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June 5, 1992

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 369/92-07

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report 369/92-07 concerning an inadvertent Engineered Safety Features actuation. This report is being submitted in accordance with 10 CFR 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,

T.C. McMeekin

TLP/bcb

Attachment

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U.S. Nuclear Regulatory Commission
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Mr. Tim Reed
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

LICENSEE EVENT REPORT (LER)

FACILITY NAME(1)	DOCKET NUMBER(2)	PAGE(3)
McGuire Nuclear Station, Unit 1	05000 369	1 OF 8

TITLE(4) An Engineered Safety Features Actuation Occurred While Placing A Steam Generator In Wet Lay Up Due To A Defective Procedure and An Inappropriate Action

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(8)
										05000
5	6	92	92	07	0	6	5	92		05000

OPERATING MODE(9)	5	THIS REPORT IS SUBMITTED PURSUANT TO REQUIREMENTS OF 10CFR (Check one or more of the following)(11)								
			20.402(b)		20.405(c)	X	50.73(a)(2)(iv)		73.71(b)	
POWER LEVEL(10)	0 %		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)	
			20.405(a)(1)(iii)		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	
	AREA CODE	
Terry L. Pedersen, Manager, McGuire Safety Review Group	704	875-4487

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 May 6, 1992, at 0121, with Unit 1 in Mode 5 (Cold Shutdown) and in the process of performing unit shutdown procedure OP/1/A/6100/02, Controlling Procedure For Unit Shutdown, an Engineered Safety Features (ESF) actuation occurred while Operations (OPS) Control Room personnel were performing a wet lay up evolution on Steam Generator (SG) 1D. A cause of Defective Procedure is assigned because procedure OP/0/A/6250/03A, SG Cold Wet Lay Up Recirculation, had an erroneous SG level value listed. A cause of Inappropriate Action is assigned because OPS Control Room personnel also deviated from procedure OP/0/A/6250/03A without proper authorization. This resulted in pressurization of SG 1D above established wet lay up values. When OPS personnel removed the pressure source from SG 1D, a Steam Line 1D High Depressurization Rate signal was generated which caused a Main Steam Isolation which is an ESF actuation. All appropriate valves automatically moved to the required isolation position. OPS personnel subsequently reset the main steam isolation valves and returned those valves to the original position. Control Room personnel notified the NRC per procedure RP/0/A/5700/10, NRC Immediate Notification Requirements, at 0242. Procedure OP/1/A/6250/03A will be revised to correct the erroneous value listed and enhanced to provide additional guidance.

EVALUATION:

Background

The Main Feedwater (CF) [EIIS:SJ] system takes treated Condensate (CM) [EIIS:SD] system water, and delivers it at the required flow rate, pressure, and temperature to the Steam Generators (SGs) [EIIS:SG] for makeup during normal plant operation. During normal startup and shutdown operations, feedwater is pressurized by one or more Hotwell pump(s) [EIIS:P] and routed to the upper nozzles [EIIS:NZL] of the SGs though valves [EIIS:V] 1CF-126B, SG 1A CF To Auxiliary Feedwater (CA) Nozzle Isolation; 127B, SG 1B CF To CA Nozzle Isolation; 128B, SG 1C CF To CA Nozzle Isolation; and 129B, SG 1D CF To CA Nozzle Isolation. The upper nozzles of the SGs are also called the CA system nozzles.

Main Steam (SM) Isolation Valves (MSIVs) [EIIS:ISV] are provided in each SG steam line to isolate each individual SG and prevent reverse flow in the event of a steam line rupture. The MSIVs automatically close on a high-high Containment pressure signal, on high steam line pressure rate of change, or low steam line pressure signal.

SGs are placed in wet lay up when the Reactor Coolant (NC) system [EIIS:AB] is less than 200 degrees F while maintaining water quality within the secondary side of the SG. Appropriate chemicals are added to minimize oxidation and corrosion inside the SG.

The Engineered Safety Features (ESF) are provided to retain fission products which may leak from the fuel in the NC system, retain fission products by isolating the containment building for releases beyond the NC system boundary, and provide adequate cooling of the core under all circumstances, for the purpose of preventing the occurrence of or minimizing the effects of any serious accident. Some of this equipment serves a function during normal operation.

