NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

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 0 6

TITLE (4) UNIT 2 REACTOR COOLANT SYSTEM AND UNITS 1&2 PRESSURIZER EXCEEDED HEATUP AND COOLDOWN RATE ALLOWED BY TECHNICAL SPECIFICATIONS - FAILED TO RECOGNIZE DISCREPANCIES - PERSONNEL ERROR

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 2	1 1	8 7	8 7	- 0 2 0	- 0 0	0 1	2 9	8 8		0 5 0 0 0
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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)	XX 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
STEVEN E. LeROY - LICENSING	AREA CODE 7 0 4 3 7 3 - 6 2 3 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)	XX NO				

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

During December 1987, Analysis and Evaluation of Operational Data (NRC) conducted an evaluation of Quality Assurance (QA) surveillance. This evaluation indicated several events where plant cooldown and heatup rates exceeded Administrative limits and one violation of Technical Specifications (TS). Subsequently, Operations (OPS) discovered other past incidents that exceeded TS limits. The incidents occurred during normal shutdowns. On 12/11 and 16/87, Westinghouse performed a preliminary evaluation of effects of similar transients on the Reactor Coolant (NC) system integrity and concluded that exceeding the allowable TS limits for the Pressurizer (PZR) and the NC system did not compromise structural integrity of the PZR and NC system. This event is assigned a cause of Personnel Error because no discrepancies were noted by OPS on 3 out of 4 procedures used during the shutdown and startup modes of operation, and OPS verified the procedures complete with all acceptance criteria being met. This event is also assigned a cause of Management Deficiency because one reason for the TS cooldown limits being exceeded was due to NC surges into and out of the PZR. Since these surges are not uncommon during this mode of operation; OPS should have addressed this problem with Design Engineering and Westinghouse. Westinghouse will provide an evaluation and OPS will revise appropriate procedures.

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

INTRODUCTION:

During December 1987, Nuclear Regulatory Commission Analysis and Evaluation of Operational Data (NRC) personnel conducted an evaluation of Quality Assurance (QA) surveillance reports. This evaluation indicated several incidents on both units where plant cooldown and heatup rates exceeded Administrative limits and one violation of Technical Specification (TS) limits. Subsequently, Operations (OPS) discovered several other past incidents that exceeded TS limits. The incidents occurred during normal shutdowns. On December 11 and 16, 1987, Westinghouse performed a preliminary engineering evaluation of the effects of similar transients on the Reactor Coolant (NC) system [EIIS:AB] integrity and concluded that exceeding the allowable TS rate limits for the Pressurizer (PZR) [EIIS:PZR] and the NC system did not compromise the structural integrity of the PZR and the NC system.

Both units were in Mode 1, Power Operation, at the time this event was discovered.

This event has been assigned a cause of Personnel Error because there were no discrepancies noted by OPS on 3 out of 4 procedures used during the shutdown and startup modes of operation, and OPS personnel verified the procedures complete with all acceptance criteria being met. This event has also been assigned a cause of Management Deficiency because one reason for the TS cooldown limits being exceeded was due to NC surges into and out of the PZR. Since these surges are not uncommon during this mode of operation and there is always the potential for Administrative and TS limits being exceeded. OPS should have addressed this problem with Design Engineering and Westinghouse.

EVALUATION:

Background

The NC system transports heat from the reactor [EIIS:RCT] core to the steam generators [EIIS:SG], where heat is transferred to the Feedwater [EIIS:SJ]/Main Steam [EIIS:SB] Systems. The NC system consists of four Steam Generators connected in parallel to the reactor vessel [EIIS:VSL]. In addition, the system includes a PZR, a PZR Relief Tank [EIIS:TK], interconnecting piping [EIIS:PSP], valves [EIIS:V], and instrumentation necessary for operational control.

The NC system pressure is controlled by the PZR where water and steam are maintained at saturation by electrical heaters [EIIS:HTR] and water sprays. Steam can be formed (by the heaters) or condensed (by the PZR spray) to reduce pressure variations due to contraction and expansion of the NC system.

The PZR is designed to accommodate positive and negative surges caused by load transients. The surge line, which is attached to the bottom of the PZR, connects the PZR to the hot leg of "B" NC system loop. During an insurge from the NC system, the spray system, which is fed from "A" and "B" cold legs,

condenses steam in the vessel to prevent the pressure from reaching the setpoint of the Power Operated Relief Valves [EIIS:RV]. During an outsurge from the PZR, flashing of water to steam and the generating of steam by automatic actuation of the heaters, keeps the pressure above the low pressure reactor trip setpoint.

