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SUBJECT: LER 89-011-00:on 890618,Tech Spec 3.7 violated as result of defective procedure.

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DUKE POWER

July 24, 1989

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

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
LER 269/89-11

Gentlemen:

Pursuant to 10CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report (LER) 269/89-11 concerning Keowee being accidentally removed from availability.

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(V)(D), 10 CFR 50.72 (b)(2)(iii)(D). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

M. S. Tuckman
Station Manager

SWB/ftr

Attachment

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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)
Oconee Nuclear Station, Unit 1	0 5 0 0 0 2 6 9	1 OF 0 9

TITLE (4) Technical Specification 3.7 Was Violated as a Result of a Defective Procedure

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 6	1 8	8 9	8 9	- 0 1 1	- 0 0	0 7	2 4	8 9	Oconee, Unit 3	0 5 0 0 0 2 8 7
										0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)					
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)		
		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)		
		20.405(a)(1)(ii)	50.36(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)(x)			

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Henry Lowery, Chairman/OSRG	8 0 3 8 8 5 1 - 1 3 0 3 4

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)	NO				

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

On June 18, 1989, at 1300 hours, with Unit 1 and 3 at 100% full power and Unit 2 in a refueling outage, both independent emergency on-site power paths from Keowee were unintentionally removed from service for approximately 20 minutes while performing PT/2/A/0610/01J, "EPSL ES Actuation Keowee Emergency Start Test". This was a violation of Technical Specification 3.7. This condition was discovered by a Shift Supervisor questioning action steps in the procedure that appeared to be in error. The root cause of this event was determined to be a defective procedure due to erroneous information. Corrective actions included correcting the defective procedure and completing the test.

BACKGROUND

The Keowee Emergency Start Logic at Oconee provides a signal to the start circuits of both Keowee hydro units [EIIS:EK] in the event the normal and startup power sources are not available and/or an Engineered Safeguards (ES) [EIIS:JE] signal is present. The Keowee hydro units will automatically start upon receipt of an emergency start signal from the emergency start relay.

Any of the following will energize the Keowee hydro emergency start relay from any Oconee unit:

1. A Main Feeder Bus (MFB) [EIIS:EA] Monitor undervoltage signal for both MFBs. These signals are the result of either:

   a. Undervoltage on two out of three phases of both MFBs for 20 seconds.
   b. A load shed signal.

2. An Engineered Safeguards signal.

3. A switchyard isolation signal.

4. Manual operation of a separate emergency start switch in each unit's control room.

5. Manual operation of a key switch in each unit's cable room.

Technical Specification (TS) 3.7.1 (b) states that two independent on-site emergency power paths shall be operable and shall consist of: (1) one Keowee hydro unit through the underground feeder path to transformer [EIIS:XFMR] CT-4, (2) the second Keowee hydro unit through the overhead path to the 230 kV switching station at Oconee which supplies each unit's Startup transformer.

Specification 3.7.2 (a) states "One of the two independent on-site emergency power paths, as defined in 3.7.1 (b), may be inoperable for periods not exceeding 72 hours for test or maintenance, provided the alternate power path is verified operable within one hour of the loss and every eight hours thereafter".

Specification 3.7.6 states "In the event that all conditions of Specification 3.7.1 are met, and planned tests or maintenance are required which will make both Keowee units unavailable, the 4160 volt Standby Buses

shall first be energized by a Lee gas turbine through the 100 kV transmission circuit and shall be separate from the system grid and offsite non-safety-related loads. The reactor shall then be permitted to remain critical for periods not to exceed 72 hours with both Keowee units unavailable".

Specification 3.7.7 states "In the event that all conditions of Specification 3.7.1 are met except that both Keowee hydro units become unavailable for unplanned reasons, the reactor shall be permitted to remain critical for periods not to exceed 24 hours provided the 4160 volt Standby Buses are energized within 1 hour by the Lee gas turbine through the 100 kV transmission circuit and it shall be separate from the system grid and all offsite non safety-related loads".

Specification 4.6.4 states "During each refueling outage, a simulated emergency transfer of the 4160 volt Main Feeder Buses to the Startup transformer (i.e., CT-1, CT-2, or CT-3) and to the 4160 volt Standby Buses shall be made to verify proper operation".

