operability of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem operability is maintained. Surveillance Requirements for throttle valve position stops and flow balance testing provide assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and, (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses.

The Operability Evaluation for Problem Investigation Report (PIR) 2-M90-0233 determined the required NV system flow could not be obtained in the unbalanced configuration. The minimum NV flow to NC loop D could not have been obtained; therefore, the NV system must be considered to have been inoperable for as long as the unbalanced conditions existed. However, this evaluation also concluded the intent of the TSs had been satisfied since the total ECCS flow from the NI, ND, and NV systems did exceed the flow assumed in the Final Safety Analysis Report (FSAR) LOCA analysis. There was, therefore, no safety significance associated with not meeting the NV minimum flow.

During the period that the NV system was inoperable, no events occurred which would have required an ECCS actuation.

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