TS 3/4.9.1 states that the NC system (except the PZR) shall be limited to a maximum heatup rate of 100 degrees-F for Unit 1 and 60 degrees-F for Unit 2 in any one hour period, a maximum cooldown rate of 100 degrees-F in any one hour period, and a maximum temperature change of less than or equal to 10 degrees-F in any one hour period during inservice hydrostatic and leak testing operations above the heatup and cooldown limit curves. These conditions are applicable at all times. With any of the above limits exceeded, the temperature and/or pressure must be restored to within the limit within thirty minutes and an engineering evaluation must be performed to determine the effects of the out-of-limit condition on the structural integrity of the NC system. If the evaluation indicates that the structural integrity is unacceptable for continued operation, the unit must be in at least Hot Standby within the next six hours and the NC system T-ave and pressure must be reduced to less than 200 degrees-F and 500 psig, respectively, within the following thirty hours. The NC system temperature and pressure shall be determined to be within the limits at least once every thirty minutes during system heatup, cooldown, and inservice leak and hydrostatic testing operations.

TS 3/4.9.2 states that the PZR temperature shall be limited to a maximum heatup rate of 100 degrees-F in any one hour period, a maximum cooldown rate of 200 degrees-F in any one hour period, and a maximum spray water temperature differential of 320 degrees-F. These conditions are applicable at all times. With the PZR temperature limits in excess of any of the above limits, the temperature must be restored to within the limits within thirty minutes and an engineering evaluation must be performed to determine the effects of the out-of-limit condition on the structural integrity of the PZR. If the PZR's structural integrity is unacceptable for continued operation, the unit must be in at least Hot Standby within the next six hours and the PZR pressure must be reduced to less than 500 psig within the following thirty hours. The PZR temperatures shall be determined to be within the limits at least once every thirty minutes during system heatup or cooldown.

The purpose of Surveillance Requirements for Unit Shutdown, PT/1,2/A/4600/09 and Precriticality Surveillance Requirements For Unit Startup, PT/1,2/A/4600/08, is to document various TS requirements and exhibit safe operating procedures for unit shutdown and startup, respectively. These procedures include administrative limits and precautions requiring that the cooldown rate of the NC system should not exceed 50 degrees-F/hr, the NC system heatup rate should not exceed 50 degrees-F/hr, the PZR cooldown rate should not exceed 100 degrees-F/hr and the PZR heatup rate should not exceed 50 degrees-F/hr.

Operations Management Procedure 1-2 states that after the completion of a Periodic Test, an Operations Supervisor shall determine that each applicable

surveillance item meets its specified acceptance criteria or is identified as a discrepancy, and is evaluated according to TS and appropriate corrective action is initiated (work request, etc.).

A Procedure Discrepancies Process Record shall be filled out for any discrepancies and routed to a Senior Reactor Operator (SRO) for approval. After SRO approval, the SRO routes the Procedure Discrepancies Process Record and the procedure to the Unit Coordinator or his designee. The Unit Coordinator or his designee insures the Procedure Discrepancies Process Record and procedure is completed properly.

Description of Event

During a normal unit shutdown on April 27, 1981, between 1130 and 1200, the Unit 1 PZR experienced a cooldown event that exceeded the TS cooldown limit of 200 degrees-F/hr by 21 degrees-F. Also on the same day between 1200 and 1300, and 1230 and 1330, the Unit 1 PZR experienced heatup events that exceeded the TS heatup limit of 100 degrees-F/hr by 118 degrees-F and 26 degrees-F, respectively. According to OPS, the TS limits were exceeded because of an increase in PZR level due to NC system surges into the PZR.

During a normal unit startup on July 20, 1981, between 2400 and 0100, the Unit 1 PZR experienced a heatup event that exceeded the TS heatup limit of 100 degrees-F/hr by 20 degrees-F. There were no discrepancies noted on the procedure.

During a normal unit shutdown on May 3, 1983, between 1700 and 1800, the Unit 2 NC system experienced a cooldown event that exceeded the TS cooldown limit of 100 degrees-F/hr by 1 degree-F. There were no discrepancies noted on the procedure and the procedure was verified complete by OPS personnel with all acceptance criteria being met.

During a normal unit shutdown on April 21, 1985, between 0930 and 1030, the Unit 2 PZR experienced a cooldown event that exceeded the TS cooldown limit of 200 degrees-F/hr by 19 degrees-F. Also on the same day, the Unit 2 PZR experienced two heatup events, one between 1000 and 1100 and the other between 1030 and 1100, that exceeded the TS heatup limit of 100 degrees-F/hr by 28 degrees-F and 74 degrees-F, respectively. There were no discrepancies noted on the procedure, and the procedure was verified as complete by OPS with all acceptance criteria being met.

