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SUBJECT: LER 88-003-03:on 880311,repetitive violation of ESF instrumentaion LCO tolerances.

W/8 ltr.

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July 18, 1989

United States Nuclear Regulatory Commission
Document Control Desk
Rockville, Maryland 20852

Operating License DPR-74
Docket No. 50-316

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Reporting System, the following report is being submitted:

88-003-03

Sincerely,

W. G. Smith, Jr.
Plant Manager

WGS:clw

Attachment

cc: D.H. Williams, Jr.
A.B. Davis, Region III
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NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
D. C. COOK NUCLEAR PLANT - UNIT 2	0 5 0 0 0 3 1 6	1 OF 0 4

TITLE (4) REPETITIVE VIOLATION OF ESF INSTRUMENTATION LIMITING CONDITIONS FOR OPERATION TOLERANCES DUE TO HIGHLY RESTRICTIVE ALLOWABLE VALUES

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 3	1 1	8 8	8 8	— 0 0 3	— 0 3	0 7	1 8	8 9	D.C. COOK - UNIT 1	0 5 0 0 0 3 1 5
										0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 8 0	20.402(b)	20.405(c)	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)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 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
T. P. BEILMAN INSTRUMENTATION AND CONTROL DEPARTMENT SUPERINTENDENT	AREA CODE 6 1 6 — 4 6 5 - 5 9 0 1

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)

This revision is being submitted to reflect an update on the results of the increased frequency calibration checks performed to date

On March 11, 1988 an equipment trend investigation was being performed on 4KV Bus Loss of Voltage relays and the 4KV Bus Degraded Voltage relays (EIIS/EK-27). The 'as found' condition of these relays during past calibration checks has generally been found to be beyond the Technical Specification (T.S.) allowable values. Each relay was adjusted to within allowable values at the time it was discovered out of specification. All relays were functional and would have performed the ESF function, although at a slightly different voltage than specified in T.S.

An engineering review has determined a plus or minus 3 percent tolerance (as opposed to the current 0.5 percent) to be acceptable for the Loss of Voltage application. The Degraded Voltage application will accept a plus or minus 1.5 percent tolerance and will require installation of more accurate undervoltage relays (Design Change currently underway). A T.S. change request has been submitted. As stated in the original LER, we have increased the calibration frequency from every eighteen months to monthly.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
D. C. COOK NUCLEAR PLANT - UNIT 2	0 5 0 0 0 3 1 6	8 8	— 0 0 3	— 0 3	0 2 OF 0 4

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

This revision is being submitted to reflect an update on the results of the increased frequency calibration checks performed to date.

Conditions Prior To Occurrence

Unit 1 and Unit 2 were operating at 90 percent and 80 percent reactor thermal power, respectively, throughout the event. There were no inoperative structures, components, or systems that contributed to this event.

Description of Event

On March 11, 1988, an equipment trend investigation was being performed on the 4KV Bus Loss of Voltage relays (EIIS/EK-27) and the 4KV Bus Degraded Voltage relays (EIIS/EK-27). The setpoints for these relays have been found to be outside of the Technical Specification (T.S.) allowable values (T.S. 3.3.2.1 Table 3.3-4, items 8a and 8b). Of 144 individual calibrations on the loss of voltage relays over a seven year period, 68 were found to be outside of the T.S. tolerances. Of the 66 individual calibrations performed on the degraded voltage relays over a seven year period, 41 were found to be outside of the T.S. tolerances. The amount of deviation from the allowable setpoint band was limited and distribution among the relays was random, indicating no particular relay to be defective. A survey of other utilities which use this type of relay revealed that the performance of our relays is consistent with their experience and within manufacturer's specifications. Each relay was readjusted to within allowable values at the time it was discovered out of specification.