Description of Event

On May 5, 1992, Unit 1 was shutting down as a conservative measure for SG tube inspection. By 2000, Unit 1 had entered Mode 5 (Cold Shutdown) and OPS Control Room [EIIS:NA] personnel were continuing to shutdown the unit as directed by procedure OP/1/A/6100/02, Controlling Procedure For Unit Shutdown. Reactor Operator at the Controls (ROATC) A and ROATC B were assigned to Control Room duties during the shift that had started at 1930 and continued until 0730 the next day. Activities scheduled to be performed during the shift included:

1. Continue to use SG 1A, 1B, and 1C to cool down the unit via the Condenser

[EIIS:COND] dump valves.

2. Place SG 1D in wet lay up.
3. Fill the Pressurizer [EIIS:PZR] to water solid condition (this activity was the primary goal).
4. Get the Containment Purge Ventilation [EIIS:VA] and Containment Air Release and Addition [EIIS:BF] systems operational.
5. Purge the Reactor Coolant Drain Tank [EIIS:TK] and the Pressurizer Relief Tank.

At 2200, ROATC A began performing procedure OP/1/A/6250/03A, Steam Generator Cold Wet Lay Up Recirculation, to place SG 1D in wet lay up. ROATC B was involved with the other scheduled duties and was not directly involved with the SG wet lay up evolution. At the time, two Unit 1 Hotwell pumps and one CM Booster pump were running. ROATC A referred to step 2.50.2 of procedure OP/1/A/6100/02 which states "If desired, place the switches for the non-operating CM Booster pump(s) to the 'STOP' position and stop the running CM Booster pump(s)". He decided that he did not want to secure the running CM Booster pump and proceeded with implementing procedure OP/1/A/6250/03A. He did not discuss this decision with ROATC B, the on duty Control Room Senior Reactor Operator (SRO), or the duty Shift Supervisor.

ROATC A closed valves 1SM-1AB, SG 1D SM Isolation, and valve 1SM-101, SG 1D SM Line Drain as directed by step 2.3 of procedure OP/1/A/6250/03A. Chemical addition to SG 1D was then completed as directed by procedure steps 2.8 through 2.9 without incident. ROATC A then verified valve 1CF-179B was open as directed by procedure step 2.10, and initiated SG 1D fill by opening valve 1CF-107, SG 1D CF Control Valve Bypass.

At 2245 SG 1D level was at approximately 70 percent full with level rising at 20 percent per hour. ROATC A then returned to other Control Room duties while continuing to monitor SG level 1D using chart recorder 1MCFCR5630, SG 1D Wide Range Level, located on the SG control board [EIIS:MCBD]. He was aware that procedure step 2.11 stated when SG level indication goes off scale (100 percent), continue filling that SG for 20 minutes, then secure feeding the SG.

On May 6, at 0022, SG 1D level indication reached 97.2 percent and stopped increasing as indicated by chart recorder 1MCFCR5630. ROATC A observed this indication over the next 23 minutes. During this time period, ROATC A developed two theories why he was not observing a continued level increase in SG 1D. The first theory was that chart recorder 1MCFCR5630 was broken and not indicating correct level. The second theory was that an air bubble was trapped and being compressed in the top of SG 1D. He decided to prove his second theory by venting SG 1D and allowing any trapped compressed air or gasses to escape the SG. At 0045,

ROATC A throttled open valve 1SM-9, SG 1D Main Steam Isolation Bypass, to vent SG 1D. He later wrote work request 147522 to investigate and repair chart recorder 1MCFCR5630.

ROATC A continued intermittently monitoring SG 1D level indication using chart recorder 1MCFCR5630 and performing other Control Room unit shutdown duties. He stated during this time period SG 1D level indication remained constant and he never observed SG 1D level indication above 97.3 percent.

