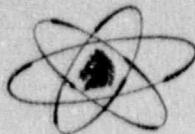


FGE



Portland General Electric Company
Trojan Nuclear Plant
71760 Columbia River Hwy
Rainier, Oregon 97048
(503) 556-3713

February 8, 1990
CPY-054-90

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington DC 20555

Gentlemen:

Licensee Event Report No. 90-02 is attached. This report discusses the potential for an event, where Low Temperature Overpressure Protection Safety Analyses conditions were not supported by procedures.

Sincerely,

C. P. Yundt
General Manager
Trojan Nuclear Plant

c: Mr. John E. Martin
Regional Administrator, Region V
U.S. Nuclear Regulatory Commission

Mr. David Stewart-Smith
State of Oregon
Department of Energy

Mr. R. C. Barr
USNRC Resident Inspector
Trojan Nuclear Plant

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Trojan Nuclear Plant	DOCKET NUMBER (2) 0 5 0 0 0 3 4 4	PAGE (3) 1 OF 0 4
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TITLE (4) Low Temperature Overpressure Protection System Evaluation Limits Violated During Plant Operation Due To Procedural Inadequacies

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)																																	
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<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">OPERATING MODE (9) 1</td> <td colspan="11">THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)</td> </tr> <tr> <td rowspan="6">POWER LEVEL (10) 0 1 9 1 7</td> <td>20.402(b)</td> <td>20.406(c)</td> <td>50.73(a)(2)(iv)</td> <td>73.71(b)</td> </tr> <tr> <td>20.406(a)(1)(i)</td> <td>50.36(c)(1)</td> <td>X 50.73(a)(2)(v)</td> <td>73.71(c)</td> </tr> <tr> <td>20.406(a)(1)(ii)</td> <td>50.36(c)(2)</td> <td>50.73(a)(2)(vii)</td> <td rowspan="4">OTHER (Specify in Abstract below and in Text, NRC Form 366A)</td> </tr> <tr> <td>20.406(a)(1)(iii)</td> <td>50.73(a)(2)(i)</td> <td>50.73(a)(2)(viii)(A)</td> </tr> <tr> <td>20.406(a)(1)(iv)</td> <td>50.73(a)(2)(iii)</td> <td>50.73(a)(2)(viii)(B)</td> </tr> <tr> <td>20.406(a)(1)(v)</td> <td>50.73(a)(2)(iii)</td> <td>50.73(a)(2)(ix)</td> </tr> </table>												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) 0 1 9 1 7	20.402(b)	20.406(c)	50.73(a)(2)(iv)	73.71(b)	20.406(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)	20.406(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)	20.406(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	20.406(a)(1)(iv)	50.73(a)(2)(iii)	50.73(a)(2)(viii)(B)	20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)
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LICENSEE CONTACT FOR THIS LER (12)

NAME S. Stephen Howze, Compliance Engineer	TELEPHONE NUMBER AREA CODE: 5 1 0 1 3 5 5 1 6 1 - 1 5 1 7 1 7
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS

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)

During an evaluation on January 9, 1990, it was determined that the Low Temperature Overpressure Protection System (LTOPS) evaluation limit may not have been met during Plant heatups and cooldowns. The LTOPS evaluation limits the number of available high head Reactor Coolant System (RCS) injection pumps to one centrifugal charging pump (CCP) when RCS temperature is less than 200°F. The periods of potential LTOPS noncompliance were short (approximately one half hour) and occurred during changes from Mode 4 to Mode 5 or Mode 5 to Mode 4. Plant operation was in accordance with the applicable operating instructions. The cause of the noncompliance was procedural inadequacy. The operating instructions gave precedence to Trojan Technical Specification (TTS) 3.1.2.4, which requires two operable CCPs above 200°F RCS temperature. This circumstance has been possible since LTOPS initiation in 1978.

This event had no effect on the health and safety of the public. No LTOPS type RCS overpressure transients occurred during Mode 4/5 transitions. The RCS overpressure protection features were not challenged by this condition. Additionally, during most heatups and cooldowns a pressurizer steam bubble was present, which could significantly lessen the consequences of any pressure transients.

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

DESCRIPTION OF OCCURRENCE

On January 9, 1990 the Plant was in Mode 1 (Power Operation) at 97 percent power with Reactor Coolant System (RCS) temperature at 583°F and pressure at 2240 psig. A review of Plant operating procedures determined that Plant heatup and cooldown operations were outside the Low Temperature Overpressure Protection System (LTOPS) evaluation limits. LTOPS analyses limit the number of available high head pumps to only one centrifugal charging pump (CCP) when RCS temperature is less than 200°F. This limit was not being strictly observed. It was determined that inadequacies existed in several procedures implementing requirements of LTOPS. An investigation was initiated.

