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January 13, 1995

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

Subject: McGuire Nuclear Station Unit 1 and 2
Docket No. 50-369
Voluntary Licensee Event Report 369/94-09, Revision 0
Problem investigation Process No.: 1-M94-1667

Gentlemen:

Attached is Voluntary Licensee Event Report 369/94-09, concerning the Boron dilution of the Unit 1 Volume Control Tank due to procedural deficiencies caused by inadequate self checking during revision of a plant procedure. This report is being submitted voluntarily and is not required per 10 CFR 50.73. 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

RJD/bcb

Attachment

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NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMD NO. 3150-0104
EXPIRES: 5/31/95
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
McGuire Nuclear Station, Unit 1	05000 369	1 OF 5

TITLE (4) Boron Dilution Of The Unit 1 Volume Control Tank Due To Procedural Deficiencies Caused By Inadequate Self Checking.

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 NAME	DOCKET NUMBER(S)
										05000
11	25	94	94	- 09	- 0	01	20	95	N/A	05000

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)	100%	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)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		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	
Rickey J. Deese, Manager, McGuire Safety Review Group	(704)	875-4065

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)

This report is being submitted voluntarily to provide information and lessons learned regarding Reactivity Management. On November 25, 1994, with Unit 1 operating in Mode 1 (Power Operation) at 100 percent power the Unit 1 Chemical And Volume Control (NV) Auto Control system made-up level in the Unit 1 Volume Control Tank (VCT). After the make-up was completed, the Unit 1 Operations (OPS) Reactor Operator (RO) noted an increase in the Unit 1 Reactor Coolant (NC) system temperature. He checked appropriate parameters and found no reason for the increase. He then attempted addition of Boron to control the increase via both normal and emergency flow paths from the Boric Acid tanks. He was unable to establish flow. At that time, the OPS RO inserted Control Rods to achieve the appropriate NC system temperature. OPS personnel determined that valve 1NV-381, Suction to Unit 1 Boric Acid Tank Pumps, had been closed by Chemistry personnel in accordance with a procedure for realignment of the Boric Acid tanks. The closed valve had prevented addition of Boron from the Boric Acid tanks during the auto make-up to the VCT and later when the OPS RO attempted to add Boron. The valve was reopened and flow was restored from the Boric Acid tanks. Additionally, the Boric Acid Flow deviation instrumentation had malfunctioned at some time prior to the auto make-up to the VCT. This malfunction had prevented actuation of both the annunciator alarm and the automatic termination of make-up to the VCT when Boric Acid flow was not established during the make-up. This incident has been assigned a cause of Procedural Deficiency due to technical inaccuracies created by inadequate self checking by personnel when implementing a procedure change. Appropriate changes have been made to correct the procedural deficiencies. Subsequent testing proved that the alarm circuitry did not function correctly due to failure of a time delay relay associated with the circuit. The circuitry was repaired and functionally tested satisfactorily.

EVALUATION:

Description of Event

This report is being submitted voluntarily to provide information and lessons learned regarding Reactivity Management. On November 24, 1994, with Unit 1 operating in Mode 1 (Power Operation) at 100 percent power and Unit 2 operating in Mode 3 (Hot Standby), Operations (OPS) personnel added Boric Acid from the Chemical And Volume Control (NV) system [EIIS:CB] to the Unit 2 Reactor Coolant (NC) system [EIIS:AB] in order to achieve Mode 5 (Cold Shutdown). A significant amount of the Boric Acid stored in the Unit 2 Boric Acid Tank [EIIS:TK] was used during this addition. Because of the depletion, Chemistry (CHM) personnel requested permission to crosstie the Unit 2 and Unit 1 tanks temporarily to raise the level in the Unit 2 tank. Permission was granted and the tanks were crosstied utilizing CHM procedure CP/0/A/8400/10, Boric Acid Addition To The Boric Acid Tanks.

