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DUKE POWER

April 29, 1993

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

Subject: Catawba Nuclear Station
Docket No. 50-414
LER 414/93-002

Gentlemen:

Attached is Licensee Event Report 414/93-002, concerning ENGINEERED SAFETY FEATURE ACTUATION WHEN STEAM DUMP VALVES OPENED.

This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

M. S. Tuckman

M. S. Tuckman

xc: Mr. S. D. Ebnetter
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
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Mr. W. T. Orders
NRC Resident Inspector
Catawba Nuclear Station

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PDR ADDCK 05000414
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LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20585-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Catawba Nuclear Station, Unit 2		DOCKET NUMBER (2) 05000414	PAGE (3) 1 OF 04
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TITLE (4)
Engineered Safety Feature Actuation When Steam Dump Valves Opened

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	31	93	93	002	00	04	29	93	N/A	05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)																				
POWER LEVEL (10) 15	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 20.405(a)(1)(iv)	<input checked="" type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 73.71(b)	<input type="checkbox"/> 73.71(c)	OTHER
<small>(Specify in Abstract below and in Text, NRC Form 366A)</small>																					

LICENSEE CONTACT FOR THIS LER (12)

NAME R. C. Futrell, Compliance Manager	TELEPHONE NUMBER (include Area Code) (803) 831-3665
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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
AW	HBC	XC	W120	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES <small>(If yes, complete EXPECTED SUBMISSION DATE)</small>	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

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

On March 31, 1993, at approximately 0858 and 2123 hours, two unexpected Engineered Safety Feature (ESF) Actuations occurred on Unit 2 while in Mode 2, Startup. A third ESF actuation occurred on April 1, 1993 at approximately 0921 hours, while in Mode 1, Power Operation, at 15% power. The ESF actuation, P-12 (LoLo Tave), occurred when two banks of valves in the Steam Dump System opened thus bringing average Reactor Coolant System (NC) temperature (Tave) below P-12 setpoint of 553 degrees F. Control Room Operators took immediate action to close the Steam Dump Valves each time. Due to a P-12 actuation that occurred in 1992, monitoring equipment had been installed on the Steam Pressure Controller to help identify the cause of future spurious P-12 actuations. Data from the monitoring equipment indicated a problem with a power supply card and pressure transmitter. Therefore, this incident is attributed to a degraded subcomponent. Corrective actions included replacement of the power supply card and pressure transmitter.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

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FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Catawba Nuclear Station, Unit 2		05000 414	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	02 OF 04
			93	002	00	

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

BACKGROUND

The purpose of the Steam Dump [EIS:JI] (IDE) System is to: 1) enable the Reactor to follow Main Turbine [EIS:TRB] load reductions of less than 5%/min ramp or 10% step change and 15%/min ramp or 30% step change; 2) allow unit load reduction from 100% to plant auxiliary loads without a Reactor trip; 3) allow a Turbine trip and Reactor trip from 100% without lifting the Main Steam [EIS:SB] (SM) System Safety Valves [EIS:V]. The system accomplishes its purpose by the use of five banks of dump valves divided into condenser dumps and atmospheric dumps. Condenser dump valves are divided into three banks with three valves per bank. Atmospheric dump valves are divided into two banks with four and five valves per bank, respectively. The total capacity of the Steam Dump System is 71.5% of the total unit capacity.

The condenser and atmospheric dump valves are controlled by one of three controllers [EIS:KC] (steam pressure, load rejection, plant trip). The selected controller actuates to control Tave at or near a set reference signal. The reference signal to the dump valves is filtered through a pneumatic circuit which contains block valves and arming valves. This "block" circuit prevents cooldown below 553 degrees F to ensure Tave remains above the minimum temperature for criticality.

The P-12, Lo Lo Tave Interlock, is part of the Engineered Safety Features Actuation System [EIS:JE]. The purpose of the interlock is to block steam dump valve actuation to prevent excessive cooldown below the minimum temperature for criticality. Its setpoint is 553 degrees F on any two out of four NC System loops. If the logic is satisfied, Steam Dump Valves are failed closed until NC System temperature is above 553 degree F.

