NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Point Beach Nuclear Plant, Unit 1	0 5 0 0 0 2 6 6	1 OF 0 7

TITLE (4)

Component Cooling Water System Surge Tank Vent Valves Outside Design Basis

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)
									Unit 2	0 5 0 0 0 3 0 1
1 0	1 2	9 2	9 2	0 0 9	0 1	0 5	1 7	9 3		0 5 0 0 0

OPERATING MODE (9): N

POWER LEVEL (10): 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	X 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)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
20.405(a)(1)(iv)	X 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)
David A. Weaver, Senior Engineer - Licensing	4 1 4 2 2 1 1 - 1 3 4 1 8

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)

ABSTRACT

On October 12, 1992, while Point Beach Nuclear Plant (PBNP) Unit 1 was operating at 100% power and Unit 2 was shut down during its annual refueling outage (U2R18), staff engineering personnel identified that component cooling water (CCW) system surge tank Vent Valves 1&2CC-00017 did not meet their design basis. The plant's design basis requires that the CCW system be considered a closed system outside containment. Any portion of the system that cannot be assured of being maintained closed must be isolated by a safety-related isolation signal. Contrary to these requirements, it was identified that the automatic closing signals for Unit 1 and Unit 2 CCW system surge tank Vent Valve 1&2CC-00017 (which are normally open) are high radiation signals from Radiation Monitors 1&2RE-217, which are designated as non-safety-related. In addition, the valve control circuits for Valves 1&2CC-00017 are designated as non-safety-related and are supplied by non-safety-related power supplies. An event causing a radioactive release to containment and a breach of the CCW system inside containment could result in a radioactive release to the primary auxiliary building (PAB) if Radiation Monitor RE-217 did not initiate the closure of Valves CC-00017. A Justification for Continued Operation (JCO) was approved on October 26, 1992, and subsequently revised on February 25, 1993, to allow continued operation with valve 1&2CC-00017 open until resolution of this issue.

EVENT AND EQUIPMENT DESCRIPTION

During the electrical design phase of a plant modification to upgrade radioactive waste disposal system component cooling water Isolation Valves LW-63 and LW-64 (Corrective Action C.1 of Licensee Event Report 301/92-002-00), it was identified that the high radiation signals provided to Unit 1 and Unit 2 component cooling water (CCW) system surge tank Vent Valves 1&2CC-00017 (hereinafter referred to as Valve CC-00017) to achieve containment isolation in the CCW system were not designated as safety-related. Radiation Monitors 1&2RE-217 (hereinafter referred to as Radiation Monitor RE-217) are designed to monitor the CCW radioactivity levels at the CCW pump suction headers of both units and provides indication and alarms in the control room of CCW contamination. Although the radiation monitoring system (RMS) is quality assurance (QA) grade and seismically qualified, the RMS is not designated as safety-related. Therefore, it is postulated that RE-217 could fail to generate a high radiation signal when necessary, thereby disabling the automatic containment isolation function. Although operator action could compensate for this failure, this does not meet containment isolation design basis requirements.

Point Beach Nuclear Plant was designed before the issuance of the NRC General Design Criteria (GDC) (10 CFR 50, Appendix A, issued in 1971) and was licensed at the same time the proposed Appendix A was published for review (July 1967). The GDC do not recognize the use of a closed system outside of containment as an acceptable means to provide containment isolation. In the standard Westinghouse two-loop pressurized water reactor design, the operation of the reactor coolant pumps (RCPs) was considered desirable following many accidents inside containment and automatic isolation of CCW to the RCPs was not provided during all accidents. This decision led to the requirement to demonstrate that public health and safety would not be adversely affected if an accident, which released radioactivity and breached the CCW system, occurred inside containment. Under these accident conditions (according to vendor correspondence) the pressure inside containment would force the cooling water out of the piping, into the surge tank, and eventually out of the tank's vent. Once radioactivity was sensed in the CCW outside containment, the radiation monitor would cause the surge tank vent valve to close and prevent the release of radioactivity to the environment. With the closing of the vent valve, the CCW system would become a closed system with a design pressure greater than the containment, and thus become an extension of containment. The arrangement of the CCW piping to the RCPs was defended in Atomic Energy Commission (AEC) hearings prior to and during the development of the GDC. PBNP was licensed on the basis of considering the CCW system to be a closed system outside containment.

