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DUKE POWER

November 17, 1992

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U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

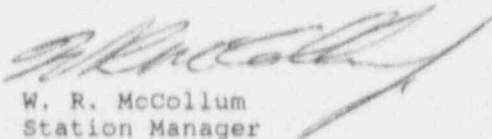
Subject: Catawba Nuclear Station
Docket No. 50-413
LER 413/92-010, Revision 1

Gentlemen:

Attached is Licensee Event Report 413/92-010, Revision 1, concerning AUTOMATIC ALIGNMENT OF THE NUCLEAR SERVICE WATER SYSTEM DUE TO UNKNOWN CAUSES. This revision corrects the 10CFR reporting criterion under which the report was submitted; as indicated on NRC Form 366.

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

Very truly yours,


W. R. McCollum
Station Manager

/lhc

Attachment

xc: Mr. S. D. Ebnetter
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, NW, Suite 2900
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Marsh & McLennan Nuclear
1166 Avenue of the Americas
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U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

INPO Records Center
Suite 1500
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Mr. W. T. Orders
NRC Resident Inspector
Catawba Nuclear Station

07-086

9212070237 921117
PDR ADOCK 05000413
PDR

JE22

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: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (INBB 7714), 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)

Catawba Nuclear Station, Unit 1

DOCKET NUMBER (2)

05000413

PAGE (3)

1 OF 08

TITLE (4)

Automatic Alignment Of The Nuclear Service Water System Due To Unknown Causes

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
08	20	92	92	010	01	11	17	92	CNS, Unit 2	05000414
OPERATING MODE (9) 6			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10) 0			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)(vi) OTHER	
			20.405(a)(1)(iii)			50.73(a)(2)(i)			50.73(a)(2)(vii)(A) (Specify in Abstract below and in Text, NRC Form 366A)	
			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

R. C. Futrell, Compliance Manager

TELEPHONE NUMBER (Include Area Code)

(803) 831-3665

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	NO X	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

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

On August 20, 1992 at 1806 hours, with Unit 1 in Mode 6, Refueling, and Unit 2 in Mode 1, Power Operation, an emergency low level signal for the Nuclear Service Water (RN) System Intake Pit B, initiated an automatic RN swap to the Standby Nuclear Service Water Pond (SNSWP). The signal lasted 2 seconds. RN Pumps 2A and 2B started. RN valves realigned to isolate RN A and B headers and swap suction and discharge to the SNSWP. At this same time an Instrumentation and Electrical (IAE) Technician was using a screwdriver to tighten an energized 120VAC power lead to level transmitter ORNLT7360 per the calibration procedure. Level transmitters ORNLT7360 and 1RNLT7370 share AC power supplies and cannot be isolated from each other. ORNLT7360 was in the tripped condition as required by Technical Specifications. This event appears to have been caused by a power surge when the leads were landed or possibly by a shorted circuit when the screwdriver used to tighten the power leads was dropped by the IAE Technician. This event has been classified as unknown, possibly due to a Design Deficiency or an Inappropriate Action. Test of the RN Intake Pit Level Instrumentation will be completed by November 2, 1992. Modifications may be initiated based on the test results.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 800 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714) 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)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Catawba Nuclear Station, Unit 1	05000 413	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	02 OF 08
		92	010	01	

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

BACKGROUND

The Nuclear Service Water [EIS:BI] (RN) System delivers raw water to provide the ultimate heat sink for essential and non-essential heat loads in the Auxiliary Buildings [EIS:NF] and Reactor Buildings [EIS:NH] for both Units. The station is supplied by four RN Pumps [EIS:P]. During normal operation, both Units are supplied by one RN Pump. During emergency conditions, one RN Pump per Unit is required to supply the essential heat loads for each Unit.

