

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Catawba Nuclear Station, Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 4 1 1 3										PAGE (3) 1 OF 0 1 4			
TITLE (4) Auto Start of Motor Driven Auxiliary Feedwater Pumps																							
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)									
1	0	1	2	8	4	8	4	0	1	7	0	1	1	2	1	4	8	4	0 5 0 0 0				
OPERATING MODE (9) 4			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																				
POWER LEVEL (10) 01010			20.402(b)				20.405(e)				<input checked="" type="checkbox"/> 50.73(a)(2)(iv)				73.71(b)								
			20.405(a)(1)(i)				50.38(c)(1)				50.73(a)(2)(v)				73.71(c)								
			20.405(a)(1)(ii)				50.38(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)(ix)												
LICENSEE CONTACT FOR THIS LER (12)																			TELEPHONE NUMBER				
NAME Roger W. Ouellette, Assistant Engineer - Licensing																			AREA CODE 7 0 4 3 7 3 - 7 5 3 0				
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)												<input checked="" type="checkbox"/> NO											

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

On October 21, 1984, at 0635 hours, Motor Driven Auxiliary Feedwater (CA) Pumps 1A and 1B started due to an emergency low suction flow signal from both Main Feedwater (CF) Pumps. Unit 1 was in Mode 4 (Hot Shutdown) with the CA System in standby readiness, in preparation for entering Mode 3 (Hot Standby).

The Unit 1 Nuclear Control Operator (NCO) began feeding Steam Generator (S/G) 1C, due to a low level deviation alarm (5% low level), causing feedwater flow to rapidly increase. After feeding S/G 1C for approximately 25 seconds, the demand for feedwater was discontinued, causing feedwater flow to rapidly decrease. Both CF Pumps received a trip signal, due to a low suction flow alarm, causing an automatic start of both Motor Driven Auxiliary Feedwater Pumps.

The cause of this incident is classified as a Design Deficiency, because valve ICM-127 was not capable of responding fast enough to compensate for this type of flow transient.

The immediate corrective action was to trip both Motor Driven CA Pumps after normal suction flow had been re-established for the CF pumps.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

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

The Condensate (CM), Feedwater (CF) and Auxiliary Feedwater (CA) Systems supply the Steam Generator's secondary sides with water.

The CM System takes condensate from the Condenser Hotwells, purifies it, reheats it to improve thermal cycle efficiency, and delivers it to the CF System through the Hotwell Pumps and Booster Pumps.

The CF System supplies feedwater to the four Steam Generators (S/G) at the temperature, pressure, and flow required to maintain proper S/G water levels. The two trip signals pertinent to this incident are Emergency Suction Flow (3000 GPM Per CF Pump) and Emergency Low Suction Pressure (275 psig), both of which have five second delays.

The CA System assures sufficient feedwater supply to the S/Gs in the event of loss of the CM/CF Systems. The Motor Driven CA Pumps will automatically start in the event of:

- Loss of offsite power
- Trip of both CF Pumps
- Safety injection signal
- Low low S/G water level

There are several sources of water available to the CA Pumps. The preferred source is non-safety, condensate quality water. The assured source of supply water is the Nuclear Service Water (RN) System. If the CA Pumps have low suction pressure for five seconds, they will trip unless started automatically, in which case, they will automatically swap over to the RN System.

Prior to this incident, the CA System had been placed in Standby Readiness in preparation for entering Mode 3 (Hot Standby). Both CF Pumps were reset and windmilling while a Hotwell Pump and a Condensate Booster Pump supplied the necessary flow through the CF Pumps, keeping them in a reset condition. At least one CF Pump must be taken out of the tripped condition by resetting it, prior to aligning the CA System for standby readiness. Since there was a low demand of feedwater to the S/G's, a flow of 7,000 GPM was being maintained by recirculating feedwater through the high pressure condensate cleanup line to the upper surge tank dome. This flow was regulated by setting the selector for Valve ICM-127 (CM-CF Cleanup Flow Control) to 7,000 GPM. A controller maintains the selected condensate flow by throttling valve ICM-127.

Valve ICA-151 (S/G 1C CF BYP to CA Nozzle) was incapable of being opened from the Control Room and work request 12326-OPS was issued to fix it. To feed S/G 1C, valve ICF-051 (S/G 1C CF Cont. Isol.) was opened to allow feedwater to enter into the S/G 1C Main Feed Nozzle. Between 0200 and 0615 hours, Technicians were working on valve ICA-151 per this work request. A Technician bypassed the Instrument Control Air Regulator and connected a temporary air supply directly to the diaphragm. The Unit 1 Nuclear Control Operators (NCO's) manipulated valve ICA-151 for the Technicians throughout their troubleshooting.