The Loss of Voltage relays are installed to sense a loss of offsite or normal auxiliary power to the ESS 4KV buses. Once the loss of voltage has been sensed and after a two-second time delay, these relays in a 2/3 phases logic initiate load shedding and emergency diesel generator starting. The Degraded Bus Voltage relays are installed to sense degraded reserve power feed to the ESS 4KV buses and , on a 2/3 phases logic with a two-minute time delay, trip open the reserve feed breakers and start the emergency diesel generators. Once the emergency diesel generator has restored bus voltage to normal, safety loads are sequenced on to the safety buses. The Technical Specifications for Units 1 and 2 have existing setpoints of 80 percent (+.5 %, -1.0%) for the Loss of Voltage and 90 percent (+1.0%, -.5%) for the Degraded Grid detection. The tolerance on these setpoints are closer than the relays can obtain, and more importantly, closer than normal voltage, initiating load shedding, and diesel starting.

Cause of the Event

Calibration history shows a performance record in line with undervoltage relays used at other plants. We have reviewed the application of undervoltage relays for this function with other utilities and various relay manufacturers.

We have concluded that the undervoltage relays are being properly applied in this mode as a conventional protective relay. This use would not normally involve having an acceptance band. Many utilities consulted had no Technical Specification required tolerances for this function and others had broader allowance values which more closely reflect the manufacturer's expected performance tolerances.

Analysis of Event

American Electric Power's System voltage studies have been performed and indicate that the worst case voltage on the ESS buses at the Cook Nuclear Plant would be 87.3 percent. We do not expect the ESS bus voltage to drop to a lower voltage than this unless a complete plant blackout condition occurred. Under a blackout condition, the ESS bus voltage would quickly drop well below the 80 percent undervoltage relay setpoint and initiate load shedding and diesel start. The only function of the 80 percent voltage relays is to sense a total loss of ESS bus voltage. Therefore, the setpoint deviations we've experienced translate into a different line voltage and time than the Technical Specification calls for, but the time involved for this additional voltage drop is insignificant.

The function of the degraded bus relays are to disconnect the plant from the grid for a sustained degraded condition, i.e., less than 90 percent voltage for at least two minutes. They are armed only when the plant is fed from offsite power. Plant normal configuration is to be fed from the generator auxiliary transformers except for short periods during startup and shutdown. Therefore, these relays are not normally active during unit operation.

Again, relating to our system studies, we do not believe the slight out of tolerance to be a safety problem for the degraded bus relays. Our studies indicate that the lowest possible offsite voltage to our buses would be 93.3 percent except for the short period during Reactor Coolant Pump (RCP) starting, which is less than one minute. During RCP starting, the bus voltage can dip to 87.3 percent, however, we are protected from an unnecessary trip by the two-minute time delay on this circuit.

An engineering review has determined a plus or minus 3 percent tolerance (as opposed to the current 0.5 percent) to be acceptable for the Loss of Voltage application. Most of the calibration history data is within 3 percent of the required setpoint. The few exceptions are considered normal random failures. The Degraded Voltage application will accept a plus or minus 1.5 percent tolerance. This value is suitable for the installation of more accurate undervoltage relays.

Based on the above, it has been concluded that there is no jeopardy to the health and safety of the public as a result of this event.

Corrective Action

The relays were recalibrated to within the allowable values at the time of discovery during the calibration. In addition, all of the relays were recalibrated from April 7-9, 1988. Out of the 36 relays for Units 1 and 2, eleven were found out of specification. Unit 1's were last calibrated in July 1987 and Unit 2's were calibrated in February 1988. An engineering review has determined a plus or minus 3 percent tolerance to be acceptable for the Loss of Voltage application and a plus or minus 1.5 percent tolerance for the Degraded Voltage application. A Technical Specification change request has been submitted. In addition, a Design Change regarding the replacement of the currently installed Degraded Voltage relays with more accurate relays is scheduled to be completed at the next refueling outages for both units. As stated in the original LER, we have increased the calibration frequency from every eighteen months to monthly until the trend indicates a different frequency is justified.

Monthly calibration checks have yielded the following results to date:

4KV Loss of Voltage	-	240 calibrations 19 failures	-- 7.9 percent
4KV Degraded Voltage	-	120 calibrations 23 failures	-- 19 percent

Failed Component Identification

None.

Previous Similar Events

LER 316/81-015
LER 315/81-017
LER 315/82-051
LER 315/82-059
LER 316/82-100
LER 316/82-108
LER 315/83-069
LER 315/83-094