NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
PALISADES NUCLEAR PLANT	0 5 0 0 0 2 5 5	1 OF 0 6

TITLE (4)
Reactor Trip Due to High Pressurizer Pressure

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 5	1 9	8 6	8 6	— 0 1 8	— 0 0	0 6	1 8	8 6	NA	0 5 0 0 0
									NA	0 5 0 0 0

OPERATING MODE (9)	N	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)	X 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)(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)	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
Robert A. Fenech; Technical Engineer; Palisades	AREA CODE 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 NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
X	J J	J X	L 0 4 5	Y		X	A A	S E A L	C 4 9 0	Y	
X	A B	2 0	B 2 9 5	Y		E	S B	V	C 6 3 5	Y	

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 May 19, 1986, a power supply failure in the turbine electro-hydraulic control (EHC) system resulted in an eventual automatic actuation of the Reactor Protection System (RPS). The RPS functioned normally to shutdown the reactor. However, a number of components in various plant systems did not operate properly, resulting in distractions to the plant operators.

The spurious loss of power in the EHC system was caused by AC line noise. The resulting closure of the turbine governor valves removed the heat sink from the Primary Coolant System (PCS) and caused the reactor to trip on high pressurizer pressure. The power supplies have been isolated from the initiating source of AC line noise.

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LICENSEE EVENT REPORT (LER) FAILURE CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION
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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
PALISADES NUCLEAR PLANT	0 5 0 0 0 2 5 5	8 6	— 0 1 8	— 0 0	0 2 OF 0 6

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	
X	C B	P C V	B 2 9 5	Y							
E	S B	V	C 6 3 5	Y							
X	C B	P	G 0 4 5	Y							

NRC FORM 366B
(9-83)

Description of Event

On May 19, 1986, at 1416, an automatic reactor (RTC;AB] trip occurred due to high pressurizer [PZR;AB] pressure. The Plant was operating at approximately 99% power at the time of the occurrence. The reactor protection system (RPS) [JC] functioned normally in response to the occurrence.

At approximately 1413, the reactor operator noticed that average primary coolant system (PCS) [AB] temperature was increasing and began driving control rods [ROD;AA] into the core. When temperature and pressure continued to increase, he looked at the turbine control panel and saw that the indicating lights were out. From the turbine control panel [PL;JJ], the control operator informed the reactor operator that the turbine governor valves [V;SB] had closed. Shortly thereafter, the reactor tripped, which also initiated a turbine trip [TRB;TA]. In verifying the reactor trip, the operator noticed control rod #34 bottom light was not lit. However, available rod position indication confirmed that the rod was fully inserted.

The Plant cooled down from 576 degrees F to 533 degrees F in approximately two minutes. The resulting shrinkage of the PCS caused pressurizer level to drop and system pressure to drop to 1690 psia before recovering. The level control system automatically deenergized pressurizer heaters [EHTR;AB] and isolated letdown. An unsuccessful attempt was made to start the variable speed charging pump (P-55A) [P;CB] (previously declared inoperable, but presumed available for emergency use) to increase PCS pressure and volume. An alternate charging pump (P-55B) [P;CB] was subsequently started. One of the pressurizer spray valves (CV-1059) [20;AB] remained slightly open, slowing the rate at which PCS pressur recovered.

As pressurizer pressure increased, the letdown backpressure control valve (CV-2012) [PCV;CB] did not reopen, requiring the operator to shift to the alternate backpressure control valve (CV-2122). The turbine bypass valve (CV-0511) [V;SB] and one of four atmospheric steam dump valves (CV-0779) [V;SB] failed to automatically open. Consequently, PCS temperature was controlled using the three remaining atmospheric steam dumps.

There have been no similar reactor trip events due to high pressurizer pressure in the recent past.

Cause of the Event

Prior to the occurrence, an Instrument and Control Technician was cleaning the turbine electro-hydraulic Control System (EHC) [JJ] power supply cabinet cooling fans [FAN;JJ] and filters [FLT;JJ]. Investigation showed that when one fan was unplugged, AC line noise was generated, which caused the 15-volt primary power supply [JX;JJ] (Lambda Electronics MDL #LM-EE-15-Y-3820-1) to

the EHC system to trip. At the time, the technician would have been completely unaware that the primary power supply had tripped.

With the primary power supply tripped, the 15-volt secondary power supply maintained power to the EHC system. Within approximately fifteen minutes, a second fan was unplugged, which again generated an AC line disturbance, and tripped the secondary power supply (Lambda Electronics, MDL # LM-EE-15-Y-3820-1). This complete loss of power to the EHC system allowed the four turbine governor valves to close. Removal of the heat sink from the PCS precipitated a temperature and pressure transient which initiated the actuation of the RPS.