From the Technical Specification Bases Section 3/4.4.9 the LTOPS limits is referenced as follows:

The operability of two power operated relief valves (PORVs) or an RCS vent opening of greater than 3.40 square inches of flow area ensures that the RCS will be protected from pressure transients which could exceed the limits of Appendix G to 10 CFR 50 when one or more of the RCS cold legs are $\leq 290^\circ\text{F}$. The operation of either PORV with an opening time of 10 seconds or less has been shown to have adequate relieving capability to protect the RCS from overpressurization when the transient is limited to either; (1) the start of an idle Reactor Coolant Pump with the secondary water temperature of the steam generator $\leq 50^\circ\text{F}$ above the RCS cold leg temperature; or (2) the start of one safety injection pump, two centrifugal charging pumps, and one positive displacement pump and their simultaneous injection into a water solid RCS evaluated at RCS temperatures $\geq 200^\circ\text{F}$; or (3) the start of one centrifugal charging pump and its injection into a water solid RCS evaluated with RCS temperature $\geq 80^\circ\text{F}$.

TTS 3.1.2.4, "Reactivity Control Systems/Charging Pumps - Operating", requires that at least two charging pumps shall be operable when RCS temperature is above 200°F, and ensures minimum boron injection capacity. LTOPS assumptions allow only one CCP to be operable below 200°F. There is no transition period between these two requirements, to allow time for CCP realignment during Plant heatup or cooldown.

During a Plant cooldown, General Operating Instruction (GOI) 4, "Plant Cooldown - Hot Standby Through Cold Shutdown", is the controlling procedure. GOI 4 directs the operator to disable the remaining safety injection pump (SIP) and one of two CCPs, when RCS temperature cools to $< 200^\circ\text{F}$. This is consistent with TTS 3.1.2.4 requiring at least two CCPs be operable above 200°F, and the LTOPS one high-head pump limit below 200°F. However, it takes a finite amount of time to realign/disable a pump. The procedural steps disabling the pump are usually accomplished between 180°F and 200°F. GOI 4 gives precedence to TTS 3.1.2.4, and is written to avoid entry into the Action Statement. Therefore, the LTOPS limit may have been violated between 180°F and 200°F during the cooldown until the pumps were disabled. If a 50°F/hour cooldown rate is assumed, the period of noncompliance was no more than 30 minutes. Important information is lacking in

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

GOI 4, which does not reference the LTOPS limit in the precaution section or in the body of the procedure. Were the operators aware of a LTOPS precaution, then pump realignment could be more timely. During most cooldowns there is a pressurizer bubble when RCS temperature is between 180°F and 200°F. A bubble in the pressurizer may provide additional margin before the pressure limit is reached.

During Plant heatup a similar situation exists with GOI 1-1, "Plant Heatup - Cold Shutdown to Hot Shutdown".

In Modes 5 and 6, the RHR Suction Valves, MO-8701 and MO-8702, are usually open with control power removed. Therefore, the RHR Suction Relief Valve is available, and has 900 gpm relieving capability at 450 psig. The LTOPS analysis assumes a single failure of the lower setpoint PORV (440 psig) and relies on the higher (490 psig) setpoint PORV. In all likelihood, the RHR Suction Relief Valve would open before the second PORV and provide additional relief capacity which would mitigate the consequences of additional pumped injection.

Before and after Mode 5 or 6 reduced RCS inventory operations the potential also exists to violate the LTOPS limit. Reduced RCS inventory operations occur below 200°F, and as a prerequisite require two "available" high-pressure Emergency Core Cooling System (ECCS) pumps and a vent path. These pumps must be aligned prior to the reduced inventory condition. The LTOPS limit below 200°F assumes a water solid RCS. Therefore, the applicable procedures must ensure that the high-head pumps are properly aligned before and after reduced inventory operations taking into account the LTOPS limitations. The controlling procedure is GOI-12, "Plant Operation - Reactor Coolant System Reduced Inventory and Recovery From Refueling". GOI 12 does not specifically reference the LTOPS limit in the precautions section or in the body of the procedure, although, the procedure does contain steps reducing the high-pressure pumps to one following reduced RCS inventory operations. This precaution is missing from this procedure, which has only been in effect since the last refueling outage.

The LTOPS analyses use conservative assumptions for initial plant conditions. No credit is taken for a pressurizer bubble, available RHR suction relief valve, or operator action. Therefore, it is conservative to observe a one CCP limit which assumes the RCS is solid, whenever RCS temperature is less than 200°F, and regardless of other conditions. Additionally, Technical Specifications, Reduced RCS Inventory requirements, and LTOPS analyses limits may not be completely compatible. From a human factors perspective, it is difficult to implement a long, complex, and conservative analysis in plant operating procedures, which are significantly different from the scenario of the analyses.

CAUSE OF OCCURRENCE

1. Failure to implement the LTOPS Analyses in the applicable operating procedures.

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

2. Failure to translate the LTOPS Analyses into operating precautions, which are applicable during actual operating conditions; i.e., with a pressurizer bubble, solid RCS, vented RCS, or reduced inventory RCS.

CORRECTIVE ACTION

1. Develop LTOPS precautions and applicability for use in operating procedures which govern Plant heatup, cooldown, solid RCS operation, and reduced RCS inventory operation due by March 20, 1990.
2. Revise applicable operating procedures to include appropriate precautions and steps to ensure compliance with the LTOPS analyses due by March 20, 1990.

SIGNIFICANCE OF OCCURRENCE

This event had no effect on the health and safety of the public. The time periods of potential noncompliance with the LTOPS limit were short. No RCS overpressure transients occurred during these periods. Additionally, during most heatups and cooldowns there was a pressurizer steam bubble which could significantly mitigate pressure transients. Therefore, the integrity of the RCS was not compromised.

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