According to Section 5.2 of the PBNP Final Safety Analysis Report (FSAR), the CCW system is required to be a closed system outside containment. PBNP was designed so that no manual action was required to initiate immediate containment isolation upon receipt of a valid signal. The intent was to provide at least one automatic barrier (trip valve, check valve, or closed system) for each containment penetration. Redundancy would be provided for each penetration by a second isolation barrier which is not required to be automatic. In the CCW system return lines from the RCPs, the automatic barrier is considered to be the closed system outside of containment. Therefore, closed system integrity is required to be established automatically, as in the case of the CCW surge tank vent valve receiving a high radiation signal from RE-217 insuring closed system integrity if this barrier is required.

CAUSE

A review of related documentation and discussions with vendor personnel has not allowed determination of the reason for the design of the isolation signal and control circuit associated with Vent Valve CC-00017. We believe that this design deficiency was an apparent oversight during the original design of the CCW system.

CORRECTIVE ACTIONS

A. Short Term:

A Justification for Continued Operation (JCO) was approved on October 26, 1992, by the PBNP Manager's Supervisory Staff allowing Valve CC-00017 to remain open during normal operations in order to prevent the possible overpressurization or vacuum condition in the CCW system.

The JCO determined operation in the identified configuration is considered acceptable for the following reasons:

1. Valve CC-00017 is safety-related and fails closed on deenergization.

2. The valve's control circuit is a control grade circuit which receives a signal from the radiation monitoring system (RMS). Radiation Monitor RE-217 is powered from 120 VAC vital Instrument Bus Y114.

3. The valve shuts on a high radiation signal from Radiation Monitor RE-217.

4. Radiation Monitor RE-217 is QA scope and seismically qualified.

5. Remote operation and position indication are available in the control room for Valve CC-00017.

6. Radiation Monitor RE-217 has an alarm on Control Panel C-03 located in the control room. The response for the alarm includes verifying that Vent Valve CC-00017 is shut.

The CCW system is normally in continuous operation with CCW surge tank Vent Valve CC-00017 open. According to vendor correspondence, closure of the vent valve could result in the increase of pressure (above normal atmospheric pressure) in the surge tank due to system inleakage or an increase in the system heat load. The pressure in the surge tank could then increase to the set pressure of the surge tank relief valve.

Additionally, Operations Special Order 92-06, "CCW-LW-63&64, 1&2CC-17 Component Cooling System Valve Interim Operations," was revised November 7, 1992, to assure a designated control room operator shuts Valve CC-00017 when containment isolation is required.

C. Long Term:

Subsequent to our original LER submittal dated November 11, 1992, we identified several options to resolve this issue. Three possible hardware modification options and one non-modification option that would satisfy the containment isolation provisions are as follows:

1) Replace the existing radiation detector and its associated control grade circuitry with a dicated safety-related system.

2) Automatically close the surge tank vent valve on a HI-HI containment pressure signal by adding this additional safety-related control circuitry.

3) Remove the necessity for a "closed" system outside containment by adding automatic closure (HI-HI containment pressure) circuitry to Motor-Operated Valves CC-754A, 754B, 759A, and 759B. These valves are currently remotely operated from the control room, are included in the 10 CFR 50, Appendix J leak testing program, and have safety-related control circuitry.

4) Operate the system with the surge tank vent valves normally closed.

