NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Catawba Nuclear Station, Unit 1	0 5 0 0 0 4 1 3	1 OF 0 7

TITLE (4)

Inadvertent Blackout During Diesel Generator Operability Test

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)
0 8	1 6	8 5	8 5	— 0 5 1	— 0 1	1 1	2 1	8 5	Catawba, Unit 2	0 5 0 0 0 4 1 4
										0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 0 9 5	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)(vii)	X 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)	50.72(b)(2)(ii)
	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	TELEPHONE NUMBER
	AREA CODE
Roger W. Ouellette, Associate Engineer - Licensing	7 0 4 3 1 7 3 - 1 7 5 3 1 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)	X NO				

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

On August 16, 1985, at 2254:03 hours, a Train B blackout occurred when a Nuclear Equipment Operator (NEO) performing the Diesel Generator (D/G) 1B Operability Test inadvertently opened the 1ETB Bus Normal Incoming Breaker, causing an undervoltage condition on 1ETB bus. This in turn initiated an Engineered Safety Features (ESF) actuation. The ESF signal caused 1ETB bus to load shed, the D/G 1B breaker to close, and all blackout load groups to energize. To recover from the actuation, all blackout load groups not needed for plant operation were shutdown, and normal power was restored to 1ETB bus. Unit 1 was in Mode 1 at 95% power at the time of the incident.

This event is classified as a Personnel Error, because the NEO pressed the wrong breaker control pushbutton.

This event is reportable pursuant to 10 CFR 50.73, Section (a)(2)(iv) and 10 CFR 50.72, Section (b)(2)(ii).

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The 4160V essential busses, 1ETA and 1ETB, supply power to equipment required to safely shutdown Unit 1. Each bus can be supplied power through a normal incoming feeder breaker (1ETA-3 or 1ETB-3, respectively) or through a standby Diesel Generator (D/G) breaker (1ETA-18 or 1ETB-18, respectively). In the event of a loss of coolant accident (LOCA) or a loss of preferred power to the essential busses (blackout), 1ETA-18 (or 1ETB-18) closes to supply power from D/G 1A (or D/G 1B) to 1ETA (or 1ETB). For the case of a blackout on an essential bus, the associated D/G will automatically start. An 8.5 second testing period verifies whether or not a two out of three undervoltage condition is actually the result of a sustained loss of voltage or from a short term voltage dip. If the loss of voltage is sustained, the 4160V essential and blackout busses are load shedded, and the D/G breaker closes when the diesel engine reaches 95% speed, and the busses have been load shedded for 1 second.

If system parameters are acceptable, a circuit in the diesel sequencer allows loading to proceed at 2 second intervals. This feature is referred to as the accelerated sequence. With the accelerated sequence, a 2 second time delay follows each load group actuation, at which time essential bus voltage is checked, and if acceptable, the next succeeding load is energized followed by another 2 second time delay.

On August 15, 1985, at approximately 2230 hours, a Nuclear Equipment Operator (NEO) was sent to perform Periodic Test PT/1/A/4350/02B (Diesel Generator (D/G) 1B Operability Test). The D/G was started at 2240 hours per Procedure OP/1/A/6350/02 (D/G Operating Procedure). On the NEO's first attempt to parallel D/G 1B with the 1ETB bus within 60 seconds, the chart paper for the D/G visicorder became jammed and the test had to be halted. D/G 1B was shutdown. At 2253:38 hours, D/G 1B was restarted. The NEO then tried to close 1ETB-18 (D/G breaker) to parallel the D/G onto 1ETB bus. The breaker would not close, so the NEO reached up and adjusted the synchroscope to match the D/G's frequency to that of 1ETB bus. While still observing the synchroscope, the NEO reached down with his other hand and inadvertently pressed the OPEN pushbutton for the breaker supplying normal incoming power, 1ETB-3. (The NEO claimed to have had his finger on the CLOSE pushbutton for 1ETB-3 when he looked down, but subsequent re-creations of pressing the close pushbutton did not open the breaker. Apparently, the NEO pressed the OPEN pushbutton while his attention was on the synchroscope.) At 2254:03:158 hours, 1ETB-3 tripped open, causing an undervoltage condition on 1ETB bus. The Diesel Generator 1B sequencer actuated. After a sustained loss of voltage for 8.5 seconds, the bus load shedded and 1ETB-18 breaker closed. The sequencer then allowed all load groups to re-energize in 2 second intervals.

