



Nuclear Management Company, LLC
Point Beach Nuclear Plant
6610 Nuclear Road
Two Rivers, WI 54241

NPL 2000-0469

October 19, 2000

10 CFR 50.73

Document Control Desk
U.S. NUCLEAR REGULATORY COMMISSION
Mail Station P1-137
Washington, DC 20555

Ladies/Gentlemen:

DOCKET NOS 50-266 AND 50-301
LICENSEE EVENT REPORT 2000-008-00
INADEQUATE PROCEDURAL GUIDANCE FOR SPURIOUS OPERATION
OF VALVES DURING APPENDIX R ALTERNATE SHUTDOWN
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

Enclosed is Licensee Event Report 2000-008-00 for Point Beach Nuclear Plant, Unit 1 and 2. This report is provided in accordance with 10 CFR 50.73(a)(2)(ii) as, "any event or condition that resulted ...in the nuclear power plant being:... (B) In a condition that was outside the design basis of the plant." This report describes the discovery that the spurious operation of the SI-851 valves, "RHR Suction from Containment Sump," due to an Appendix R fire event was not adequately considered and addressed in the PBNP alternate shutdown procedures. This condition has been corrected with appropriate procedure changes.

This report contains no new NRC corrective action commitments.

Please contact us if you require additional information.

Sincerely,

Dan Cole
Manager,
Site Assessment

Enclosure

CWK/tat

cc: NRC Resident Inspector
NRC Regional Administrator
NRC Project Manager

INPO Support Services
PSCW

IE22

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT

FACILITY NAME (1) Point Beach Nuclear Plant, Unit 1	DOCKET NUMBER (2) 05000266	PAGE (3) 1 of 6
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TITLE (4)
Inadequate Procedural Guidance For Spurious Opening of SI-851A/B Valves During Appendix R Alternate Shutdown

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
09	20	2000	2000	008	00	10	19	2000	PBPN Unit 2	05000301
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)									
	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)			
POWER LEVEL (10) 100	20.2203(a)(1)		20.2203(a)(3)(i)	X	50.73(a)(2)(ii)		50.73(a)(2)(x)			
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71			
	20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER			
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A			
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)					

LICENSEE CONTACT FOR THIS LER (12)								TELEPHONE NUMBER (Include Area Code)			
NAME Charles Wm. Krause, Senior Regulatory Compliance Engineer								(920) 755-6809			

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	

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 15 single-spaced typewritten lines) (16)

While completing a re-verification and re-validation of the Fire Protection Evaluation Report fire scenarios, the licensee's Appendix R Rebaselining Project Team determined that the procedural guidance in Appendix R alternate shutdown procedures, AOP-10A, "Safe Shutdown - Local Control," and AOP-10B, "Safe to Cold Shutdown in Local Control," did not adequately consider spurious operation of the SI-851A/B, "RHR to Containment Sump," isolation valves. Spurious operation of these valve during an Appendix R fire event could lead to diversion of RWST or RCS coolant volume to the containment sump. This would be contrary to an Appendix R performance goal to maintain pressurizer level and was determined to be a condition outside the design basis of the plant. The potential for this condition has been eliminated by changes to the identified procedures. Due to the availability of alternative water sources, the training provided to the operating staff to recognize and respond to this event, and the defense in depth to minimize the potential for the initiating fire event, this event was determined to have a low safety significant.

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

Event Description:

Nuclear Management Company, licensee for the Point Beach Nuclear Plant (PBNP), has been in the process of conducting a 10 CFR 50 Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," Rebaselining Project. This project includes reviews of Appendix R fire scenarios as described in the Fire Protection Evaluation Report (FPER) and validation that the plant procedures adequately address the concerns identified in the new Appendix R fire analyses. During this review, we identified that the Appendix R alternate shutdown procedures, AOP-10A, "Safe Shutdown - Local Control," and AOP-10B, "Safe to Cold Shutdown in Local Control," did not properly address spurious operation of the SI-851A and SI-851B, "RHR Suction from the Containment Sump," isolation valves. It is postulated that these valves could spuriously open at the beginning of a fire event in either the Control Room, the Cable Spreading Room or the central areas of the 26 foot elevation of the Primary Auxiliary Building (PAB). These are all Alternate Shutdown areas and could result in implementation of the Appendix R alternate shutdown procedures. There are additional valves, the SI-850A/B valves, between the containment sump and the RHR pump suction piping. The SI-850A/B valves are hydraulically operated "bath tub" type valves which are opened during the recirculation phase of safety injection to provide a suction water source to the RHR pumps after the Refueling Water Storage Tank (RWST) is empty. Although these valves are designed to control the flow of coolant from the containment sump, we have conservatively assumed that these valves would not prevent significant back flow to the sump if the RHR pump suction piping is pressurized and the SI-851 valves are open.