At approximately 0119 Annunciator [EIIS:ANN] 1AD4-C4, SG 1D Flow Mismatch Low CF Flow, activated. ROATC A and ROATC B both looked at SG 1D pressure indication and observed 200 psi displayed. At the time, ROATC A was on the phone with Security personnel coordinating Annulus door [EIIS:DR] lock removal as directed by procedure OP/1/A/6100/02, step 2.49.6. ROATC B was closest to the SG control board and he closed valve 1CF-107 and valve 1CF-129B. This action removed the pressurization sources from SG 1D.

At 0120, Annunciator 1AD3-C4, Steam Line 1D High Depressurization Rate Alert alarm activated due to the rapid pressure decrease in SG 1D caused by pressure bleeding off SG 1D through valve 1SM-9.

At 0121, a Main Steam Isolation and ESF signal was generated due to the rapid depressurization of SG 1D. All open SG isolation valves on SGs 1A, 1B, and 1C then automatically closed as required.

At 0125, the manual loader for valve 1SM-9 was closed. Shortly thereafter, the MSIVs were reset and returned to the pre ESF actuation position.

At 0242, Control Room personnel notified the NRC per procedure RP/0/A/5700/10, NRC Immediate Notification Requirements.

On May 19,1991, Instrument and Electrical (IAE) personnel investigated chart recorder 1MCFCR5630 per work request 147522. They were unsuccessful in determining the as found calibration settings because a circuit card failed in the recorder when the recorder was initially connected to the calibration equipment. The chart recorder was found in service before troubleshooting began with a displayed SG 1D level of 99 percent.

Conclusion

This event is assigned a cause of Defective Procedure due to a technical deficiency of procedure OP/1/A/6250/03A.

Procedure OP/1/A/6250/03A, step 2.11 states: "When the last SG level indication (NR or WR) for the applicable SG goes off scale (100 percent), continue filling that SG for 20 minutes, then secure feeding the SG by closing its associated valves." During the event investigation it was determined that the 100 percent indicated value may not be obtainable during wet lay up activities. The SG level instrumentation is calibrated for correct readings at the temperatures and pressures associated with power operation. A slight correction factor is necessary to determine actual SG level when the unit is off line. These correction factors indicate that an indicated SG level of 97 percent with plant parameters identical to those during the event would correspond to an actual SG level of 100 percent. A conservative value of 95 percent should have been listed in the procedure. This value accounts for instrument calibration tolerance and would provide a hold point before the possibility of over pressurization of the SG occurs.

This event is assigned a cause of Inappropriate Action because ROATC A deviated from procedure and action taken was not the best alternative.

ROATC A deviated from procedure OP/1/A/6250/03A by allowing the CM Booster pump to remain running during SG 1D wet lay up activities. Section 1.0, Initial Conditions, of the procedure requires that all Condensate Booster pumps are off during this activity. ROATC A was aware of this requirement, however, he decided without consulting the SRO or the other more experienced ROATC that he would leave the CM Booster pump running. During a recent crew meeting covering the present outage activities it was mentioned by OPS management personnel that the CM system was to remain in operation during the outage. ROATC A erroneously assumed that it was the intention of OPS management personnel that the CM Booster pump was to remain running in order to keep the CM system in operation. ROATC A was less experienced than other Unit 1 OPS Control Room personnel on duty that night. He had been promoted to ROATC approximately 18 months before the event and this was the first time he had performed the SG wet lay up on the control board in the Control Room. The crew communication that took place at the beginning of the shift was inadequate because other more experienced personnel understood that it was not necessary for a CM booster pump to remain running to keep the CM system operational, however, the less experienced team member did not. Also, ROATC A had referred to step 2.50.2 of procedure OP/1/A/6100/02 which states "If desired, place the switches for the non-operating CM Booster pump(s) to the 'STOP' position and stop the running CM Booster pump(s)". When he read "If desired. . .", this confirmed his belief that leaving a CM Booster pump running was an acceptable option and not a definite requirement to stop it prior to initiating SG 1D wet lay up activities. The action taken was not the best option because ROATC A did not discuss the apparent procedural discrepancy with the other more experienced RO, SRO or shift supervisor. Those individuals were available for consultation and would have been able to clarify the correct options available to maintain the CM system operable during SG 1D wet lay up activities.

