



DUKE POWER

March 23, 1993

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

Subject: Catawba Nuclear Station  
Docket No. 50-414  
LER 414/93-001

Gentlemen:

Attached is Licensee Event Report 414/93-001, concerning UNIT 2 ESSENTIAL AUXILIARY POWER SYSTEM BLACKOUT DUE TO MISSED PROCEDURE STEP.

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

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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 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 2

DOCKET NUMBER (2)

05000414

PAGE (3)

1 OF 06

TITLE (4)

Unit 2 Essential Auxiliary Power System Blackout Due To Missed Procedure Step

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
02	21	93	93	001	00	03	23	93		05000
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
0			20.402(b)			20.405(c)			X 50.73(a)(2)(iv)	
POWER LEVEL (10)			20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(iv)	
0			20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)	
			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)	
			OTHER (Specify in Abstract below and in Text, NRC Form 366A)							

## 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 NRCDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRCDS

## SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On February 21, 1993, at 0957 hours, Unit 2 status was No Mode, Defueled, for refueling outage 2EOC5. The 4160 V Essential Auxiliary Power System (EPC) Train B (ETB) was powered from Unit 1 through alternate feeder SATB. Diesel Generator (D/G) 2B was removed from service for scheduled maintenance. During performance of the D/G 2B Load Sequencer timer calibration test, a procedure step placing the sequencer in the test mode was inadvertently missed. When the test sequence was initiated, a blackout resulted. On February 22, at 0955 hours, problems with the Train B Control Room Area Ventilation (VC) System required that Train A be placed in service. However, the Train B fans continued to run since the sequencer latch circuit was not reset after sequencer initiation. Case 2 of AP/2/A/5500/07, Loss of Normal Power, did not require resetting the sequencer latch circuit. After the circuit was reset, Train A VC was placed in service. This event is attributed to work practices in that the test procedure was not followed properly. The procedure steps that places the sequencer in test were missed. Subsequent corrective actions included removing power to the sequencer and restoring power to 2ETB. Planned corrective actions include revisions to procedures associated with the D/G sequencer, and to determine if caution signs inside the sequencer cabinets are necessary.

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

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Catawba Nuclear Station, Unit 2		05000 414		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	02 of 06
				93	001	00	

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

**BACKGROUND**

The Diesel Generator [EIS:GEN] (D/G) Load Sequencing [EIS:EK] (EQB) System energizes blackout and/or safety injection (SI) loads in a sequence that would not momentarily overload the D/G or auxiliary transformer [EIS:XFMR] supplying power to the 4160 V Essential Auxiliary Power [EIS:EB] (EPC) System. A blackout (B/O) is a loss of power to an EPC bus that is caused by a degraded voltage condition or a SI signal from the Solid State Protection [EIS:JE] (ISE) System. The loads on the bus (or train) with the degraded voltage condition will be de-energized automatically by opening the load and feeder breakers in order that the loads necessary for operation or safe shutdown can be sequentially loaded.

The load sequencer is alternately powered from either the 125 VDC Essential Vital Instrument and Control Power [EIS:EI] (EPL) System batteries [EIS:BTRY] or the 125 VDC Diesel Essential Auxiliary Power [EIS:EI] (EPQ) System batteries. Due to expected battery voltage decrease during the B/O, the sequencer power source may select the alternate power supply [EIS:JX] through use of auctioneering diode assemblies.

The EPC System is provided to supply power to the 4160 V essential loads and the 600 V essential load centers through 4160/600 V essential load center transformers. EPC is divided into two safety related trains. Train A consists of the ETA bus switchgear assemblies and Train B consists of the ETB switchgear assemblies.

IP/2/A/3670/01B, Calibration Procedure For D/G 2B Load Sequencer Timers, is used to record and to calibrate load sequencer timer intervals. The test is performed during refueling outages during the associated D/G maintenance window.

The Control Room Area Ventilation [EIS:UC] (VC) System and the Control Room Area Chilled Water [EIS:UE] (YC) System are provided to maintain Control Room habitability during accident conditions.

**EVENT DESCRIPTION**

On February 21, 1993, at 0800 hours, Unit 2 was in No Mode for refueling outage 2EOC5 when Instrument And Electrical (IAE) Specialist A and Component Engineer (CE) A began work on the 2B D/G load sequencer per Work Order 92083922-01.

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

The key for the D/G Sequencer Panel Test Activation Switch [EIIS:XIS] was obtained from the Work Control Center (WCC) per IP/2/A/3670/01B, Prerequisite step 4.3.

Preliminary Requirements steps 10.1.1 through 10.1.6 were performed before it was discovered that breaker CB-4 on 2DGCB, 2B D/G 125 VDC Battery Charger, was ed tagged.

IAE Specialist A returned to the WCC to request that the red tag be removed so that the sequencer could be energized.

While waiting for the red tag to be removed, IAE Specialist A proceeded to section 10.2, Timer Calibration, of the procedure in order to prepare the test equipment necessary for the timer calibration test.

After the red tags were removed, it was discovered that the "ESSENTIAL SEQUENCER CONTROL POWER AVAILABLE" lamp on sequencer panel 2DGSLB-2 was not illuminated. A white tag was found on breaker 2EDF-F01F, Diesel Generator Load Sequencer Panel 2DGLSB.

IAE Specialist A again returned to the WCC in order to request that the white tag be removed.

Once the white tag was removed and power was restored to the sequencer, IAE Specialist A opened the sliding links to defeat a 2B D/G auto-start. CES Engineer A independently verified this step.

