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

October 9, 1989
CPY-243-89

US Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Gentlemen:

Licensee Event Report No. 89-18 is attached. This reports an event in which both trains of the Residual Heat Removal System were technically not operable.

Sincerely,

C P Yundt

C. P. Yundt
General Manager
Trojan Nuclear Plant

c: Mr. John B. Martin
Regional Administrator
US Nuclear Regulatory Commission

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

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

IE22
1/1

NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Trojan Nuclear Plant	0 5 0 0 0 3 4 4	1 OF 0 5

TITLE (4)
Both Trains of Residual Heat Removal Inoperable due to Cognitive Error

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	0 8	8 9	8 9	0 1 8	0 0	1 0	0 9	8 9	n/a	0 5 0 0 0
										0 5 0 0 0

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 9 9	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(vii)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(viii)(B)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
John D. Guberski, Compliance Engineer	5 0 3 5 5 6 - 5 5 2 1 3

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)

On September 8, 1989, the plant was in Mode 1 at 99 percent power with Reactor Coolant System (RCS) conditions of 585 F degrees and 2242 psig. At approximately 0945, work was initiated to change the setpoints for the 'B' train Residual Heat Removal (RHR) pump's flow indicating switch. Operations personnel reviewed the work to be done, but considered the 'B' train RHR pump operable as it would automatically start and the recirculation flow control valve could be opened from the control room while work was in progress. The setpoints had been adjusted, but functional testing was delayed while changes to the testing methods, desired by Operations personnel, were reviewed. At 1250, the 'A' train Component Cooling Water (CCW) System was declared inoperable and cross-connected to the 'B' train of CCW per the controlling procedure for a Service Water System (SWS) biocide treatment. Systems cooled by 'A' train CCW, specifically the 'A' train RHR pump, were therefore also inoperable. The on-coming swing shift was briefed on both evolutions but the train of RHR being worked was not adequately communicated. When the revised functional test was presented to the Shift Supervisor at 1520 it was realized that both trains of RHR were inoperable. Immediate action was to restore the 'A' train of CCW (and RHR) to service. This was accomplished at 1550. 'B' train RHR was restored at 2037. Corrective actions include appropriate disciplinary actions for an incorrect operability determination, determining operability when planning work, and discussing this event with all operations crews. At least one train of RHR was available during the entire time period of 0945 to 2037, although both trains were considered technically inoperable from 1250 until 1550. Thus the health and safety of the public was protected during this event.

DESCRIPTION OF OCCURRENCE

On September 8, 1989 the plant was in Mode 1 at 99 percent power with Reactor Coolant System (RCS) conditions of 585 F degrees and 2242 psig. Work was planned to change the flow setpoints for the minimum flow recirculation valves in both trains of the Residual Heat Removal (RHR) System. This work became high priority as the Justification for Continued Operation with setpoints that were non-conservative under seismic conditions was due to expire on September 8, 1989. Prior to commencing the setpoint change, the technician performing the work discussed the activity with the day shift Operations crew. The 'B' train of RHR was selected by Operations as the first train to be worked as other 'B' train work was already in progress.

The setpoint change was to be made to the flow indicating switch (FIS-611) which opens the 'B' RHR pump recirculation flow control valve (FCV-611) when the train 'B' RHR pump breaker is closed and low flow conditions exist. This provides a minimum flow path to protect the pump until the pump can begin injecting water into the RCS. When flow exceeds the high flow setpoint, FCV-611 closes to maximize injection flow to the RCS.

When the Maintenance Request (MR) was presented to operations personnel they reviewed the Technical Specifications (TS), the TS OPERABLE definition and the Periodic Operating Test (POT) for the RHR pumps to assist in their determination of equipment operability. The Shift Supervisor and Control Operator determined the TS did not specifically address FCV-611, and the operability criteria in the POT identified the pump differential pressure as the determining factor for operability. The Operations crew further determined that changing the setpoint for FIS-611 did not prevent the RHR pump from starting, nor did it affect their ability to open FCV-611 manually from the control room. Therefore, the Operations crew determined the work did not render the 'B' train of RHR inoperable. No discussion occurred as to the circumstances under which the valve would be opened and by whom. The Operations crew did recognize that the functional test for the setpoint change would render the 'B' train RHR pump inoperable. Operations personnel authorized work to start and the setpoint change work commenced at approximately 0945.

The technician completed the setpoint change at approximately 1130 and returned to the control room to request permission to perform a functional test of the setpoints (open/close) by varying the flow signal and observing that FCV-611 stroked open/closed at the appropriate value. The Operations crew determined that the Maintenance Request functional test as written would require running the 'B' train RHR pump, as there is an interlock which requires the pump breaker to be closed for FIS-611 to operate FCV-611. The Control Operator determined the test could be performed without running the 'B' train RHR pump if the pump's power supply breaker was placed in the "TEST' position and closed. This second method was preferable to Operations as it

did not involve actually running the 'B' train RHR pump. Operations personnel requested this revision be made to the functional testing instructions in the Maintenance Request. The technician then left the control room to have the Maintenance Request revised and approved.