The Standby Nuclear Service Water Pond [EIS:BS] (SNSWP) is bounded by a Class 1 seismically qualified dam that impounds a sufficient volume of water to attain safe shutdown conditions on both Units during normal and accident conditions during a seismic event that exceeds the design basis of the Lake Wylie Dam. The RN system is normally aligned to take suction from and discharge to Lake Wylie. RN Pump Structure Pit [EIS:NO] level instrumentation is provided to automatically align the suction and discharge of the RN system to the SNSWP on 2 out of 3 emergency low level signals from either RN pump pit. The following actions are initiated on an emergency low level in either RN Pump Structure Pit:

- 1) RN Pumps 1A, 1B, 2A, 2B start.
- 2) The RN Pump Intake Pits are isolated from Lake Wylie and aligned to take suction from the SNSWP.
- 3) The normal RN discharge through the Low Pressure Service Water [EIS:KI] System is isolated and RN is aligned to discharge to the SNSWP.
- 4) The Diesel Generator [EIS:QE] Cooling Water returns to Lake Wylie are closed and the discharges to the SNSWP are opened.
- 5) The RN Discharge Headers A and B are isolated into separate headers.

Nuclear Station Modification (NSM) CN-50330 was implemented in March of 1989 to modify the circuit that automatically aligns the suction and discharge of the RN system to the SNSWP from Lake Wylie on an emergency low RN Pump Structure Pit level, from a 1 out of 2 logic to a 2 out of 3 logic.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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 (INBB 7714) 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

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Catawba Nuclear Station, Unit 1		05000 413		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	03 OF 08
				92	010	01	

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

During this event an Instrumentation and Electrical (IAE) crew was calibrating the RN Intake Pit B level instrumentation per Standing Work Request 004173SWR and procedure IP/O/A/3112/01B, Calibration Procedure for the RN Intake Pit B Level Instrumentation. This procedure has been performed once since the implementation of NSM CN-50330.

Technical Specification 3.3.2, Engineered Safety Features Actuation System [EIS:JE] Instrumentation, requires the inoperable channel to be in the tripped condition within 4 hours with the minimum channels operable or alignment of RN to SNSWP during power operation and/or startup.

EVENT DESCRIPTION

On August 20, 1992, Unit 1 was in refueling outage EOC6, Mode 6, Refueling, and Unit 2 was in Mode 1, Power Operation. RN Pump 1A was in service supplying both units and RN Pump 1B was out of service for outage related work. At approximately 1800 hours, IAE was in the process of replacing RN Intake B Pit Level Transmitter [EIS:XT] 0RNLT7360 after completing a calibration check per work request 004173SWR. 0RNLT7360 was in the trip position per Technical Specification 3.3.2, while this work was in progress. The IAE technician had landed the energized 120VAC Power leads to the terminals and began tightening the screws, when the screwdriver dropped from the technician's hand and struck the housing of Level Transmitter 1RNLT7370, located approximately two feet below the transmitter being replaced. At that time the IAE technician noticed RN Pump 2B start. Replacement of 0RNLT7360 was then completed.

At 1806:11 the Control Room received a RN Pit A and B swap to SNSWP alarm that lasted two seconds and a RN Intake Pit B Low Level alarm from 1RNLT7370 that lasted six seconds. RN pumps 2A and 2B started and RN valves [EIS:V] began the automatic alignment to separate the RN headers, isolate RN from Lake Wylie and align RN to the SNSWP. The Control Room Operator (CRO) then entered Abnormal Procedure AP/O/A/5500/20, Loss of Nuclear Service Water.

At 1811 hours, the CRO noticed B Pit Level decreasing and secured RN pump 2B.

At 1815 hours, the CRO opened RN supply crossover isolation valve 2RN47A to provide flow to the RN B Header.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

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

At 1817 hours, the CRO noticed valve 1RN-4B, Pumphouse Pit B Isolation from SNSWP, had opened only partially and successfully opened the valve using the push button on the control board.

At 1915 hours, the CRO was contacted by IAE and confirmed they had been working on ORNLT7360 when transfer to the SNSWP occurred.

At 1930 hours, the required 4 hour notification of the Engineered Safety Feature (ESF) actuation was made to the NRC.

At 2000 hours, IAE compared the output of 1RNLT7370 with Unit 2 level transmitter in intake pit B, 2RNLT7370. The output of the level transmitters were the same. This was done to verify that 1RNLT7370 was now working properly.