EVENT DESCRIPTION

On March 31, 1993, at approximately 0858 hours, Unit 2 was in Mode 2, Startup, following a refueling outage. NC temperature was approximately 560 degrees F with the Steam Dump Controller in Auto. Condenser Steam Dump Bank 1 and 2 valves opened. At approximately 0900 hours, the Operator At The Controls (OATC) placed the steam dump control switch to off/reset in order to close the valves. The valves went to the closed position. NC temperature continued to decrease momentarily to 553 degrees F and caused the P-12 interlock to actuate. Component Engineering evaluated data from monitoring equipment. The data was not conclusive as to what caused the steam dump valves to open.

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On March 31, 1993, at approximately 2123 hours, Banks 1 and 2 of Condenser Steam Dump valves failed open again while in Auto with Tave at 558 degrees F. At approximately 2124 hours, the OATC placed the steam dump control switch to off/reset in order to close the valves. The valves went to the closed position. Tave continued to decrease momentarily with the Condenser Steam Dump valves closed and caused the P-12 interlock to actuate. Data was not available due to monitoring equipment malfunction.

A third P-12 actuation occurred on April 1, 1993 at approximately 0921 hours. Condenser Steam Dump valves in Bank 2 opened and the OATC placed the Steam Dump controller in manual and stabilized reactor coolant temperature.

Instrument and Electrical (IAE) technicians and Component Engineering (CE) were monitoring the Steam Dump Control System. Data from the condenser steam dump control signals indicated a problem with a power supply card and a pressure transmitter. IAE technicians replaced the pressure transmitter and power supply card. This work was completed on April 1, 1993, at approximately 1400 hours. The system operated normally during the subsequent unit startup.

CONCLUSION

The root cause of this event is classified as a system failure due to a degraded subcomponent.

During Unit 2 startup, CE and IAE were monitoring the Condenser Steam Dump Control System. The monitoring activities were due to a P-12 actuation during a previous unit startup due to unknown causes. After the April 1, 1993 actuation, the monitoring of the steam pressure controller provided information that indicated problems with the pressure transmitter and loop power supply card. The IAE technicians replaced the pressure transmitter and loop power supply card. During this event, Control Room Operators took necessary actions to stabilize NC system temperature. All other systems functioned as designed.

A review of the Operating Experience Program database for the past 24 months prior to this event identified one incident involving a P-12 actuation. LER 414/92-002 involved a P-12 actuation due to an unknown cause. Corrective action had maintenance install a recorder to monitor the steam pressure controller during subsequent Unit 2 startup. Both ESF actuations appear to be the same. This incident is considered to be recurring.

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Catawba Nuclear Station, Unit 2	05000414	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	04 OF 04
		93	002	00	

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CORRECTIVE ACTION

SUBSEQUENT

- 1) Control Room Operators responded to stabilize NC system temperature.
- 2) CE and IAE monitored the Steam Pressure Control System and evaluated resultant data.
- 3) Work Orders 93024878-01 and 92095486-01 were issued to replace the loop power supply card and the pressure transmitter.

SAFETY ANALYSIS

The P-12 (Lo Lo Tave) interlock is an ESF actuation which blocks Steam Dump valves actuation to protect against excessive plant cooldown below the minimum temperature for criticality. Its setpoint is 553 degrees F on any two out of four NC System loops. If the logic is satisfied, then the Steam Dump Valves are failed closed until NC System temperature is above 553 degrees F.

During this incident, the P-12 interlock responded properly and as expected to the signal generated.

The cooldown portion of the transient is bounded by the inadvertent opening of a Steam Generator Relief or Safety Valve described in FSAR Section 15.1.4. The total NC temperature decrease was approximately 6.5 degrees F.

The health and safety of the public were not affected by this incident.