

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)
Point Beach Nuclear Plant

DOCKET NUMBER (2)
0 5 0 0 0 2 1 6 1 6

PAGE (3)
1 OF 0 1 6

TITLE (4)
Safety Injection Block Switch Design 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 8	1 9	8 8	8 8	0 0	7	0 9	1 6	8 8			0 5 0 0 0 0
<p>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11):</p>											

OPERATING MODE (9)	20.402(a)	20.402(b)	20.73(a)(2)(iv)	73.71(a)
POWER LEVEL (10)	20.402(a)(1)(i)	20.36(a)(1)	20.73(a)(2)(v)	73.71(a)
	20.402(a)(1)(ii)	20.36(a)(2)	20.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Test. NRC Form 368A)
	20.402(a)(1)(iii)	20.73(a)(2)(i)	20.73(a)(2)(vii)(A)	
	20.402(a)(1)(iv)	20.73(a)(2)(ii)	20.73(a)(2)(vii)(B)	
	20.402(a)(1)(v)	20.73(a)(2)(iii)	20.73(a)(2)(viii)	
	20.402(a)(1)(vi)	20.73(a)(2)(iv)	20.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME: C. W. FAY, VICE PRESIDENT - NUCLEAR POWER

TELEPHONE NUMBER: 4 1 1 4 2 1 2 1 1 - 1 2 1 8 1 1 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC TURE	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFAC TURE	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)

NO

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

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

On August 19, 1988, analysis of a suspected design deficiency of the safety injection (SI) block circuitry revealed that it would be possible for a failure of a switch block to render both trains of SI inoperable. A design change to separate SI block by train is near completion and will be installed on each unit during the next scheduled refueling outage.

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TEXT (if more space is required, use additional NRC Form 308A's) (17)

EVENT DESCRIPTION

On July 14, 1988, during a control room design review meeting concerning the placement of controls on the control boards, a licensed senior reactor operator questioned the use of a single manual SI 'block/unblock' switch for both SI trains. It could not immediately be determined if the configuration was a design deficiency. A nonconformance report (NCR #88) was initiated and the Instrument and Control group was consulted for design analysis. The evaluation of the NCR resulted in the determination that a single failure of the Westinghouse OT2 switch (OT2V6 selector switch with three-position cam and spring return to neutral, with four OT2A contact blocks) could result in the blocking of the low pressurizer pressure automatic SI and the low steam line pressure automatic SI signal in both SI trains. It was determined that this design configuration was reportable as a Licensee Event Report on August 19, 1988.

Both Units 1 & 2 of Point Beach Nuclear Plant were operating at 100% during the design analysis. The SI system remained and continues to remain operable.

SYSTEM DESCRIPTION

The low steam line pressure SI signal (setpoint of 530 psig steam pressure) from either steam line (Loop A or Loop B) and the pressurizer pressure low (setpoint 1735 psig) are blocked manually by use of the 'block/unblock' switch in order to accomplish a normal cooldown and depressurization during the performance of OP-3C, "Hot Shutdown to Cold Shutdown." When two of three pressurizer pressure instruments are less than 1765 psig, the permissive annunciator light "Low Pressurizer Pressure SI Block" is lit and the manual block is allowed.

High containment pressure (5 psig) automatic SI actuation as well as manual SI actuation is not blocked by this switch.

The automatic SI block signal is automatically unblocked if pressurizer pressure increases above 1775 psig and two of three pressurizer pressure bistables deenergize. This automatic unblocking feature is single failure proof and is mechanically and electrically independent for the two SI trains. In addition, the block signal can be manually defeated by turning the block switch momentarily to the unblock position.

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

This Licensee Event Report considers a configuration where a possible single failure of a manual switch for SI block could result in the failure of both trains of SI to function. The selector switch is a Westinghouse OT2V6 three-position cam, spring return to neutral switch. Four Westinghouse OT2A contact blocks are stacked together in series and operated by a single selector switch. Two blocks, one for blocking each train of SI are on top and two blocks, one for unblocking each train of SI are underneath.

Two failure modes have been postulated. The first assumes the spring return mechanism breaks and the switch could remain in the block position. This failure is visible to the operator due to the non-return to neutral of the switch.

The second failure mode requires the malfunction of the top block of the upper two of the four contact blocks such that the spring return plunger sticks in the block position. The bottom contact block is operated by the top contact block plunger mechanically bearing on the bottom contact block plunger to effect actuation. Therefore, it should be noted that a failure of the bottom contact block would not affect the top contact block and would affect only one train of SI.