If the SI-851A or B valve should spuriously open during an Appendix R event requiring an alternate safe shutdown, the RWST could begin draining to the Containment Sump. Preliminary Appendix R calculations show that to stop this drain down and retain enough inventory volume in the RWST to support a cool down of the unit, the SI-856A/B valves, "RWST Outlet to RHR Pump Suction Header," should be closed within 15 minutes. Currently in AOP-10A (at Attachment D, Step 30), the SI-856A/B valves are not closed until approximately 30 minutes into the procedure. This could result in inadequate inventory remaining in the RWST to support continuous charging during the unit cool down.

The procedure validation further identified that since no action is specified to verify the SI-851A/B valves are closed in either the AOP-10A or AOP-10B procedures, if one or both valves have spuriously opened due to the initiating fire event, one must assume that the valves would remain open. The result would be that during AOP-10B steps 22 and 30, when the RHR system is aligned for normal recirculation to continue the plant cool down, the RCS coolant inventory would begin back flowing to the Containment Sump when the RH-700 and RH-701 valves, "RHR Pump Suction Isolation," are opened in step 30.

Appendix R, Section III.L.2.b, of 10 CFR 50 requires a performance goal of maintaining RCS level within the level indication in the pressurizer. In AOP-10A, if either of the SI-851A/B valves are spuriously opened and the SI-856A/B valves are not closed in a timely manner, some amount of RWST inventory could be lost to the containment sump and RWST inventory may then run out prior to reaching cold shutdown. Without adequate charging make-up volume in the RWST, pressurizer level could drop below indication. Additionally, if AOP-10B were performed as written without checking the SI-851 valves shut, RCS inventory could be rapidly drained to the Containment Sump when RHR is

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initiated.

A condition report was submitted concerning these procedural inadequacies on September 20, 2000 (CR 00-2804). Since the procedural inadequacies had the potential to result in a failure to meet the Appendix R performance goal in Section III.L.2.b, we concluded that this postulated spurious valve operation could result in a condition that was outside the Appendix R design basis. Accordingly, a one hour notification (Event 37358) to the NRC was completed at 1652 CDT on September 20, 2000, pursuant to 10 CFR 50.72(b)(1)(ii)(B) for, "Any event or condition during operation that results...(B) In a condition that is outside the design basis of the plant." This notification was updated on September 21, 2000, to clarify the concern identified with the AOP-10B procedure.

Cause:

The re-verification and re-validation of the FPER fire scenarios by the Appendix R Rebaselining Project Team discovered this inadequate procedural guidance. Although the normal plant operating and emergency procedures address providing assurances that the SI-851 valves are closed or tagged closed before initiation of RHR during a plant cool down, the alternate shutdown procedures, which are used when the control room has to be evacuated and the unit shutdown from the remote shutdown panels, had not adequately addressed these concerns. A specific cause for this condition was not identified. This was apparently an oversight that occurred during the procedure development process.

Corrective Actions:

1. AOP-10A has been revised to ensure that power to the motor control centers (MCCs) that provide power to the SI-851A and B valve operators are tripped prior to leaving the control room by taking their control switches to pull-out. As an added measure, Step 30 of Attachment D of AOP-10A, which closes the SI-856A/B valves, has been moved up to be part of Step 3. This assures that the valves are closed in a timely manner and the path from the RWST to the containment sump isolated regardless of any spurious valve operation.
2. AOP-10B has been revised to add an action in procedure Step 22 and Attachment A, Step 15, to ensure the SI-851A/B valves are closed prior to aligning RHR for normal cool down circulation.

These procedure changes were completed September 25, 2000.

Safety Assessment:

The defense-in-depth approach to Point Beach Nuclear Plant's Fire Protection Program, which includes both fire detection and suppression provisions in these areas, tends to mitigate the significance of the conditions postulated in this event report. There is a high likelihood that any postulated in-plant fires which could result in this spurious valve motion would be detected and controlled before significant damaged to safe shutdown equipment would occur or necessitate application of the alternate shutdown procedures.

The potential spurious operation of the SI-851A/B valves cause two distinctly different concerns: 1) The Loss of RWST inventory and/or 2) the Loss of RCS inventory. Each concern is discussed separately below.

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Loss of RWST inventory - A minimum amount of RWST inventory is required as a supply source to the Charging Pumps which supply make-up coolant to the RCS. The make-up coolant is required due to RCS shrinkage as the unit cools down and the potential failure of the RCP seals due to an initial loss of charging which normally supplies cooling water to the seals and the assumed unavailability of component cooling water to the RCP thermal barrier. An analysis was performed which conservatively assumes that the maximum allowed technical specification limit for RCS leakage was occurring at the time of the event and the RCP seals experience a complete failure during the event resulting in a maximum leakage rate from both RCP seals. This maximum leakage rate translates to a minimum required volume which must be retained in the RWST. A separate analysis was then performed which conservatively determined the time required for the RWST to drain down to this minimum volume should either SI-851A and/or SI-851B spuriously open. With both valves open at time zero the drain down was determined to occur in approximately 15 minutes. With only one valve open, the drain down would occur in approximately 30 minutes. It is noted that there is considerable conservatism in this analysis and it assumes that all things occur at exactly time zero (i.e. maximum seal leakage, spurious valve opening and maximum drain down of the RWST) and that the SI-850 valves do not prevent backflow to the containment.