A meeting with Westinghouse personnel to discuss the proposed options was conducted on February 15, 1993. The option of operating the CCW system with the surge tank vent valves closed was determined to be the most desirable solution. On February 25, 1993, the options were presented to the PBNP Manager's Supervisory Staff. The Manager's Supervisory Staff concurred with the recommendation of operating the CCW system with the surge tank vent valves closed. However, in order to implement this option, further review of potential consequences such as equipment overpressure, pump performance, surge response, and gasses escaping solution needed to be performed.

Our contractor has completed an assessment of CCW system operation with the surge tank vent valve closed and has concluded that this mode of operation is feasible. They are proceeding with formalizing their evaluation which includes finalizing the calculations that document the system evaluation, a review of system overpressure protection and relief valve sizing, and identification of procedural or design changes to support the vent valve closure modification.

We will implement this configuration by September 25, 1993, following completion of final calculations, revisions to operating procedures, and post-alignment testing. This date corresponds to the beginning of our Unit 2 refueling shutdown and will provide appropriate plant conditions for CCW system testing.

REPORTABILITY

This event is being reported under the requirements of 10 CFR 50.73(a)(2)(ii)(B), "The licensee shall report...any event or condition that resulted in the nuclear power plant being in a condition that was outside the design basis of the plant," and 10 CFR 50.73(a)(2)(v)(D), "The licensee shall report...any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident."

SAFETY ASSESSMENT

In the unlikely event of a radioactive release to containment and a breach of CCW piping, a radioactive release to the environment would result if Radiation Monitor RE-217 did not fulfill its automatic function and not initiate the closure of CCW surge tank Vent Valve CC-00017. This could result in a radioactive release into the primary auxiliary building (PAB), through its ventilation exhaust, and to the environment until plant operating personnel could isolate the breach by closing the motor-operated containment isolation valves (which serve as the redundant isolation barrier) or the CCW surge tank vent valve.

The PAB ventilation exhaust is continuously monitored for radioactivity concentration during normal operations, anticipated transients, and accident conditions. If PAB exhaust ventilation Gas Monitor RE-214 detects radiation levels exceeding acceptable levels, the PAB exhaust is automatically shifted to pass through carbon filters and high efficiency particulate air (HEPA) filters to minimize the release of radioactive isotopes to the environment. Therefore, the automatic switchover function of the PAB exhaust to the carbon filters combined with the compensatory measures listed in the Justification for Continued Operation ensures that the safety of the plant and the health and safety of the public and plant employees are not jeopardized while in the plant's current configuration.

GENERIC IMPLICATIONS

The normally open status of CCW surge tank Vent Valve CC-00017 was confirmed to be an original plant design. This also appears to be a standard Westinghouse two-loop pressurized water reactor design which could be a generic concern of other plants of similar design. On July 12, 1984, Westinghouse notified the NRC under 10 CFR 21 of a potential overpressurization condition in the CCW systems designed by Westinghouse. Westinghouse reported that the overpressurization condition could result from closure of the surge tank vent valve on a high radiation signal from the radiation detectors within the CCW system. Subsequent to this notification, we replaced the existing CCW surge tank relief valve with a new relief valve set at a lower pressure in order to prevent the potential overpressure condition. In related correspondence, there was much discussion regarding the closed system integrity and other containment options available, but there was no discussion of the classification of the associated valves or circuitry.

SIMILAR OCCURRENCES

On August 18, 1992, the Unit 1 reactor protection system, engineered safeguards system, and associated process instrumentation were declared inoperable when a seismic review of the auxiliary feedwater system revealed that the Unit 1 control room instrumentation cabinets did not meet their original seismic design criteria as specified in the PBNP FSAR. This event was reported in LER 266/92-007-00 on September 15, 1992.

On August 28, 1992, plant personnel discovered component cooling water (CCW) system Isolation Valves LW-63 and LW-64 in a condition outside of the plant's design basis. Valves LW-63 and LW-64 were discovered to not be capable of providing the appropriate interface between the Seismic Class I and Seismic Class III portions of the CCW system as specified in the PBNP FSAR. This event was reported in LER 301/92-002-00 on September 28, 1992.