The scenario in which a single failure would block both trains of SI is as follows. During the performance of OP-3C, "Hot Shutdown to Cold Shutdown," when the block switch is momentarily switched to the block position, the upper contact block internal stick such that both contacts remain in the block position. When the KCS pressure is later increased above 1775 psig, the system's priority network should automatically unblock the signals. On the next RCS pressure decrease (planned or unplanned) to less than 1765 psig, the SI signal would block in both trains such that if the RCS pressure decreased below 1735 psig or steam line pressure decreased below 530 psig, automatic SI actuation setpoints, no auto SI would occur due to the single failure. However, an automatic SI actuation on containment pressure would occur. Note that SI independent annunciator lights indicating "SI Blocked Train A," and "SI Blocked Train B," which receive a signal directly from the SI master relay, would come on during this scenario as RCS pressure decreased below 1765 psig. These annunciators would alert the operators that the SI signals were blocked. The operators could then respond with a manual SI actuation.

Emergency Operating Procedure EOP-0, "Reactor Trip or Safety Injection," has immediate steps covering the actuation of safety injection. Step 4 is "Check if SI Actuated" and requires the checking of all of the following annunciators:

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TEXT IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC FORM 288A'S (17)

- Steam line low pressure
- Pressurizer low pressure SI
- Containment pressure high
- Manual SI

If SI is required and has not actuated, the operator is instructed to initiate manual SI. The procedure continues to verify that SI has actuated by checking the proper operation of components. The operator manually operates those components that have not responded to the SI actuation signal. These emergency operating procedures are designed to ensure that those systems needed to mitigate the consequences of an accident are operating.

SAFETY ASSESSMENT

The safety injection system provides protection against the loss of coolant accident and the steam line break. Protection for a loss of coolant accident or the steam line break inside containment is provided by low pressurizer pressure or low steam line pressure respectively, and is backed up by safety injection initiation based upon containment pressure. Containment spray also aids in the mitigation of a containment pressure transient. Containment spray is initiated when containment pressure reaches 25 psig.

Train independent annunciators "SI Blocked Train A" and "SI Blocked Train B" would light as pressurizer pressure decreased to less than 1765 psig alerting the operators of the presence of a blocked condition. This would allow the operator to respond to the blocked condition.

A low steam line pressure initiation of SI would occur with a failed block switch if pressurizer pressure were above 1775 psig.

Emergency Operating Procedure, EOP 0, "Reactor Trip Safety Injection," has immediate action Step 4 which requires the verification of SI. Immediate action steps are required to be committed to memory by the licensed reactor operator. Therefore, the operator would be required to check the tripped condition of the reactor trip breakers and immediately check the condition of the safety injection system. If the operator were to find the SI system not operating when, in fact, it was needed, the procedure requires immediate manual initiation. The block switch failed condition does not prevent the initiation of manual safety injection.

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TEXT IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC FORM 288A (7-83)

All these analyzed conditions will result in the initiation of mitigating actions, all of which are diverse and most automatic in nature.

Therefore, this condition will not have a significant impact on the health and safety of the general public or the employees of the Point Beach Nuclear Plant.

GENERIC IMPLICATIONS

In 1985, the SI block annunciators were modified to separate the A and B train.

Reactor trip push buttons were separated due to the potential for a common mode failure. Other than these, there are, to our knowledge, no single failure switch conditions present at Point Beach Nuclear Plant.

REPORTABILITY

Since no component discussed in this LER has failed, no identification codes are applicable.

This Licensee Event Report is filed pursuant to 10 CFR 50.73(2)(v), "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems . . ." as referenced in 10 CFR 50.73(2)(vi) where the condition may be a "design."

CAUSE

The cause of this found condition is a design error which occurred during the original construction of Point Beach Nuclear Plant.

CORRECTIVE ACTIONS

Short Term

A note has been written in the control room night order book explaining the potential single failure mode of the SI block switches.

Testing will be performed prior to October 1 to ensure that the block of SI is not engaged.

An operator aid will be attached prior to October 1 to the control board next to the block switches. This aid will advise the operators to test the 'block/unblock' switch for correct orientation after each operation of the switch.

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

Long Term

During the next scheduled refueling outage for each unit, a design change will be made to separate the block switches for each SI train.

SIMILAR OCCURRENCES

As discussed in the generic issues section above, there have been investigations into switch configurations on other systems at Point Beach. These investigations have revealed some deficiencies which have been corrected.



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VPNPD-88-468
NRC-88-087

10 CFR 50.73

September 16, 1988

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Gentlemen:

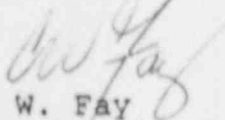
DOCKETS 50-266 AND 50-301
LICENSEE EVENT REPORT 88-007-00
SAFETY INJECTION BLOCK SWITCH
DESIGN DEFICIENCY
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

Enclosed is Licensee Event Report 88-007-00 for Point Beach Nuclear Plant, Units 1 and 2. This report is provided in accordance with 10 CFR 50.73(a)(2)(v), "Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to...(D) mitigate the consequences of an accident."

This report details the discovery of a design inadequacy involving a postulated single failure of a safety injection block switch.

If any further information is required, please contact us.

Very truly yours,


C. W. Fay
Vice President
Nuclear Power

Enclosure

Copies to NRC Resident Inspector
NRC Regional Administrator, Region III

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