On November 25, 1994, at approximately 1210, CHM personnel contacted the OPS Control Room [EIIS:NA] personnel to inform them that they were about to begin batching of Boric Acid to make up the Boric Acid depleted from storage on the previous day. OPS personnel suggested that they un-crosstie the Unit 1 and Unit 2 Boric Acid Tanks prior to beginning the batching process. The CHM personnel agreed to un-crosstie the tanks. This operation was performed, again utilizing CHM procedure CP/0/A/8400/10.

At 1345, the system for automatic level control of the Unit 1 NC system Volume Control Tank (VCT) automatically made-up, increasing the level in the tank. After the make-up was completed, the Unit 1 OPS Reactor Operator (RO) noted an increase in the Unit 1 NC system temperature. He checked the appropriate parameters and found no reason for the escalation of temperature. He then attempted addition of Boron via both normal and emergency flow paths from the Boric Acid tanks to control the increase. He was unable to establish Boric Acid flow. At that time, the RO inserted Control Rods to achieve < or = to 100 percent Reactor [EIIS:RCT] Power and normal NC system temperature. At no time did Reactor power exceed 100.7 percent, well within allowable Technical Specification (TS) limits.

Instrumentation for Westinghouse 4 Loop Plants is installed to detect and alarm on loss of Boric Acid flow. The Boric Acid Flow deviation instrumentation had malfunctioned at some time prior to the auto make-up to the VCT. This malfunction prevented actuation of both the annunciator alarm and the automatic termination of auto make-up to the VCT when Boric Acid flow was not established.

At that time OPS personnel knew that there was either a blockage or a valve misalignment preventing addition of Boric Acid. Review of recent events revealed that the only work which had been performed which could have affected Boric Acid flow was the un-crosstieing of the Unit 1 and Unit 2 Boric Acid Tanks by CHM personnel earlier that day. CHM personnel involved in that work were contacted and it was then determined that valve [EIIS:V] 1NV-381, Suction to Unit 1 Boric Acid Tank Pumps [EIIS:P], had been closed by CHM personnel during performance of the procedure for realignment of the tanks. This valve should have remained in the open position, but had been closed in accordance with the procedure. Accordingly, OPS personnel instructed CHM personnel to re-open the valve.

As soon as the valve was opened OPS personnel were able to reestablish Boric Acid flow from both normal and emergency paths to control NC system temperature. The normal flow being reestablished, the Control Rods were returned to their normal operating positions to achieve stable operation of Unit 1. OPS personnel consulted

appropriate procedures and TS and determined no additional actions were necessary as a result of the incident. This incident is not reportable, since Reactor power never exceeded allowable TS limits and the minimum Boration flow paths were always available from the Refueling Water Storage Tank (FWST). Problem Investigation Process (PIP) 1-M94-1667 was generated to further investigate root causes and any additional corrective actions as appropriate for the incident.

Conclusion

This incident has been assigned a cause of Procedural Deficiency due to technical inaccuracies created by inadequate self checking by personnel when implementing a procedure change.

CHM procedure CP/0/A/8400/10, Boric Acid Addition To The Boric Acid Tanks was revised on October 17, 1994. The CHM person performing the revision had moved the portion of the procedure which addresses crosstieing and un-crosstieing of the Boric Acid Tanks in an effort to make the procedure more understandable and easier for CHM personnel to follow. Changes were also made to clarify wording and editorially improve the procedure. During these changes the person preparing the revision inadvertently added valve 1NV-381, Suction to Unit 1 Boric Acid Tank Pumps, to steps 4.7.4.1 and 4.7.4.2 instructing personnel to close the valve. The person preparing the change did not adequately self check the changes made to this section of the procedure. Subsequent reviews by CHM personnel reviewing and approving the procedure for use did not include a technical review of this specific section of the procedure because the need for such a review was not recognized. Since the changes made to the procedure should only have affected CHM personnel, or were editorial for correction of typographical errors or clarification of wording, it was determined that no cross disciplinary review of the changes by OPS personnel was required. Also, since no major changes were supposed to be included in the revision, it was determined that verification of the changes in the field was not necessary prior to approval. Therefore, November 25, 1994, was the first time the section of the procedure dealing with un-crosstieing of the Boric Acid Tanks had been performed since the revised procedure had been approved. CHM personnel using the procedure on that date closed valve 1NV-381 as directed by procedure. On November 25, 1994, immediately upon discovery of the procedural deficiencies, CHM personnel placed the procedure on administrative hold until appropriate changes could be made to correct the inaccuracies. The procedure was subsequently completely rewritten, functionally verified to be correct, and has received a cross disciplinary review by OPS personnel.