Also at 2000 hours, Operations initiated work request 61089OPS to investigate and repair valve 1RN-4B.

At 2030 hours, Removal and Restoration Tag (R&R) 12-2281 was placed to tag valve 1RN-4B in the open position and to remove power. RN Train B was also left aligned to the SNSWP to maintain RN Train B operability.

On August 21 at 0100 hours, IAE's investigation of valve 1RN-4B revealed no problems. The Shift Manager recommended further evaluation of valve 1RN-4B by Engineering.

At 0400 hours, Operations aligned RN Train A to Lake Wylie to minimize the heat load on the SNSWP.

At 1435 hours, Operations received a Technical Specification Operability Notification Sheet (TSONS) from Component Engineering Services (CES) stating that valve 1RN-4B was operable. Also, CES recommended increasing the valve's torque settings to further ensure the valve would overcome high unseating loads.

At 1515 hours, work request 004173SWR, calibration of RN Pit B Level Loops ORN7360 and ORN8270, was completed and control returned to Operations.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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 (MNB 7714), 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.

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

At 1555 hours, R&R 12-2281, previously required to maintain RN Train B operability, was cleared.

At 1615 hours, the torque settings on valve 1RiV-4B were increased and work request 61089OPS was completed and control returned to Operations.

At 1705 hours, Operations aligned RN Train B to Lake Wylie.

On August 22, IAE inspected Level Transmitter 1RNLT7370 for loose parts per work request 92038607. No loose parts were found.

CONCLUSION

This event has been classified as unknown, possibly due to a Design Deficiency or a possible Inappropriate Action, since the investigation could not determine the exact reason for Level Transmitter 1RNLT7370 to alarm emergency low and cause the subsequent RN swap to the SNSWP.

IAE Technicians were in the process of replacing level transmitter 0RNLT7360, when the screwdriver being used to tighten the 120VAC power leads was dropped and subsequently struck 1RNLT7370. At that time the technicians noticed that RN pump 2B started. Initially the IAE Technicians thought the impact of the screwdriver striking the housing of level transmitter 1RNLT7370 caused the transmitter to spike and initiate the RN swap. Work request 92038607 was initiated to inspect 1RNLT7370 for loose parts. During this inspection the IAE Technicians monitored the output of the transmitter while reenacting the event of dropping the screwdriver onto the housing of 1RNLT7370. No loose parts were found and the reenactment failed to change the output of the level transmitter. Therefore the impact of the screwdriver striking the transmitter was most likely not the cause of this event.

This event could have possibly been due to a Design Deficiency. Level transmitters 0RNLT7360 and 1RNLT7370 share power supplies (120VAC 1ERPD Breaker No. 20) and cannot be isolated from each other. Therefore, when replacing or removing either transmitter, the AC power leads must be terminated or removed while energized. It is possible that landing and tightening these leads to the terminal while energized caused a power surge affecting both channels of the 2 of 3 logic circuit and thereby causing the RN swap to the SNSWP. However, it is noted that a calibration of this same loop was completed without incident in March of 1991.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (ANBB 7714), 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.

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

Electrical Engineering has evaluated the design of this circuit and concluded that this circuit is designed in accordance with established codes and standards. Evaluation of generic applicability may be conducted if the planned test concludes there is a design deficiency. Work Requests 92040151 and 92040152 have been initiated to test RN Pit A and B level instruments and determine if landing AC power leads while energized could cause a surge affecting both channels. This work will be completed by November 2, 1992. The results of the test will determine if a modification to separate AC power supplies is necessary to prevent recurrence.