At 2254:03 hours, upon loss of power to Motor Control Center 1EMXB, the Containment Chilled Water (YV) Chillers A and B tripped due to an interlock with valve 1RN437B, (lower containment ventilation units supply). Shortly afterwards, containment pressure began to rise until it reached a maximum of .4 psig. Because the two Unit 1 NCO's were busy recovering from the blackout, the Unit 2 NCO came over to the Unit 1 controls to reduce containment pressure by opening Containment Air Release and Additon (VQ) valves 1VQ16, 1VQ2, 1VQ3, and 1VQ15. At 2309:03 hours, YV chillers A and B were returned to service, and by approximately 2317 hours, containment pressure had been restored to normal condition.

Upon initiation of the blackout logic, the Turbine Driven Auxiliary Feedwater (CA) Pump #1 auto-started as designed. Due to radioactive sodium isotope, Na24, being used in the Moisture Carryover Test on the secondary side of Unit 1, there was concern that a radioactive release may have occurred due to the exhaust steam from the CA turbine dumping to the atmosphere. Health Physics was contacted to sample the secondary side of the Steam Generators to determine if any radiation limits had been exceeded.

Recovery from the incident began at 2256:43:048 hours when the sequencer was reset. Then, all the loads that were energized by the sequencer which were not needed for plant operation at that time were shutdown. Breaker 1ETB-3 was closed, breaker 1ETB-18 was opened, and D/G 1B was shutdown.

DEVIATIONS FROM EXPECTED PLANT RESPONSE

Before the Unit 2 NCO came over to Unit 1 to assist in recovering from the Blackout, he was in the process of making up to the Unit 2 Volume Control Tank (VCT). This is accomplished by opening either valve 2NV252A or 2NV253B, (Chemical and Volume Control System (NV) pumps suction from the Refueling Water Storage Tank (FWST)), until VCT level returns to normal. When the blackout occurred on Unit 1, power was lost to motor control center 2EMXH, which was being fed by Unit 1 Load Center 1ELXB. 2EMXH supplies 120 VAC Panelboard 2EKPH which provides control power to certain interlocks which will close 2NV189B, (VCT Outlet Isolation), and open 2NV253B on a loss of voltage from 2EKPH. Therefore, the Unit 1 blackout caused the outlet of the Unit 2 VCT to be isolated with flow from the Unit 2 FWST still being supplied. When the Unit 2 NCO returned to the controls, level in the VCT had increased to almost 100% and pressure had increased to approximately 80 psig. Valve 2NV172A, (3 way divert to VCT/RHT), control switch was in the VCT position, and therefore, did not divert on high level. Reactor Coolant System letdown to the VCT was immediately secured and Pressurizer Power Operated Relief Valve (PORV) 2NC34A was opened to stop flow pressure input. When 2NV189B was opened, VCT level and pressure were rapidly restored to normal.

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

When CA pump #1 and CA pump 1B auto-started in response to the diesel generator sequencer, valve 1BB57B, (S/G A Blowdown Containment Isolation) did not automatically close as designed. The valve was listed as inoperable in the Technical Specification Action Item Logbook. The NCO tried to close the valve from the Control Room with no success. A NEO was then sent to manually close the valve. Upon slight manual actuation, the valve then closed on its own power. The valve was then cycled from the Control Room, and lubricant was applied to the valve stem. 1BB57B was then cycled three times with no failures. A stroke time test was performed on the valve. 1BB57B passed the stroke time test and was declared operable.

This incident is classified as a Personnel Error. The NEO performing PT/1/A/4350/02B apparently pressed the wrong pushbutton, while his attention was focused on the synchroscope, causing 1ETB-3 to open, instead of 1ETB-18 to close. Although the NEO maintains that he pressed the close pushbutton for 1ETB-3, re-creation of a similar scenario the next day (the only difference being that D/G 1B breaker was closed) showed that pressing the closed pushbutton for 1ETB-3 did not open the breaker.