At noon the Operations crew gave permission to start biocide treatment of the 'A' train Service Water System (SWS). At 1250 the 'A' train of Component Cooling Water was declared inoperable as required by Operating Instruction 8-8, "Traveling Screens, Chlorination and Dechlorination Systems", and cross-connected to the 'B' train CCW. This cross-connection provides cooling to operating equipment (Reactor Coolant Pump, etc.) normally cooled by 'A' train CCW. Declaring 'A' train CCW inoperable also rendered systems cooled by that train of CCW, specifically the RHR pump, inoperable. The 'A' train SWS was then throttled to approximately 8300 gpm (13,750 gpm minimum needed for operability) at 1330 to reduce the amount of biocide used.

The technician working on the setpoint change to FIS-611 returned to the control room with the revised Maintenance Request at approximately 1400. The Operations crew refused to authorize the testing of FCV-611 at that time as placing the 'B' RHR pump breaker in the 'TEST' position would render the pump inoperable. This could not be done as the 'A' train RHR system was considered inoperable due to the 'A' train CCW system being declared inoperable at 1250. The technician was directed to return after the shift change and discuss the testing of FIS-611.

During the shift turnover from days to swings (at approximately 1430) work in progress was discussed, including the functional testing of the setpoint change to the flow indicating switch. Neither Shift Supervisor remembers if the train of the RHR flow switch on which work was being performed was specifically mentioned. The on-coming shift was aware that 'A' train CCW was inoperable due to the biocide treatment. At 1520 the technician returned to the control room and discussed the planned testing of the setpoints for FIS-611 with the Shift Supervisor. The Shift Supervisor then recognized that both trains of RHR were technically inoperable, declared entry into TS 3.0.3, "Applicability", and directed that 'A' train SWS and CCW be returned to service. The CCW trains were separated from each other at 1548 and full flow restored to the SWS at 1550, at which time the plant exited TS 3.0.3. The required Nuclear Regulatory Commission notification was made at 1610 using the Emergency Notification System, plant Event Report 89-154 was initiated to evaluate this event, and a critique of the event was held at 1700 on September 8, 1989.

CAUSE OF OCCURRENCE

This event was caused by a cognitive error on the part of the Operations crew in not determining that the planned work on FIS-611 required declaring the 'B' train RHR pump inoperable.

Contributing causes include inadequate administrative controls, and lack of depth in review of the planned work. The inadequate administrative controls include relying on a single barrier (the Operations Crew) for operability determinations, and planning work in both trains on the same day without adequate precautions. The existing system for operability determination allows a work group to plan work without an operability determination being made by a person with the knowledge provided by a Senior Reactor Operator's License (or equivalent) prior to presenting the Maintenance Request to the Shift Supervisor. The setpoint change work was planned for both trains on the same day, along with the biocide treatment and surveillance testing of equipment. However, the planning did not extend to specifying which items could be worked concurrently and which items could not be worked concurrently.

The Operations crew's lack of depth in review of the planned work is evident both by the Shift Supervisor not being aware that FIS-611 was to be isolated (isolation is stated on the MR), and that the Operations crew was not aware that it was necessary to lift leads in order to perform the setpoint change.

CORRECTIVE ACTIONS

Immediate corrective action was to restore the 'A' train of CCW and SWS to operability, which restored the 'A' train of RHR to operability. Personnel involved in the incorrect operability determination received appropriate disciplinary action.

To ensure correct operability determinations are made in the future, additional actions were taken as follows:

Temporary Administrative Order T-33, "Control of Work, Tests, Modifications, and Maintenance has been issued to schedule train related work. This scheduling includes determining if the work affects operability of safety-related equipment.

Operations crew briefings have been conducted to discuss the seriousness of this event, the reasons why the original operability decision was in error, the need to obtain assistance in making operability determinations when doubt exists, and the need to take a conservative approach if the question(s) cannot be resolved.

SIGNIFICANCE OF OCCURRENCE

During the morning of September 8, 1989, the 'A' train of RHR was capable of performing its safety function if a Safety Injection signal was received, or a safe shutdown was required. After 1250 the 'A' train of RHR would not have received its design cooling water flow and operator action to increase cooling may have been necessary if the RHR pump was required to operate. Also,

operator action to increase SWS cooling to the CCW would have been necessary for a safe shutdown using 'A' train systems.

During this event the 'B' train RHR pump would have started if a Safety Injection signal was received. If this occurred while the setpoint change was in progress, the recirculation flow control valve for the 'B' train RHR pump may, or may not, have functioned correctly. If this Safety Injection signal was from a large break Loss Of Coolant Accident (LOCA), injection flow to the core would have occurred in less than thirty seconds. Westinghouse letter 89-502, dated January 13, 1989 states that the RHR pump could be successfully operated in a deadheaded condition for thirty seconds. Thus the 'B' train RHR pump would have been able to perform its safety function for a large break LOCA but could not have been relied upon to perform its safety function for a small break LOCA during the 0945 to 1130 time frame. After 1130 the 'B' train of RHR would have responded as designed, although operability was not demonstrated until testing of FIS/FCV -611 was completed at 2037. During this event the 'B' train of RHR was also capable of performing its safety function if a safe shutdown was required, as plant procedures specify that the operator is to verify the recirculation flow control valve opens upon manually starting an RHR pump.

In summary, at least one train of RHR was available, during the entire time period of 0945 to 2037, although both trains were considered technically inoperable from 1250 until 1550. Thus the health and safety of the public was not affected during this event.