

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (1-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

SURRY POWER STATION, Unit 1

DOCKET NUMBER (2)

05000 - 280

PAGE (3)

1 OF 5

TITLE (4)

Loss of Pressurizer Heaters Results in Manual U1 Trip and U2 ESF Actuation

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 NAME	DOCUMENT NUMBER
02	19	97	97	-- 003 --	0	03	19	97	Surry Unit 2	05000-281
									FACILITY NAME	DOCUMENT NUMBER
										05000-

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)											
N	100 %	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 73.71
		<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 20.2203(a)(4)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> OTHER	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A				
		<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)									

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
D. A. Christian, Station Manager	(757) 365-2000

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
E	AB	PMC	R305	No					
B	AB	RLY	B455	No					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

At 2040 hours on February 19, 1997, with Unit 1 at 100 percent power and Unit 2 at Hot Shutdown, a Technical Specification 3.12.F.2 two hour Limiting Condition of Operation was entered due to Reactor Coolant System (RCS) pressure being less than 2205 psig. An Abnormal Procedure was entered in response to the decreasing RCS pressure. At 2052 hours, a Unit 1 shutdown was commenced. At 2259 hours, a manual reactor trip was initiated due to a continuing decrease in RCS pressure. Upon receipt of the reactor trip signal, the Reactor Protection System actuated and functioned as designed, and all control rods inserted into the core. Station operating personnel acted promptly to place the plant in a safe, hot shutdown condition in accordance with the proper procedures. The shutdown margin was calculated and the critical safety function status trees were monitored to verify that the unit conditions were acceptable. Plant response was as expected and the unit stabilized at hot shutdown. No conditions adverse to safety resulted from this event and the health and safety of the public were not affected. A detailed Reactor Trip Report and a Root Cause Evaluation is being performed for this event. The cause of the trip was inability to maintain RCS pressure due to loss of the Group C pressurizer proportional heaters due to failure of the Robicon controller unit. Additional approved recommendations from the Root Cause Evaluation will be implemented. This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv) and 10 CFR 50.73(a)(2)(i).

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

1.0 DESCRIPTION OF THE EVENT

At 2040 hours on February 19, 1997, with Unit 1 at 100 percent power and Unit 2 at Hot Shutdown, a Technical Specification (TS) 3.12.F.2 two hour Limiting Condition of Operation was entered due to Reactor Coolant System (RCS) {EIS-AB} pressure being less than 2205 psig. TSs state that pressurizer pressure must be maintained greater than or equal to 2205 psig. If pressure is less than 2205 psig and not restored within two hours, then thermal power shall be reduced to 5 percent rated power within the next four hours. Abnormal Procedure, 1-AP-31.00, Increasing or Decreasing RCS Pressure, was entered in response to the decreasing RCS pressure. At 2052 hours, a Unit 1 shutdown was commenced.

At 2259 hours, with the unit at approximately 53 percent reactor power, a manual reactor trip was initiated due to the continuing decrease in RCS pressure. Upon receipt of the manual reactor trip, the Reactor Protection System (RPS) functioned as designed and all control rods {EIS-AA-ROD} inserted into the core as indicated by the rod bottom light indication and by all Individual Rod Position Indicators (IRPIs) indicating less than 10 steps. A shutdown margin calculation verified adequate shutdown margin.

All three Auxiliary Feedwater Pumps (AFW) {EIS-BA-P} automatically started as designed on low low steam generator {EIS-AB-SG} levels following the trip.

The RCS pressure and temperature stabilized at no load Tavg following the trip. No primary safety or power operated relief valves were actuated during the event. No secondary safety relief valves or power operated relief valves {EIS-RV} actuated during the transient. All electrical busses transferred properly following the trip and all emergency diesel generators were operable. However, Reactor Coolant Pump A (RCP) {EIS-AB-P} tripped during the Station Service Bus transfer to the Reserve Station Service Transformers due to unexpected actuation of the speed sensing relays. RCP C was secured by the operating team in accordance with procedures to prevent further RCS pressure decrease. Pressurizer Spray Valve B {EIS-AB-V} had been previously isolated due to leakby. No safety injection occurred.