Because this calibration has been completed before using the same procedures without incident, it is concluded that the most probable cause of this incident is due to a possible Inappropriate Action. When replacing the level transmitter it is first placed in its metal case and attached to the wall. The AC power leads are then screwed to the terminals. At this time, the terminal points for the AC power are located about an inch away from the metal case. While tightening the AC power leads to the terminals, the screwdriver dropped from the IAE Technician's hand. It is possible that the screwdriver touched the case while still in contact with the terminal, thus creating a momentary short circuit to ground. This would cause level transmitter 1RNLT7370 to read low and complete the 2 out of 3 logic, thereby initiating the RN swap to the SNSWP. However, the IAE technician did not recall any burns or arcing on the transmitter case and the associated fuse did not blow, which would be the expected occurrence with a shorted circuit. Work Requests 92040151 and 92040152 have been initiated to test RN Pit A and B level instruments. This work will be completed by November 2, 1992. The results of the test will determine if a modification to isolate the transmitters is necessary to prevent recurrence.

The IAE Technician was using established procedures during the replacement of the transmitter. However, IAE does not have established guidelines for working with energized low voltage components. Had appropriate guidelines been in place, the suspected short circuit might not have occurred. IAE will evaluate the need to establish guidelines for using insulated tools when working with energized low voltage components to prevent inadvertent component actuations.

The time associated with the completion of work request 92040151 and 92040152 will have no affect on the operability of the RN Pit level instrumentation or on the ability of the instrumentation to perform their intended functions. There is no work scheduled on this instrumentation before the appropriate corrective actions are complete. The RN Pit B level instrumentation is not scheduled to be calibrated again for 18 months and the calibration procedure for the RN Pit A level instrumentation does not require removal of AC power. This testing will be performed when RN can be aligned to the SNSWP to avoid an automatic swap.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (IMRB 7714) U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE FAP WORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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TEXT (If more space is required, use additional copies of NRC Form 365A) (17)

A review of the Operation Experience Program Data Base indicates that there have been no ESF actuations involving the automatic alignment of RN to the SNSWP during the past 36 months. Therefore this incident is not classified as a recurring event.

CORRECTIVE ACTION

Immediate

- 1) CRO entered Abnormal Procedure AP/0/A/5500/20.

Subsequent

- 1) CRO secured RN Pump 2B and opened valve 2RN-47A.
- 2) CRO opened valve 1RN-4B using the push button on the main control board.
- 3) CRO tagged valve 1RN-4B open and removed power per R&R 12-2281.
- 4) IAE verified the output of Level Transmitter 1RNLT7370.
- 5) IAE investigated valve 1RN-4B and increased torque settings per work request 61089OPS.
- 6) Operations realigned RN to Lake Wylie.
- 7) IAE inspected and tested Level Transmitter 1RNLT7370 per work request 92038607.

Planned

- 1) Test and collect data on RN Pit A and B level instruments per work request 92040151 and 92040152.
- 2) CES will evaluate the test data collected and initiate any needed modifications to prevent recurrence.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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 (IMRB 7714) 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.

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

- 3) IAE will evaluate the need to establish guidelines for using insulated tools when working with energized low voltage components to prevent inadvertent component actuations.
- 4) Safety Review Group will revise this report if definite results are obtained on the root cause of this ESF actuation.

SAFETY ANALYSIS

The RN system automatically aligned to the SNSWP when the 2 out of 3 RN Pit Emergency Low Level Logic was completed during calibration of the RN Intake Pit B Level Instruments. The CROs responded by entering Abnormal Procedure AP/0/A/5500/20, Loss of Nuclear Service Water. The automatic positioning of valve 1RN-4B was the only action that did not respond as designed per the design bases and FSAR Section 7.4.2.

Valve 1RN-4B opened only partially and subsequently B pit level began decreasing. The CRO responded by securing RN pump 2B and opening valve 2RN-47A to supply flow to RN B Header. Valve 1RN-4B was successfully opened by the CRO using the push button on the main control board. The subsequent investigation determined that 1RN-4B did not fully open on receipt of the "momentary" emergency low pit level signal due to a high unseating load causing actuation of the torque switch. The torque switch would have been reset if a "maintained" open signal had been present. The CRO's action of opening the valve from the control board push button verified that the valve would have opened fully on a "maintained" signal from an actual emergency low pit level condition. The torque switch settings were subsequently increased to further ensure the valve will overcome high unseating loads.

Sufficient RN flow was maintained as well as adequate RN pit level throughout this event. If an actual emergency low pit level had occurred the RN system would have properly aligned.

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