The Emergency Power Switching Logic (EPSL) [EIIS:EK], in conjunction with its associated circuits, provides a means for assuring that power is supplied to the MFBs and therefore to the essential plant loads under accident conditions. The EPSL monitors the normal and emergency power sources and upon loss of the normal power source, the EPSL will seek an alternate source of power. The first priority as the alternate power source is the unit Startup transformer powered from the plant switchyard. The second is from an emergency power source, the first Keowee hydro unit, via the 230 kV overhead feeder through the Startup transformer. In the event the startup source is not available, the EPSL will select the Standby Bus as the alternate power source with power provided from an emergency power source, the second Keowee hydro unit, via the 13.8 kV underground feeder. If none of the alternate power sources are available, the EPSL waits until power is available at one of the sources and then selects that source as the emergency power supply.

PT/2/A/0610/01J, "EPSL ES Actuation Keowee Emergency Start Test", is performed each refueling outage while the unit is at Cold shutdown. The purpose for this Performance test is to verify that the Keowee unit which is tied to the underground feeder path will emergency start and supply load to the MFBs on ES actuation and loss of the startup source. This test also verifies that non-essential loads trip from the load shed signal.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Oconee Nuclear Station, Unit 1	0 5 0 0 0 2 6 9	8 9	— 0 1 1	— 0 0	0 4 OF 0 9

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

EVENT DESCRIPTION

From 1972 until 1980, TS 4.6.4 was verified by PT/2/A/0610/01F, "EPSL Keowee Feeder Breaker Closure Channels A and B". In 1980, this emergency transfer was verified by implementing a new test procedure PT/2/A/0610/01J, "EPSL ES Actuation Keowee Emergency Start Test" and PT/2/A/0610/01F was subsequently deleted per this new procedure. In this new test procedure, the unit's auxiliaries were transferred to the CT transformer by performing a dead-bus transfer per Operating procedure OP/0/A/1107/3, "100 kV Power Supply". Later revisions of PT/2/A/0610/01J incorporated the steps of performing this dead-bus transfer from OP/0/A/1107/3 as an enclosure in efforts to make the test procedure stand alone. However, further investigation revealed that when the steps for the dead-bus transfer were incorporated into the Performance test, extra steps of opening the SK breakers while their transfer switches were in manual were added. These action steps contained an evolution which violated TS 3.7. It should be noted that these procedures were cross-disciplinary reviewed by the Operations section, but the discrepancies were not noticed.

On June 18, 1989, Channel "A" of PT/2/A/0610/01J was being performed on Unit 2. The initial conditions of this test called for Unit 2's Main Feeder Buses (MFB) to be powered from the Startup (CT-2) transformer and for inhibiting the Keowee unit tied to the overhead power path thus rendering the overhead emergency path inoperable. An undervoltage signal on the MFBs was then simulated by opening the switchyard Power Circuit Breakers (PCB) supplying the Startup transformer (PCBs 26 and 27) simultaneous with a manual actuation of ES channels 1 or 2 to cause a Keowee emergency start and loadshed of non-essential equipment. After Keowee was emergency started and had powered up the unit loads through CT-4 to the Standby Buses, Operations was requested to do a dead bus transfer back to CT-2 transformer after the loadshed signals were reset. While doing the dead bus transfer per Enclosure 13.3 of PT/2/A/0610/01J, the SK1 and SK2 (CT-4 Standby Bus numbers 1 and 2 Feeder Breakers) AUTO/MANUAL transfer switches were placed in manual and opened. This evolution caused the second independent on-site emergency power path as stated in TS 3.7.1 (b) to be inoperable for automatic initiation. This violated TS 3.7 for all Oconee units. At the time that both SK breakers were opened, the TS violation was not noticed by either Operators or Performance personnel performing the test. This situation was later noticed by a Unit 3 Shift Supervisor who questioned the positions of the SK breakers due to statalarms received in the Unit 3 control room. After an investigation into Technical Specifications by Operations personnel, it was determined that both Keowee emergency power paths had been inoperable for 21 minutes. It was then realized that the test, as written, could not be completed and comply with TS 3.7.

After Enclosure 13.3 was completed and the Keowee emergency start signal reset, the loads on the 4160 volt switchgear were recovered. Following these actions, the AUTO/MANUAL transfer switches for the SK1 and SK2 breakers were returned to automatic. This returned one on-site emergency power path back to service and ended the TS violation.

PT/2/A/0610/01J was then continued for Channel "B", however, steps in Enclosure 13.3 were performed out-of-sequence to prevent the on-site emergency power paths from becoming inoperable again due to having the SK breaker transfer switches in manual while they were open.