Input Isolation was performed per Enclosure 11.1.1, Instrument Calibration Data Sheet, for the sequencer 'Auto Reset' timer.

At 0957 hours, step 10.2.3 was performed to initiate the timer. IAE Specialist A and CES Engineer A heard unexpected circuit initiations and immediately realized that the sequencer was not in the test mode. At this time 2ETB was de-energized due to the opening of 2ETB-4, Alternate Incoming Feeder From Transformer SATB.

IAE Specialist B was instructed to call the Control Room (C/R) and inform as to what had taken place.

The C/R Shift Supervisor instructed IAE Specialist B to reopen breaker 2EDF-F01F in order to de-energize the sequencer. IAE Specialist B was also instructed to rehang the white tag.

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

At 1230 2ETB was energized by closing 2ETB-4.

On February 22, at 0610 hours, YC System Train B compressor tripped due to a high temperature condition.

At 0615 hours, the compressor was successfully restarted.

At 0950 hours, the Train B compressor was tripped again due to the high temperature condition. YC Train B was declared inoperable.

At 0955 hours, the Train B VC fans continued to run due to the sequencer latch circuit being initiated by the inadvertent actuation of the sequencer.

At 1010 hours, VC System Train A fans were placed in service.

At 1015 hours, the YC System Train A compressor was started.

### CONCLUSION

This incident has been attributed to work practices in that the procedure was not followed properly. IP/2/A/3670/01B steps 10.1.10 and 10.1.11 were missed which resulted in the sequencer initiation. Step 10.1.10 requires that the sequencer "TEST ACTUATE" switch be turned fully clockwise and then released. Step 10.1.10 did not require a sign-off although the following step 10.1.11, "Verify TEST ACTUATE light is illuminated," did require a sign-off.

The IAE Specialist performing the sequencer timer calibration test is extremely familiar with the procedure along with the D/G load sequencer and the D/G control circuits. It should be noted that the procedure had not been performed since being rewritten. The Specialist was fully aware of the purpose and importance of the "TEST ACTUATE" switch. Prior to the incident, problems with removing red/white tags and restoring power to the sequencer could have contributed to this event. While waiting for the power to be restored to the sequencer, the Specialist began preparing for the test by setting up the necessary test equipment which required performance of steps that were beyond the step that requires setting the TEST ACTUATE switch to the test position. Another point to consider is that the TEST ACTUATE switch and the TEST ACTUATE lamp are on the outside of the sequencer cabinet door. With the cabinet door open during testing, both the switch and the lamp are out of view.



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

The blackout of bus 2 ETB had no operational effect on Unit 2 due to the fact that no motor loads were connected to the bus. During the blackout, Control Room Operators entered Case 2, Loss of Normal Power and D/G, of abnormal procedure AP/2/A/5500/07, Loss Of Normal Power. However, Case 2 did not have a step to reset the sequencer latch circuit for the VC System following the inadvertent sequencer initiation. When problems were encountered with the YC Train B compressor temperature and operators attempted to start VC/YC A Train, the B Train fans continued to run because the sequencer latch was not reset. Case 1, Loss Of Normal Power, of AP/2/A/5500/07 has the step to reset the sequencer latch.

Immediate corrective actions include CROs entering AP/2/A/5500/07 in order to return Unit 2 ETB to normal. Subsequent corrective actions include IAE notifying the C/R of what had caused the inadvertent initiation of the sequencer. Per the Shift Supervisors instructions, IAE de-energized the sequencer by opening EDF-F01F. Planned corrective actions include revisions to the sequencer timer calibration procedures for both units and revisions to AP/2/A/5500/07 so that the step to reset the sequencer latch will be included in Case 2.

A review of the Operational Experience Database for the previous 24 months revealed a Licensee Event Report, LER 413/91-002, where a Technical Specification violation occurred due to a missed grab sample. When a Radiation Protection technician failed to follow the correct procedure. However, LER 413/91-002 did not involve procedure steps that were inadvertently missed. Therefore, this event is determined not to be a recurring problem.

CORRECTIVE ACTIONS

## IMMEDIATE

- 1) CROs entered AP/2/A/5500/07.

## SUBSEQUENT

- 1) IAE informed the C/R about what caused the sequencer to inadvertently actuate.
- 2) IAE removed power from 2B D/G sequencer.
- 3) CROs reset the sequencer latch circuit in order to place A Train VC/YC in service.

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		93	001	00	

TEXT (If more space is required, use additional copies of NRC Form 3654) (17)

## PLANNED

- 1) Sequencer procedures IP/1(2)/3670/01A(B) will be revised in order to ensure that the Test Actuate switch is properly manipulated.
- 2) AP/1(2)/A/5500/07 Case 2 will be revised to include resetting the sequencer latch circuit.
- 3) Implement recommendations from HPES report 93-024 as appropriate.

## SAFETY ANALYSIS

At the time of the incident, Unit 2 was in No Mode for refueling outage 2EOC5 with 2ETB being supplied from Unit 1 1TB/SATB through Alternate Feeder Breaker 2ETB-4. D/G 2B was out of service due to scheduled maintenance. The D/G 2B start circuit was disabled by the timer calibration procedure so that actuation of the sequencer would not cause an attempted D/G start. Since there were no essential loads on the 2ETB Train B bus, there was no effect on the unit. When the C/R received the blackout alarms, the CROs responded by entering Case 2 of the AP/2/A/5500/07.

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