Due to the progressive nature of the way a fire must occur, the conditions which must be present for the below minimum required RWST volume to occur, will take some time to develop. That is, the SI-851A/B valves will not spuriously operate at the same time since the fire must propagate from one valve control circuit to the next. Additionally, power to the valves is removed at approximately 10-15 minutes into the procedure when power to the MCC's supplying these MOV's are tripped. Therefore it is likely that at least one if not both of the valves will be prevented from spuriously operating. Also, the assumed RCS leakage at the beginning of the event is Technical Specification maximum limit which is unlikely to occur. With the combination of these facts, the actual drain down time to a minimum point will be greater than 15 minutes and likely greater than 30 minutes. The step to close the SI-856A/B valves to terminate the loss of RWST volume, will be reached in the AOP-10A procedure in approximately 30 minutes. It is probable that operations staff would, in fact, close these valves in sufficient time to retain adequate charging volume in the RWST.

Nonetheless, should the valves not be closed in time to retain the charging volume in the RWST needed for a satisfactory cool down, an alternate source of water to the charging pumps would remain available from the Boric Acid Storage Tanks (BAST). These tanks can be manually aligned to gravity feed to the charging pump. These tanks will provide several hours of supply, giving operations time to make arrangements to begin a batching process to the tanks and provide a virtual continuous supply of water to the charging pump.

Loss of RCS inventory - During performance of AOP-10B the SI-851A/B valves become boundary valves to the RHR recirculation path to the RCS. Should either of the SI-851A/B valves spuriously operate, they could potentially remain open since there was no specific steps to verify the valves closed in the procedure. Thus, a flow path would be created from the pressurized RCS to the Containment Sump when the RH-701 valve is opened to begin operation of the RHR system. This would result in a rapid loss of RCS inventory to the sump until the RH-701 valve is re-closed.

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Operations personnel are aware that during RHR operations, opening of the SI-851A/B valves can result in flow to the Containment Sump. They are trained on the normal plant cool down procedure (OP 7A), to danger tag shut the SI-851A/B valves prior to going on normal RHR cool down. For the Appendix R scenario, the AOP-10B procedure specifically instructs them to remain on soak for 30 hours prior to going on RHR. At this point there will be more than the minimum number of staff on site due to call-ins. This provides a substantial amount of time and people to review the situation and verify conditions and systems status through out the plant. We believe that it is highly probable, based on their prior training relating to the SI-851A/B valves, that the plant operations staff would, in fact, verify the SI-851A/B valves closed prior to aligning and initiating RHR. It should be also noted that should the RWST inventory actually run out during the cool down, the SI-851A/B valves would be recognized as the problem and would be verified closed thus preventing the potential loss of RCS inventory.

With the defense in depth design of fire protection at PBNP, the actions to prevent the spurious operation by removing the power to the valves early in the event and the availability of alternate charging supply, it is unlikely that pressurizer level would actually be lost during this postulated event. In addition to the above, with the training of operations personnel to verify the SI-851A/B valves are closed during normal operations, it is unlikely there would have been a loss of RCS inventory. We believe the potential impact on the health and safety of the public or plant personnel as a result of this procedural inadequacy was not significant. Since the evaluation of this sequence of events did not identify the loss of a safety related function, in that provisions are available to provide for a controlled safe shutdown of the unit, this event does not constitute a Safety System Functional Failure.

System and Component Identifiers:

The Energy Industry Identification System component function identifier for each component/system referred to in this report are as follows:

<u>Component/System</u>	<u>Identifier</u>
Residual Heat Removal System	BP
Chemical and Volume Control System	CB
Refueling Water Storage Tank	TK
Charging Pump	P
Valve, Isolation	ISV
Motor Control Center	MCC

Similar Occurrences:

A review of recent LERs (past two years) identified the following events which addressed Appendix R related events as a result of the licensees rebaselining initiative.

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<u>LER NUMBER</u>	<u>Title</u>
266/2000-006-00	Inadequate Procedural Guidance to Restore Equipment Necessary To Maintain Hot Safe Shutdown as Required by Appendix R Design Basis
301/2000-001-00	Replacement of Charging Pump Control Power Fuse Outside Appendix R Design Basis
266/2000-004-00	Potential Loss of Process Monitoring Instrumentation Due to a Fire In Containment
266/1999-008-00	Postulated Fire Could Lead To Loss Of Redundant Trains Of Charging Capacity
266/1999-007-00	Cable Tray Fire Stops Do Not Meet Appendix R Exemption Requirements
266/1999-006-00	Postulated Fire and Inability to Isolate PORV Outside Appendix R Design Basis
266/1999-004-00	Fuel Oil Transfer Pump Cable in the AFW Pump Room Outside Appendix R Design Basis
301/1999-002-00	Red Channel of Steam Generator Pressure Indication Passes Through Fire Zone
266/98-030-00	Assumptions for Equipment Necessary To Maintain Hot Safe Shutdown Outside Appendix R Design Basis