When the Unit 2 NCO left the control board unattended to assist in lowering Unit 1 containment pressure, he was unaware that the blackout on Unit 1 would cause the VCT outlet valve to close and the valve supplying makeup to the VCT to open, thus increasing level and pressure above normal conditions. If the NCO had been present, this situation could have been prevented. Prior to this incident, Unit 2 NCOs were allowed to perform work on Unit 1 if it was necessary, provided proper turnover status was given.

Motor Control Center 2EMXH, which should normally be aligned to Unit 2 power, was being fed by 1ETB because 1ETB had an operable backup D/G, whereas 2ETB did not at that time. Further investigaiton showed that the normal power to the controlling relays in the valve motor operator circuits is not strictly unit related. Train "A" relays for both units' valves are fed from Unit 1 power, and Train "B" relays for both units' valves are fed from Unit 2 power.

As a result of this incident, there was concern that the Unit 2 VCT may have been overpressurized. An overpressurization of the Unit 2 VCT occurred earlier this year during cold hydrostatic testing, resulting in the rupture of the tank. An investigation was initiated to determine the amount of pressure the tank had been subjected to. The level trace and alarm typer showed that the NCO shutdown the reciprocating charging pump, which was supplying approximately 12 gpm of input to the Unit 2 VCT at roughly the same time the indicated tank level reached 100%. After 100% indication is reached, there is still an additional 15% volume available in the VCT.

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

Since there are no alarm points associated with the VCT relief valve, 2NV223, there was no way of determining whether the valve lifted at the design setpoint of 75 psig. The relief path was determined to be operable. Following the incident, 2NV223 was removed for bench testing to determine its setpoint. Bench testing the valve showed that the valve relieved at 73.8 psig which was different from the manufacturer's drawing and nameplate data value of 63 psig. The 63 psig setting accounts for the normal relief header back pressure of approximately 12 psig. The valve had the manufacturer lead seals still intact and had attached a repair tag dated March 16, 1984. Apparently, the manufacturer had reset the valve. Non Conforming Item (NCI) Report was written to document the discrepancy. Since 2NV223 was realigned to relief through a temporary header to the Turbine Building sump where no back pressure was thought to exist, a Temporary Station Modification (TSM) was used to allow the relief setpoint to remain at 73.8 psig until Unit 2 fuel load. However, it was found later that the temporary header had a back pressure of approximately 11.5 psig associated with it under worse case conditions. A TSM, which originally allowed installation of the temporary header to the turbine building sump, was changed to allow 2NV223 to relieve to the atmosphere. Also, following the incident when the Unit 2 VCT was drained with only atmospheric pressure in the tank, an indication of approximately 5 psig was being shown on the Control Room receiver gauge (2NVP5500). A Work Request (WR) was written to investigate this. Water in the instrument line was determined to be the reason for the Control Room gauge indicating 5 psig higher than actual pressure. Therefore, from the information shown on the alarm typer and level trace, along with the results from the WR, it was concluded the VCT was not overpressurized.

When the blackout occurred on Unit 1, it was originally thought that the subsequent auto-start of CA Pump #1 may have caused a radiation release due to the Na24 tracer being used in the Moisture Carryover Test on the secondary side of Unit 1. Prior to this test, Health Physics had evaluated the consequences of CA Pump #1 start. Health Physics determined that a release would be within acceptable limits. Health Physics samples of the Steam Generators (S/Gs) following the incident showed that there was no release to the atmosphere.

The reason for the failure of valve 1BB-57B to close when CA auto-started is not known. It is possible that either a limit switch or torque switch was out of adjustment because the valve motor had not energized. Having the NEO turn the valve by hand may have actuated the limit switches and allowed the valve actuator to energize. The valve was then cycled from the Control Room and subsequently passed its stroke time test.