It should be noted that uncertainty concerning application of this event to the quoted sections of TS 3.7 led to a delay of several days in determining reportability. Shift operating personnel first decided that a violation had occurred in regard to the SK breakers as "functional units" in TS Table 3.7-1 per TS 3.7.2 (b). However, this interpretation of Table 3.7-1 was found to be inappropriate. TS 3.7.7 then appeared to apply and to be satisfied, depending upon the definition of "unplanned reasons". On June 23, 1989, the event was determined to be reportable under 10CFR50.72&73 on the basis of exceeding the requirements of TS 3.7.2 (a), and the NRC was notified.

TS 3.7.9 also addresses reporting when the requirements of TS 3.7.2 or 3.7.6 are exceeded. However, TS 3.7.9 applies only to cases in which the requirements will continue to be exceeded during subsequent operation.

CONCLUSIONS

It was discovered during this investigation that PT/2/A/0610/01J, since its existence in 1980, has always had both SK breaker transfer switches in manual and open during the dead bus transfer for a brief time period. Before the existence of PT/2/A/0610/01J, the emergency transfer of power to the Standby Buses, as described in Technical Specification (TS) 4.6.4, was verified by PT/2/A/0610/IF, "EPSL Keowee Feeder Breaker Closure Channel A and B". In this test only one SK breaker was opened and in manual at a time. This was an acceptable evolution which did not render both independent emergency on-site power paths inoperable simultaneously. Subsequent investigation revealed that erroneous information was added to PT/2/A/0610/01J during the transfer of steps from the Operating procedure which were necessary to perform the dead-bus transfer. Therefore, it is concluded that the root cause of this event was a defective procedure due to erroneous information. It should be noted that the procedure deficiencies described during the dead-bus transfer also existed in Units' 1 and 3 Performance tests.

A review of events during the past year revealed that two other similar incidents had occurred where a Technical Specification violation had occurred with a root cause of a defective procedure. Licensee Event Report (LER) 270/89-01 involved a violation of TS 3.7 regarding the underground emergency power path from Keowee hydro being rendered inoperable due to a defective procedure. This defective procedure stemmed from a previous response to a corrective action of LER 269/88-13. Corrective action 4.2.1 of this LER revised Operating procedure to ensure its compliance with TS 3.7 but it did not include revising or reviewing any other sections' procedures or tests for compliance with the electrical TS. Therefore, this corrective action would have not prevented this event from occurring. LER 269/89-05 involved a violation of TS 3.4.5 regarding the Emergency Condenser Cooling Water (ECCW) system [EIIS:BS] being inoperable due to a defective procedure. The corrective actions resulting from LER 269/89-05 would not have prevented this event because they referenced doing a comparison of valve checklists to check for missing valves.

It should be noted that contributing to this event and the above events was the complication and misunderstanding of TS 3.7 and of the Emergency Power Switching Logic (EPSL) system. As a result of these misunderstandings and complicated nature of TS 3.7, a Task Force was formed to review TS 3.7. This Task Force will consist of Design Engineering, General Office Licensing, General Office Maintenance, and Station personnel. Duke Power is performing a Self Initiated Technical Audit (SITA) of the EPSL system which will be completed in 1989. Also, Design Engineering has developed a Design Basis Documentation Analysis which is a project that will review all Safety Related and TS related systems at Oconee. From this analysis, Design Engineering will prepare a Design Basis Manual which will be issued as a controlled document. This manual will provide a means to ensure that all scenarios are reviewed prior to issuing and revising procedures, therefore minimizing the number of inadequate procedures.

There were no radiation exposures, radioactive releases, or injuries associated with this event. The health and safety of the public were not compromised. This incident did not involve any component failure; therefore, it is not NPRDS reportable.

CORRECTIVE ACTIONS

Immediate

1. PT/2/A/0610/01J was stopped after the Channel "A" portion was completed and after it was realized that a Technical Specification had been violated.

Subsequent

1. Steps in the Channel "B" test of PT/2/A/0610/01J were performed out-of-sequence to eliminate taking both SK breaker transfer switches to manual with both breakers open simultaneously.

Planned

1. Operations, Performance, and Design Engineering will review EPSL testing procedures and revise them as necessary to ensure that emergency power paths will not be rendered inoperable due to testing evolutions.

2. Station Management will have all applicable sections review all emergency power procedures to ensure compliance with Technical Specification 3.7.

SAFETY ANALYSIS

If both SK breakers are open with their respective AUTO/MANUAL transfer switches in manual while the Keowee overhead path is inhibited, potential scenarios exist where essential station auxiliaries may not receive sufficient power (reference enclosure 3). In order to assess the impact of this evaluation, various scenarios need to be addressed.