A contributing factor to this incident was the failure of the Boric Acid Flow deviation instrumentation alarm circuitry at some time prior to the auto make-up to the VCT. Subsequent testing proved that the circuitry did not function correctly due to failure of a time delay relay [EIIS:RLY] associated with the circuit. The circuitry was subsequently repaired and functionally tested satisfactorily. Review of the equipment history for this circuitry revealed that this is an isolated equipment failure and is not generic to other similar equipment. It was determined that probability of recurrence due to a similar failure is highly unlikely because of the nature of the failure. Addition of a surveillance to verify operability of the instrumentation is being pursued. No further actions with regard to this equipment are deemed necessary at this time.

A review of the Problem Investigation Process (PIP) data base for the past 24 months revealed one other incident related to Reactivity Management. This incident is documented in Voluntary Licensee Event Report 369/94-05. That incident concerns the Boron dilution of the Unit 1 Spent Fuel Pool during the drain down and decontamination of the Transfer Canal. It was assigned a cause of improper Managerial Methods, and is in no way similar in the

circumstances surrounding this incident. No corrective actions from that incident would have prevented occurrence of this incident. Therefore, this incident is not considered to be recurring.

This incident did not result in any uncontrolled releases of radioactive material, personnel injuries, or radiation overexposures.

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

CORRECTIVE ACTION:

Immediate:

1. OPS personnel inserted Control Rods to achieve < or = to 100 percent Reactor Power and normal NC system temperature.

Subsequent:

1. OPS personnel contacted CHM personnel involved in the work and it was then determined that valve 1NV-381, Suction to Unit 1 Boric Acid Tank Pumps, had been closed by CHM personnel during performance of the procedure for realignment of the Boric Acid tanks.

2. CHM personnel re-opened valve 1NV-381 at the instruction of OPS personnel.

3. CHM personnel placed procedure CP/0/A/8400/10, on administrative hold pending appropriate corrections and verification.

4. OPS personnel verified Boric Acid flow had been reestablished from both normal and emergency paths.

5. OPS personnel returned the Control Rods to their normal operating positions and to achieve stable operation of Unit 1.

6. CHM personnel rewrote, and functionally verified procedure CP/0/A/8400/10, to correct deficiencies identified during this incident.

7. OPS personnel reviewed procedure CP/0/A/8400/10, to insure that it was in conformance with appropriate operating parameters.

Planned:

1. CHM personnel will implement a process for validation of procedures.

2. CHM personnel will develop a list of CHM procedures requiring cross diciplinary review by OPS Group personnel whenever they are revised.

SAFETY ANALYSIS:

This incident is being reported voluntarily to provide information and lessons learned regarding Reactivity Management. During this incident Reactor power never exceeded allowable TS limits for full power operation. Also, two flow paths from the Refueling Water Storage Tank via the charging pumps to the NC system were always available as specified by TS. OPS personnel recognized an increase in NC system temperature and took appropriate action to control and mitigate the power escalation associated with this incident immediately. If left completely unchecked by operator intervention, this event would have progressed to a Reactor trip. The major effect of this would be a possible increase in the plant specific reactor trip initiating frequency in the probability risk assessment (PRA) analysis. In the McGuire PRA, reactor trips account for less than 1 percent of the core melt frequency due to plant transients and only about 0.5 percent of the overall core melt frequency. A small change in the reactor trip initiator frequency has an insignificant effect on the calculated core melt frequency for McGuire.

At no time were the health and safety of the public or plant personnel affected by this incident.