The problem with containment pressure increasing above the Technical Specification limit of .3 psig to a high of .4 psig was caused by the loss of YV. This resulted from an optical isolator in the control circuit of valve 1RN437B, (outside isolation supply to lower containment ventilation units) that is normally energized by 1EMXB and trips the YV chillers upon loss of power. YV high temperature indication in the Control Room presently consists of the "YV Operable" light going out. More positive Control Room indications probably would have helped identify the problem

of the loss of YV earlier. Health Physics was contacted about the VQ release and verified it to be within acceptable limits.

There were no radioactive material releases, radiation exposures, or personnel injuries as a result of this incident.

CORRECTIVE ACTION

Immediate

1. Operations entered Abnormal Procedure AP/1/A/5500/17, Case 1 (Loss of Normal Power to an Essential Train).

2. Sequencer 1B was reset, all actuated loads not needed for plant operation were shutdown, breaker 1ETB-3 was closed, breaker 1ETB-18 was opened, and D/G 1B was shutdown to return system to normal alignment.

3. Containment pressure was lowered by setting up a VQ release and restoring YV chillers.

4. A NEO was sent to manually close valve 1BB-57B.

5. Letdown was immediately secured to the Unit 2 VCT and PORV 2NC-34A was opened.

6. Health Physics was notified to determine if a Na24 release had taken place because of turbine driven CA pump auto-start.

Subsequent

1. Protective covers have been placed over the breaker controls on D/G 1A and 1B panels.

2. Breaker 1ETB-3 was tested to determine if pressing the CLOSE pushbutton would cause the breaker to OPEN.

3. Health Physics sampled the Steam Generators for Na24 concentrations.

4. The NEO was counselled on the incident.

5. A Work Request was initiated to remove 2NV-223 and check the relief setpoint.

6. A NCI was written to document the discrepancy between the setpoint of 73.8 psig found on 2NV-223 and 63 psig found on manufacturer's drawing and valve nameplate.

7. A TSM was issued to leave the valve setpoint at 73.8 psig until fuel load.

8. A Work Request which was initiated to investigate the cause of 2NVP5500 giving erroneous readings, was completed.

9. A TSM was changed to have 2NV223 relieve to the atmosphere instead of the temporary header.

10. A change was made to AP/1/A/5500/07 to provide steps for verifying that YV is operable following a blackout.

11. BB valve inservice test, PT/1/A/4200/17 was performed on 1BB-57B.

12. An Intrastation letter was issued to Shift Supervisors on August 16, 1985, stating the Control Room operators assigned to Unit 2 will under no circumstances be used on Unit 1, or vice-versa.

13. D/G 1 B Operability Test was re-performed satisfactorily.

14. A review has been conducted of the loads powered from MCC 1EMXG and 2EMXH and their panelboards. The NV valve control circuits (1 and 2NV188A, 252A, 189B and 253B) are the only unit related loads supplied from these buses. These control circuits will be moved to unit related power sources from the same units as the associated valves. This was an isolated case in which the NV control circuits were not assigned to the proper unit panelboard.

15. A Work Request was written to investigate/repair 1BB-57B.

16. A NSM was issued to provide Control Room annunciator on high YV temperature.

17. An Operator Update was issued to all shift personnel describing the events of this incident.

SAFETY ANALYSIS

The onsite diesel generators provide class 1E power to specified equipment in the event that the normal system power becomes unavailable. The system functioned as designed when power was lost to the essential switchgear by automatically starting, loading, and operating until normal system power could be restored. Therefore, Operations had the capability to safely shut the plant down if the need had arisen.

The failure of valve 1BB-57B to close on the CA auto-start did not affect steam generator levels during this incident. Also, subsequent Health Physics' samples of the S/Gs showed that there was no release of the sodium isotope due to the start of CA Pump #1.

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

DUKE POWER COMPANY
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HAL B. TUCKER
VICE PRESIDENT
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November 21, 1985

Document Control Desk
U. S. Nuclear Regulatory Commission
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 to Licensee Event Report 413/85-51 concerning an inadvertent blackout during a diesel generator operability test. 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

cc: Dr. J. Nelson Grace, Regional Administrator
U. S. Nuclear Regulatory Commission
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