The CM Booster pump operates at a much higher pressure than the Hotwell pumps. The running CM Booster pump pressurized the SG until approximately 350 psi was reached at the top of the SG. Had the Hotwell pumps alone, as specified by procedure OP/A/1/6250/03A, been used to provide flow to SG 1D, the pressure in SG 1D may not have exceeded acceptable limits and this event could have been avoided.

ROATC A also should have consulted others concerning the apparent level problem in SG 1D. The indicated level stopped increasing at 97.2 percent. The tolerance of chart recorder 1CFCR5630 is +/- 4 percent. ROATC A stated during the event investigation he was aware of this. It was later determined that SG 1D was full with an indicated level of 97 percent. However, ROATC A did not consider that SG 1D could be full with an indicated level of 97 percent. He was interested in the Pressurizer fill operation being performed by ROATC B and had lost full attention to SG level. His initial thought was the instrument was broken or there was an air bubble on SG 1D. ROATC A made the decision to vent SG 1D by opening valve 1SM-9, however, this action was taken without authorization from, or discussion with, licensed OPS management personnel.

A review of the Operating Experience Program (OEP) data base for the twenty-four months prior to this event revealed no LERs involving an ESF actuation due to Inappropriate Action. However, there were 3 LERs involving an ESF actuation due to Defective Procedure during this time period. Therefore, this event is considered recurring. LER 370/91-11 documented a manual actuation of CA pumps 2A and 2B due to insufficient flow provided to the main Feedwater pumps. LER 370/92-01 documented a Solid State Protection system Safety Injection signal which was generated during maintenance activities on Diesel Generator 2A Sequence Timer. LER 370/92-02 documented an actuation of the Unit 2 Diesel Generator Load Sequencer Blackout Logic which occurred while a Train B ESF test was being performed. The corrective actions performed as a result of these events related to specific procedural deficiencies and would not have prevented this event from occurring.

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

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

CORRECTIVE ACTIONS:

Immediate: OPS Control Room personnel stopped filling SG 1D.

Subsequent: 1) OPS Control Room personnel reset the main steam isolation signal.

2) OPS Control Room personnel returned the affected valves to the original position.

3) Chart Recorder 1MCRCF5630 was calibrated and repaired as directed by work request 147522.

4) An ongoing procedure adhearance working group consisting of station personnel was formed February 20, 1992 to address generic procedure and procedure usage problems.

Planned:

1) Procedures OP/1 and 2/ A/6250/03A will be changed to state that when the applicable SG should be filled for 20 minutes after level indication reaches 95 percent vs 100 percent as now stated.

2) Procedures OP/1 and 2/ A/6250/03A will be enhanced to state that while filling SGs for wet lay up, the Control Room Data Book correction factor table: Actual SG Level With Lower Containment Temperature At 60 to 340 Degrees F, shall be referred to.

3) Procedures OP/1 and 2/ A/6250/03A will be enhanced to add a sign off step that states: while establishing wet lay up conditions in a SG, all CM booster pumps shall be off.

4) The intent and purpose of initial conditions in procedures will be reemphasized to OPS licensed operators during annual requalification training.

SAFETY ANALYSIS:

Unit 1 was in Mode 5 at the time of the inadvertent MSIV isolation and ESF actuation. The ESF actuation system [EIIS:JE] is not required to be operable during Mode 5 or below because the ESF equipment does not serve to mitigate the consequences of an accident with the unit in Mode 5 or below. Some ESF equipment is intentionally removed from service in Mode 5 to preclude damage to the equipment or the unit because the ESF equipment is not designed to operate in Mode 5 or below. The available Unit 1 ESF equipment actuated and operated properly. There were no operational problems, disturbances, or damage to Unit 1 as a result of this event.

FACILITY NAME(1)	DOCKET NUMBER(2)	LER NUMBER(6)			PAGE(3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
McGuire Nuclear Station, Unit 1	05000 369	92	07	0	8	OF	8

OPS personnel took prompt action to reset the MSIVs and returned the affected valve to the original position prior to the event.

The ESF actuation resulting from the main steam isolation was not generated as a result of actual system conditions that required ESF equipment to function.

Therefore, this event did not affect the health and safety of the public.