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Palisades Nuclear Plant: 27780 Blue Star Memorial Highway, Covert, MI 49043

**G B Slade**  
General Manager

October 26, 1990

Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT -  
LICENSEE EVENT REPORT 90-017 - LTOP INOPERABLE AS PORV ACTUATION CIRCUITRY  
INAPPROPRIATELY DISABLED

Licensee Event Report (LER) 90-017 (VARIABLE LTOP INOPERABLE AS PORV ACTUATION  
CIRCUITRY INAPPROPRIATELY DISABLED) is attached. This event is reportable to  
the NRC per 10CFR50.73(a)(2)(i).

Gerald B Slade  
General Manager

CC Administrator, Region III, USNRC  
NRC Resident Inspector - Palisades

Attachment

9011020049 901026  
PDR ADDCK 05000255  
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Palisades Nuclear Plant	DOCKET NUMBER (2) 0 5 0 0 0 2 5 5	PAGE (3) 1 OF 0 5
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TITLE (4)  
LTOP INOPERABLE AS PORV ACTUATION CIRCUITRY INAPPROPRIATELY DISABLED

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	9	2 6 9	0	9	0	1	0	2 6 9	N/A		0 5 0 0 0
0	9	2 6 9	0	9	0	1	0	2 6 9	N/A		0 5 0 0 0

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

OPERATING MODE (9) N	POWER LEVEL (10) 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(e)	<input type="checkbox"/> 50.73(a)(2)(iv)	73.71(b)	
		<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)		73.71(e)
		<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)		OTHER (Specify in Abstract below and in Text, NRC Form 365A)
		<input type="checkbox"/> 20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)		
		<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)		
		<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(viii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
William L Roberts, Staff Licensing Engineer	6 1 6 7 6 4 - 8 9 1 3

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS
				N					

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

ABSTRACT

On September 26, 1990 at 0830 hours the plant was in cold shutdown and on shutdown cooling. Technical Specification 3.1.8, "Overpressure Protection Systems", requires that whenever the temperature of one or more of the Primary Coolant System (PCS) cold legs is less than 430 degrees F, both Power Operated Relief Valves (PORVs) be operable. During a daily control room tour, the Instrument and Control (I&C) supervisor noticed that an alarm was annunciated on the main control boards as "No PCS Protection" and questioned the operability of the PORVs which were being used for overpressure protection. Discussions with the project engineer and the I&C supervisor failed to provide a clear answer as to the operability of the system. During this review, the PORVs and associated block valves were opened to provide a positive vent path. To verify the actual system response, portions of MI-27E Test Procedure were performed to test the operability of the overpressure protection system in the shutdown cooling mode. It was determined that the PORVs would not open under an actual high pressure condition, with a failure of the temperature input. This event is reportable as a condition prohibited by plant Technical Specifications in that the requirement to verify the PCS vent path every 12 hours when the vent is being used for overpressure protection was not met.

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

EVENT DESCRIPTION

On September 26, 1990 at 0830 hours the plant was in cold shutdown and on shutdown cooling. Technical Specification 3.1.8, "Overpressure Protection Systems", requires that whenever the temperature of one or more of the Primary Coolant System (PCS) [AB] cold legs is less than 430 degrees F, both Power Operated Relief Valves (PORVs) [AB; RV] be operable. The PORVs and associated instrumentation and controls are used to provide low temperature overpressure protection [JE] of the PCS. If one or both PORVs are inoperable then the Technical Specifications provides action statements to eventually depressurize the PCS and either vent the PCS through a vent path greater than or equal to 1.3 square inches in size, or open both PORV valves and both PORV block valves [AB; ISV]. This requirement ensures that the 10CFR50 Appendix G pressure limits for the PCS will not be exceeded. Technical Specification 4.1.1, "Overpressure Protection Systems", requires that the PCS vents shall be verified to be open at least once every 12 hours when the vent is being used for overpressure protection except when the vent pathway is provided with a valve which is locked, sealed, or otherwise secured in the open position, then these valves must be verified open at least once per 31 days. During a daily control room tour, the Instrument and Control (I&C) supervisor noticed that an alarm was annunciated on the main control boards as "No PCS Protection" and questioned the operability of the PORVs which were being used for overpressure protection. Discussions with the project engineer and the I&C supervisor failed to provide a clear answer as to the operability of the system. During this review, the PORVs and associated block valves were opened to provide a positive vent path. To verify the actual system response, portions of MI-27E Test Procedure were performed to test the operability of the overpressure protection system in the shutdown cooling mode. It was determined that the PORVs would not open under an actual high pressure condition, with a failure of the temperature input. This event is reportable as a condition prohibited by plant Technical Specifications in that the requirement to verify the PCS vent path every 12 hours when the vent is being used for overpressure protection was not met.

The overpressure protection system sensing and actuation schemes and logic (commonly called LTOP for low temperature overpressure protection) were changed under Facility Change 809. This modification was completed in the fall of 1989 and enhanced the LTOP by having the system establish its own protection setpoints rather than the I&C Technicians having to change the setpoints manually based on changing plant conditions. The system has two modes of operation; a mode in which the high pressure trip setpoint is calculated as a function of temperature, and a shutdown cooling mode in which the trip setpoint is fixed. This modification also resulted in the addition of alarm features that indicate a system failure upon loss of various logic system subfunctions.