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No problem was found with this valve, other than a slow response time. Therefore, the Technicians discontinued troubleshooting and returned the air supply to the regulator. The NCO's began using valve 1CA-151 to feed S/G 1C. When the Technician returned the air supply back to the regulator, valve 1CA-151 closed, isolating feedwater to S/G 1C.

Twenty minutes later, S/G 1C had a Low Level Deviation (5% low level) Alarm. An NCO immediately opened valve 1CF-051. Valve 1CF-048 (S/G 1C CF BYP Control) was then throttled to provide feedwater to S/G 1C. The condensate flow increased to approximately 9,200 GPM causing valve 1CM-127 to begin throttling closed to reduce the flowrate back to the selected setpoint (7,000 GPM). When the feedwater demand to S/G 1C discontinued, valve 1CF-051 closed, reducing the condensate flowrate to approximately 4,500 GPM. Since both CF Pumps require a minimum of 3,000 GPM suction flow each, and are in parallel, an emergency low flow alarm was initiated for the pumps. After a five second time delay, the CF Pumps received a trip signal causing both Motor Driven CA Pumps to start, on loss of both CF Pumps.

CA Pump 1A started 12 seconds after CA Pump 1B. When CA Pump 1B initially started, a loss of normal suction alarm to both CA Trains was initiated. This alarm returned to normal within 2 seconds, but because the B Train Five Second Delay was incorrectly set on zero, the B Train suction swapped over to the Nuclear Service Water (RN) System, by opening valves 1CA-18B and 1RN310B.

When another NCO recognized that the Feedwater System was still maintaining condensate flow by means of a Hotwell Pump and Booster Pump, he manually tripped both Motor Driven CA Pumps. CA Pump 1A restarted and had to be manually tripped a second time.

A Temporary Station Modification has been completed per work request 12365-OPS to allow a higher instrument air pressure to be supplied to valve 1CA-151 so that it will operate properly. A Station Problem Report will be initiated to have this problem permanently resolved.

Valve 1CM-127 is not capable of responding quickly enough to prevent the CF Pumps from tripping under these conditions. The cause of this incident is classified as a Design Deficiency, and a Station Problem Report will be initiated to provide assured minimum flow protection for the CF Pumps independent of the Selector/Controller for valve 1CM-127.

Auxiliary Feedwater System Temporary Test, TT/a/A/1250/04, was performed on November 14 and 15, 1984, to verify the response time for both Motor Driven CA Pumps. The response time for both pumps was within 2 to 3 seconds. It is not known why Train A responded 12 seconds later than Train B.

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EXPIRES 8/31/85

FACILITY NAME (1) Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2) 01500041384	LER NUMBER (6)			PAGE (3)	
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		84	017	01	04	OF 04

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

CORRECTIVE ACTION

A Unit 1 NCO tripped CA Pumps 1A and 1B when he recognized normal suction flow had been regained.

All timing relays effected were subsequently calibrated and the CA auto start circuitry was retested.

Drawing CNEE-0147-03.03 will be revised to reflect the five second relay setting.

A Station Problem Report will be initiated to provide the CF Pumps an independent, minimum flow protection.

Station Problem Report will be initiated to modify the instrument air supply to valve 1CA-151.

SAFETY ANALYSIS

Unit 1 was in Mode 4 (200°F Mode 4 350°F) prior to initial criticality. No residual heat was present or being removed at the Steam Generators. Steam Generator 1C heat removal capacity was never compromised. The health and safety of the public were unaffected by this incident.

DUKE POWER COMPANY

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VICE PRESIDENT
NUCLEAR PRODUCTION

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December 14, 1984

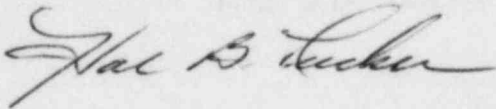
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Washington, D. C. 20555

Subject: Catawba Nuclear Station, Unit 1
Docket No. 50-413

Gentlemen:

Pursuant to 10 CFR 50.73 Section (a) (1) and (d), attached is Revision 1 of Supplement 1 to Licensee Event Report 413/84-17 concerning the auto start of motor driven auxiliary feedwater pumps. This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,



Hal B. Tucker

RWO:slb

Attachment

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