The cabinet fans had not previously been unplugged during power operation. The EHC power supplies were not known to be sensitive to line noise or other sources of noise such as radio frequency noise.

Corrective Actions

Previously, the primary power supply and the cabinet fans shared a common breaker [BKR;JJ]. The fans have subsequently been removed from this breaker and are now powered from an alternate breaker.

The wiring to the secondary power supply and the wiring to one of the cabinet fans had previously been routed in the same bundle, allowing AC line disturbance to be induced from one wire to another. The wiring has since been physically separated.

The power supplies have been further shielded by encasement in flexible conduit. Investigation indicates that no other source of noise is present in the EHC power supply cabinet.

Analysis of the Event

In this event, the RPS functioned as designed to automatically shut down the reactor. While the magnitude of the transient resulting from a reactor trip varies with the power level, a reactor trip from full power is an analyzed occurrence which would not place the Plant in a condition which is outside of its design basis.

Additional Information

The occurrence was originally classified as a loss of load trip due to failure of the EHC system. This classification is considered a normal reactor shutdown, and is not an emergency class event. Accordingly, a four hour non-emergency report was made to the NRC at 1458 on May 19, 1986.

After further investigation, operations personnel determined that the reactor tripped on high pressurizer pressure. The NRC was notified of this information at 1616. Subsequently, at 1745, operations reviewed the occurrence with respect to the emergency classifications and determined that a reactor trip due to high pressurizer pressure is an Unusual Event (UE) condition. The Unusual Event was declared and terminated at 1745, with notification to the NRC at 1752.

The declaration of an Unusual Event should properly have been made at 1616, when the evaluation of the incident determined that the initiating condition was different from that which was originally believed. The need to re-review the emergency action levels when relevant information is attained has been stressed to the involved Shift Engineer, as well as to the remaining Shift Engineers and Site Emergency Directors.

While a number of components did not function properly when called upon in response to the transient, the overall impact on the safe shutdown of the Plant was negligible. Significant equipment failures are listed as follows:

- Control Rod #34 - (Combustion Engineering, Unique Design)

  The cause of the unlit rod bottom light was determined to be the inability of the limit switch within the control rod drive mechanism (CRDM) drive package to properly make up due to corrosion, which was caused by PCS leakage from the CRDM #34 mechanical seal. Repairs to the CRDM drive package have corrected both the leakage problem and the limit switch problem.

- Charging Pump P-55A - (Gaulin Corp, MDL # P-45-3-TPSX)

  Evaluation of Charging Pump P-55A determined that the pump started and subsequently tripped due to low lube oil pressure. The lube oil pump was found to be deficient and has been replaced. Verification of acceptable resolution to the lube oil pressure problem is currently in progress.

- Pressurizer Spray Valve CV-1059 - (Black, Sivals & Bryson, MDL # 70-19-9DRT)

  Evaluation determined that the actuator air pressure setting had drifted slightly, which inhibited complete closure of the valve. Appropriate adjustments were subsequently completed.

. Letdown Backpressure Control Valve CV-2012 - (Black, Sivals & Bryson, MDL # 70-14-2R)	While the specific cause of CV-2012 failing to respond is unknown, appropriate coordination of components which function to provide proper backpressure regulation is a previously recognized problem (See LER 86-017). To correct this problem, letdown system trim valves and orifices will be replaced, along with the positioners for both backpressure control valves. The system will then be dynamically tuned and tested.
. Turbine Bypass Valve CV-0511 - (Copes-Vulcan, MDL # D-100-400)	CV-0511 was inhibited from opening by an overly stiff valve spring which was not previously discovered because the valve was not tested at full steam pressure. The valve will be replaced and thoroughly tested to insure appropriate operation.
. Atmospheric Steam Dump CV-0779 - (Copes-Vulcan, MDL # D-100-400)	Evaluation determined that diaphragm degradation had allowed the valves hydraulic damping fluid to leak out, precluding proper valve operation. The diaphragm has been replaced. A preventive maintenance program will be initiated to periodically inspect the valves for diaphragm degradation which could affect the valves operation.

A Task Force has been established and is currently in the process of investigating the overall material status of safety systems and balance of plant systems important to reliable plant operation. The NRC will be apprised of the results of the investigation and actions planned to assure safe plant operation, per NRC Confirmatory Action Letter 86-002, dated May 22, 1986.

Consumers Power
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US Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT -
LICENSEE EVENT REPORT 86-018- REACTOR TRIP DUE TO HIGH PRESSURIZER PRESSURE

Licensee Event Report (LER) 86-018 (Reactor Trip Due to High Pressurizer Pressure) is attached. This event is reportable to the NRC per 10CFR50.73(a)(2)(iv).

Brian D Johnson

Brian D Johnson
Staff Licensing Engineer

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

Attachment

OC0686-0099-NL02

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