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TEXT (If more space is required, use additional NRC Form 388A's) (17)

A work order was written on August 9, 1990 to remove the primary system RTDs from the PCS loops during the refueling outage so as to limit the potential for any inadvertent damage from the Steam Generator Replacement Activities to the RTDs. The work order was reviewed by operations and it was determined that no adverse affect on the plant would occur with these RTDs out of service if the work started after the primary coolant pumps were turned off and the primary system drained to a level which would render these RTDs ineffective. It was thought that the PCS Temperature Input was not part of the LTOP control scheme when in the shutdown cooling mode and, therefore, the removal of the RTD was thought to have no effect on the system response. This schedule information was entered on the work order and the work was scheduled to be performed.

When the primary system RTDs were disconnected, a high temperature (>600 degrees F) signal was sent to the LTOP computer. This signal was properly diagnosed by the LTOP logic as a failed signal. The LTOP logic is designed to prevent any automatic actuation with a failed temperature input. The LTOP computer sent an alarm which annunciated on the main control boards as "No PCS Protection". This alarm was acknowledged by the control operators and discussed with the Shift Supervisor. The operations personnel concluded that with the LTOP system in the shutdown cooling mode the temperature input was not required in order for the LTOP to function.

With the RTDs disconnected, a high pressure condition would not have opened the PORVs but the LTOP computer would have still calculated a pre-trip alarm value and this alarm would have annunciated in the control room. This alarm would have prompted the operators to look at the PCS pressure and to take manual action to reduce the pressure if needed.

Prior to releasing the work order to remove the primary system RTDs, the PCS was vented and drained, and preparations for reactor head removal were in progress. In addition to the two sets of manual pressurizer vents being open, all reactor vessel head tool access flanges were removed. These openings created vent paths which exceeded the Technical Specification required vent path of 1.3 square inches. These vent paths had not however been formally identified as the PCS vent paths for over pressure protection and had not therefore been verified each 12 hours as required by Technical Specification 4.1.1.

CAUSE OF THE EVENT

The event was caused by personnel error by not recognizing that the removal of the RTDs as an input to the LTOP logic would also render the LTOP logic incapable of opening the PORVs.

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TEXT (If more space is required, use additional NRC Form 388A's) (17)

**CORRECTIVE ACTION**

When the I&C supervisor raised the question concerning the control room alarm and it could not be readily identified if the PCS was protected from an overpressure event, the PORVs and their associated block valves were opened to provide a positive vent path. This was in addition to the manual pressurizer vents and tool access flanges that were open at the time of discovery of the event.

Following the opening of the PORVs the monthly LTOP surveillance procedure was performed and it was shown that the valves would, in fact, not open on an actual high pressure condition with the failed RTDs.

The work order under which the RTDs were removed from the PCS and under which the RTD's will be reinstalled, will be completed prior to placing reliance on LTOP for over pressure protection. The work order will be reviewed to identify the effects upon LTOP when the RTDs are removed.

The alarm response procedure (ARP-4), which provides cautions for the alarm window "NO PCS PROTECTION", will be revised to note that the LTOP channel will not open the PORVs if the PCS RTDs are disconnected or failed.

The event report will be reviewed by control room operators prior to placing reliance on LTOP for overpressure protection.

Changes will be made to the overpressure protection LTOP training lesson plan for operators to identify that the temperature input to LTOP is not used by the LTOP computer in the shutdown cooling mode, but that failure of the temperature input will render the LTOP channel out of service.

All corrective actions that have not already been completed will be completed prior to next placing reliance on LTOP following the current outage.

**ANALYSIS OF THE EVENT**

The Technical Specification 3.1.8 requires that under certain conditions, actions be taken to provide for proper venting of the PCS in order to ensure that the 10CFR50, Appendix G pressure limits will not be exceeded. From the time that the RTDs were removed, thus rendering the LTOP inoperable, PCS overpressure protection was assured by open vent valves and the 45 tool access flanges which provided the required vent path. Thus there was no impact on the operational safety of the plant, or the safety of plant personnel or the general public.

There are several other contributing factors to this event which made it an isolated occurrence. The PCS RTDs are rarely, if ever disconnected. It was done here as a precautionary measure to protect the RTDs from the potential of inadvertent damage from the steam generator replacement activities.

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TEXT (If more space is required, use additional NRC Form 388A's) (17)

Arming the LTOP circuitry to rely on the PORVs to provide overpressure protection is also not our preferred method of protecting the PCS while on shutdown cooling. We prefer to use a manual locked open vent path. This manual vent path was to be provided by the newly installed vent upstream of one of the PORV block valves, but prior to this shutdown it was discovered that this vent path was improperly sized. (LER 90016) The old manual vent path that we used was the tool access flanges. While these flanges were open during the event they had been formally removed from the PCS venting procedures as being capable of being used and verified as a PCS vent.