During December 1987, NRC personnel conducted an evaluation of QA surveillance reports and noted several observations which were made by QA concerning plant cooldown rates that exceeded Administrative cooldown rates. NRC and OPS researched the Surveillance Requirements For Unit Shutdown and Precriticality Surveillance Items for Unit Startup Procedures, and found events where plant cooldown and heatup rates exceeded TS limits. These events occurred during normal shutdown and startup.

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

On December 11 and 16, 1987, Westinghouse performed a preliminary PZR heatup and cooldown transient evaluation and found that the Unit 1 and Unit 2 PZRs, and the Unit 2 NC system's structural integrity had not been compromised.

Conclusion

Between 1981 and 1985, the Unit 2 NC system, and the Unit 1 and the Unit 2 PZRs experienced transient events that exceeded administrative and TS limits. There was only one procedure, which was dated April 27, 1981, that indicated a discrepancy in surveillance requirements; all other procedures indicated no discrepancies and were verified as complete by OPS personnel with all acceptance criteria being met. OPS personnel did not thoroughly review the procedures to recognize the transients as discrepancies and therefore did not note them on the procedures. Therefore, this event has been assigned a cause of Personnel Error.

A cause of Management Deficiency has also been assigned to this event because the transients experienced by the PZR and NC system are not uncommon during the shutdown and startup modes of operation and there is always the potential for Administrative and TS limits being exceeded; OPS should have addressed this problem with Design Engineering and Westinghouse.

Westinghouse performed an engineering evaluation and made a preliminary judgement that the transients experienced by the PZR and the NC system did not compromise their structural integrity. A final engineering evaluation is forthcoming from Westinghouse.

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

A review of previous McGuire Licensee Event Reports revealed no other documented events where plant heatup and cooldown rates had been in violation of TS. Therefore, this event is not considered recurring.

CORRECTIVE ACTIONS:

Immediate: None

Subsequent: Westinghouse performed an engineering evaluation of the effects of similar transients on the NC system's integrity. A preliminary judgement determined that the transient events did not compromise the structural integrity of the Pressurizer and the NC system.

Planned:

1) OPS will review this report with a representative from each shift to emphasize the importance of thoroughly reviewing procedures for discrepancies and properly completing procedures.

2) Westinghouse will submit a final engineering evaluation and OPS will revise the appropriate procedures based on recommendations from Westinghouse.

NOTE: Based on the results of the Westinghouse evaluation and the impact it has on this event, Duke may supplement this report. If so, the supplemental information would be submitted 30 days after receipt of the Westinghouse report.

SAFETY ANALYSIS:

The Unit 1 PZR experienced cooldown and heatup rates that exceeded the allowable TS limits. The PZR temperature ranged from 196 degrees-F to 427 degrees-F during the events. The NC system pressure varied between 313 psi and 337 psi. The NC system temperature varied from 144 degrees-F to 168 degrees-F. The maximum temperature that the cooldown and heatup rates of the Unit 1 PZR were exceeded was 21 degrees-F and 118 degrees-F, respectively.

The Unit 2 PZR experienced cooldown and heatup events that exceeded the allowable TS limits. The NC system and PZR pressure varied between 50 psi and 300 psi during the cooldown. Also, the Unit 2 NC system experienced a cooldown rate exceeding allowable TS limits. During this cooldown, the PZR water temperature ranged from 650 degrees-F to 428 degrees-F, the NC system temperature ranged from 55[illegible] degrees-F to 184 degrees-F and the NC system pressure ranged from 2268 psi to 328 psi. The maximum temperature that the cooldown and heatup rates of the Unit 2 PZR were exceeded was 19 degrees-F and 74 degrees-F, respectively. The Unit 2 NC system exceeded its cooldown rate by 1 degree-F.

NC surges into and out of the PZR are not uncommon during the heatup and cooldown modes of operation, and based on the above information and experience with evaluation of the effects of similar transients on the NC system's integrity, it was Westinghouse's preliminary judgement that the events above did not compromise the structural integrity of the Unit 1 and the Unit 2 PZRs and related systems or the Unit 2 NC system.

Also, Quality Assurance personnel performed non-destructive examinations of Pressurizer primary welds and NC system primary welds during the 1986 outage. Any significant failure in the structural integrity of the PZR or the NC system would have been noted during these examinations. There were none noted.

There were no personnel injuries, personnel 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.

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HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

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January 29, 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 370/87-20

Gentlemen:

Pursuant to 10CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 370/87-20 concerning McGuire exceeding allowable technical specification limits for heatup and cooldown of the Unit 2 reactor coolant system and Units 1 and 2 pressurizers. This report was to have been submitted on January 11, 1988; however, was delayed till January 29, 1988 by my letter of December 29, 1987. This report is being submitted in accordance with 10CFR 50.73(a)(2)(i)(B). 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

Hal B. Tucker

SEL/217/jgc

Attachment

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