1. Loss of Coolant Accident/Loss of Offsite Power (LOCA/LOOP)

In the event of a LOCA on one unit simultaneously with a LOOP, the Oconee units will trip and the switchyard will try to align itself to provide power from the Keowee overhead path through the Startup transformer and the E breakers. Simultaneous with this action, the generated Engineered Safeguards (ES) signal starts the Keowee hydro unit which is not inhibited. The Emergency Power Switching Logic (EPSL) would first seek power from the startup source but none would be available because the switchyard would be isolated and because the Keowee unit tied to the overhead is inhibited. The EPSL would then seek power from the Standby Bus. During normal situations, the Keowee unit from the underground feeder path would have powered up the Standby Buses; however, since this scenario has both SK breakers open with their transfer switches in manual and because the Keowee unit tied to the underground can not generate to the overhead path with an emergency start signal, no power would be available from this

source either. At this time, the EPSL has exhausted all automatic functions to restore power to the Main Feeder Buses (MFB); therefore, manual operator action is the only alternative to restore voltage to the MFBs.

To mitigate the consequences of this scenario, the operator must recognize the loss of voltage condition and take appropriate actions to align an acceptable power source to the Standby Buses. The operator has three alternatives for restoring power to the Standby Bus. One is to take the SK breaker for the underground feeder and place its transfer switch to automatic allowing it to close into the Standby Bus. The second is to close in the SL (Lee) breakers thus supplying power to the Standby Bus through CT-5 and the Central Switchyard. It is recognized that this is not an "acceptable" offsite power source due to its lack of degraded grid protection but it is allowed by AP/1700/11, "Loss of Power" procedure as a last resort to restoring power to the MFBs if all other alternatives have been exhausted. The third option would be to call the Keowee operator and instruct him to take the Keowee unit tied to the overhead path out of inhibit allowing the retransfer to Startup source to occur. The expected response time of these manual operator actions can not be predicted with any degree of accuracy. It is expected that this action will take place quickly due to the operators ability to promptly recognize a loss of voltage condition. If fuel damage were to occur, it would still be bounded by Final Safety Analysis Report (FSAR) Section 15.15 (Maximum Hypothetical Accident) which states the gross release of fission products from the core to the environment will be well below the limits of 10CFR100.

2. LOCA

During a LOCA, the Oconee unit will trip and the switchyard will align itself to provide power from the system grid through the Startup transformer and the E breakers. Simultaneous with this action, the generated ES signal starts the Keowee hydro units in case they are needed. In this scenario, the LOCA would have been mitigated as designed and be bounded by FSAR Section 15.14.

If a single failure had been present that prevented the affected unit from receiving power from the system grid thru its startup transformer simultaneously with a LOCA while the SK breakers were open with their transfer switches in manual, the result would be the same as the LOCA/LOOP scenario described above. Therefore, manual operator action would be required to restore power to the MFBs.

3. LOOP

In the event of a LOOP, the Oconee units will trip and both Keowee hydro units will start as a result of the switchyard isolation signal. The switchyard will try to align itself to provide power from Keowee via the overhead path through the Startup transformers and the E breakers. However, since the Keowee unit connected to the overhead path is inhibited from starting, the EPSL will sense no voltage from this path. After a 20 second time delay, the Main Feeder Bus Monitor Panel (MFBMP) logic will look at the Standby Bus for voltage. Because both SK breakers are open with their transfer switches in manual, the Standby Bus will have no voltage either. Therefore, the situation would be the same as that of the LOCA/LOOP scenario above where manual operator action would be required to restore power to the MFBs. The operator, in this scenario, has four choices of restoring power to the Standby Bus. These are using the SL breakers and the Central Switchyard, putting the SK breaker's transfer switch tied to the underground feeder path in automatic, aligning the Lee gas turbines to the Standby Bus, or instructing the Keowee hydro operator to place the Keowee unit tied to the overhead out of inhibit allowing the retransfer to startup source to occur. The third choice is allowed in this scenario because FSAR Section 15.8.3 states that in the event of a loss of power, with the Turbine Driven Emergency Feedwater Pump (TDEFWP) [EIIS:BA] and the gravity flow of the Emergency Condenser Cooling Water (ECCW) available, core protection is ensured.

It needs to be recognized that the accidents described above are of extremely low probability especially considering the infrequent use of PT/2/A/0610/01J, "EPSL ES Actuation Keowee Emergency Start Test", and since the duration that both Keowee units were inoperable during the test was brief. Therefore, the health and safety of the public was not affected by this condition and corrective actions have been taken to ensure that this condition will not recur.