Since Unit 2 was in Hot Shutdown at the time of the trip, automatic load shedding was enabled, and the load shed affected station service electrical loads tripped as designed. At the time of the load shed sequence, the Unit 2, Main Feed Pump A (MFP) {EIS-SJ} was in service, and the Unit 2 MFP B was tagged out for repairs. Unit 2 MFP A tripped on load shed as designed. This resulted in a loss of both MFPs on Unit 2 and resulted in an automatic start of both Unit 2 Motor Driven Auxiliary Feedwater Pumps.

At 2328 hours on 2/19/97, a one hour Non-Emergency report was made to the NRC in accordance with 10 CFR 50.72(b)(1)(i)(A) for initiation of any plant shutdown required by TS. This report also included the notification of the Unit 1 RPS actuation following the manual reactor trip. In accordance with 10 CFR 50.72(b)(2)(ii), a separate four hour report was made at 0149 hours due to the automatic AFW actuation on Unit 2.

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There were no radiation releases due to this event, nor were there any personnel injuries or contamination events.

This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv) for a condition that resulted in automatic actuation of the RPS for Unit 1 and automatic actuation of an Engineering Safety Feature (ESF) for Unit 1 and Unit 2. This event is also being reported pursuant to 10 CFR 50.73(a)(2)(i) due to completion of a TS required shutdown for Unit 1.

2.0 SAFETY CONSEQUENCES AND IMPLICATIONS

Upon receipt of the reactor trip signal, the RPS actuated and functioned as designed, and all control rods inserted into the core. Station operating personnel acted promptly to place the unit in a safe, hot shutdown condition in accordance with the proper procedures. The Shift Technical Advisor calculated the shutdown margin and monitored the critical safety function status trees to verify that the unit conditions were acceptable. Plant response was as expected and the unit stabilized at hot shutdown. There were no radiation releases due to this event, nor were there any personnel injuries or contamination events. No conditions adverse to safety resulted from this event and the health and safety of the public were not affected.

3.0 CAUSE

The cause of the trip was inability to maintain RCS pressure due to loss of the Group C pressurizer proportional heaters. This loss of the proportional pressurizer heaters was due to age related failures of a Robicon controller unit circuit card.

4.0 IMMEDIATE CORRECTIVE ACTION(S)

Following the reactor trip at 2259 hours on February 19, 1997, control room operators initiated the appropriate emergency operating procedures. The reactor trip breakers were verified open and control rods were verified inserted into the core.

The Shift Technical Advisor calculated the shutdown margin and monitored the critical safety function status trees to verify that the unit conditions were acceptable.

Management conducted a post trip review meeting with the operating staff at 0100 hours on February 20, 1997.

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5.0 ADDITIONAL CORRECTIVE ACTION(S)

A Root Cause Evaluation was initiated to investigate the Pressurizer Heater C control circuitry failure. The Robicon controller module was sent to the vendor. The investigation by the vendor revealed age related failures of capacitors, zenor diodes, and resistors in a controller circuit card. The components were replaced, and the controller module was calibrated. The Robicon controller module was re-installed and satisfactory post maintenance tests returned the proportional heaters to service.

Upon completion of repairs to the pressurizer heaters and the Post Trip review, Unit 1 was taken critical at 0724 hours and on line at 1342 hours on February 22, 1997. Unit 1 was returned to 100% reactor power at 1353 hours on February 23, 1997.

It was determined that the trip of the RCP A was due to the failure of Pro-Star speed sensing relays {E1IS-AB-RLY} due to a manufacturing deficiency. The relay was replaced. Software problems in the computations being performed by the Pro-Star relays were discovered following the Unit 1 trip. The specific causes and corrective actions will be implemented by the corrective action program.

As part of the Root Cause Evaluation, the equipment problems which occurred were evaluated in accordance with the Maintenance Rule and it was determined that two Maintenance Rule Functional Failures occurred. The first was the Robicon heater controller failure and the second was the failure of the speed sensing relays. These are being addressed in accordance with maintenance rule program requirements.

6.0 ACTIONS TO PREVENT RECURRENCE

A detailed Reactor Trip Report and a Root Cause Evaluation is being performed for this event. The Pro-Star relay and the Robicon controller failures are being evaluated. Additional approved recommendations from the Root Cause Evaluation will be implemented in accordance with the corrective action program.

An evaluation of preventive maintenance on the Robicon controllers is being conducted.

7.0 SIMILAR EVENTS

None

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8.0 MANUFACTURER

Robicon Controller Unit:

Manufacturer - Robicon

Model - Series 413

Pro-Star Relays:

Manufacturer - ABB

Model with 1.6 version software