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December 14, 1989

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U. S. Nuclear Regulatory Commission
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SUBJECT: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Licensee Event Report No. 50-368/89-022-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(iv), attached is the subject report concerning inadequate post maintenance test controls which resulted in deenergizing a 4160 VAC Engineered Safety Features electric bus unexpectedly while performing post maintenance testing on an auxiliary relay.

Very truly yours,

James J. Fisicaro

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General Manager,
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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)
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TITLE (4) Inadequate Post Maintenance Test Controls Resulted in Deenergizing a 4160 VAC Engineered Safety Features Electric Bus Unexpectedly While Performing Post Maintenance Testing on an Auxiliary Relay

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)
1 1	1 4	8 9	8 9	0 2 2	0 0	1 2	1 4	8 9		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)					
POWER LEVEL (10)	0 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)(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)
Dana Miller, Nuclear Safety and Licensing Specialist	5 0 1 9 6 4 - 3 2 0 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

SUPPLEMENT 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 November 14, 1989, maintenance personnel initiated a post maintenance test, using instructions in a maintenance job order, to simulate an undervoltage on a 480 VAC Engineered Safety Features (ESF) Motor Control Center (2B5) by placing a jumper across the 2B5 undervoltage relay contacts. Immediately following this step, the normal offsite power feeder breaker to the associated 4160 VAC ESF bus (2A3) unexpectedly opened resulting in the loss of power to 2A3. The electrical bus deenergized as designed. The test steps provided in the job order did not identify that 2A3 would deenergize as part of the test. When 2A3 was deenergized, a Low Pressure Safety Injection (LPSI) pump, which was supplying flow for decay heat removal and a Service Water pump deenergized. A standby LPSI pump powered from the redundant 4160 VAC ESF electrical bus was started in approximately one minute and flow reestablished. Since the plant had been shutdown for several days prior to this event, the reactor decay heat levels were low and the momentary interruption of flow did not result in any significant Reactor Coolant System temperature or pressure increases. The test was reevaluated and satisfactorily completed. The root cause of this event was determined to be inadequate post maintenance test controls. An evaluation of the controls that are in place will be performed and the appropriate station procedures revised to reflect the results of the evaluation. This event is reportable pursuant to 10CFR50.73(a)(2)(iv).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

A. Plant Status

At the time of occurrence of this event Arkansas Nuclear One, Unit Two (ANO-2) was in Mode 5 (Cold Shutdown). Reactor Coolant System (RCS) [AB] temperature was approximately 178 degrees Fahrenheit and RCS pressure was about 250 psia. The seventh refueling outage (2R7) for ANO-2 commenced September 25, 1989 and ended November 22, 1989.

B. Event Description

During refueling outage 2R7, detailed as-built wiring verification inspections of several Control Room cabinets were performed by engineering personnel. On November 10, 1989, it was discovered that an auxiliary relay (27-1X/2B5), actuated by undervoltage relays which monitor voltage on a 480 VAC Engineered Safety Features (ESF) Motor Control Center (MCC) (2B5), was not correctly wired.

MCC 2B5 receives power from a 4160 VAC ESF electrical bus (2A3), which is normally energized by the stations offsite power system. In the unlikely event of a loss of offsite electrical power or degraded offsite power voltage conditions, the offsite power source is automatically disconnected and an Emergency Diesel Generator (EDG) [EK] (2K4A) is started to supply 2A3 and 2B5 with power. These functions (opening of offsite power feeder breaker and EDG start) are initiated by the 2B5 bus undervoltage relays which upon detection of a low voltage condition actuate to energize auxiliary relay 27-1X/2B5. When the auxiliary relay is energized it functions to close contacts in each of two redundant automatic starting circuits for the associated EDG and to provide an open signal to the normal offsite electrical feeder breaker to 2A3 (2A309). During the wiring inspection, it was found that one of the contacts on 27-1X/2B5 which provides one of the redundant EDG automatic starting circuits was not wired into the circuit as indicated on the applicable design drawings. Upon a request by engineering, a job order was issued and the wiring discrepancy corrected. To ensure the wiring was correctly performed, engineering personnel were contacted to provide recommendations for testing the circuit.

The testing method, decided upon between engineering, maintenance and operations was included in the maintenance job order, which was used to correct the wiring error, to provide the necessary steps to perform the test. The proposed test included placing the start handswitch for 2K4A in the pull-to-lock position to prevent actual starting of the EDG and verifying both of the redundant EDG emergency start relays would energize when an undervoltage condition was simulated on 2B5.

At approximately 0245 hours on November 14, 1989, maintenance personnel initiated the test by placing a jumper across the 2B5 bus undervoltage relay contacts to simulate undervoltage on the bus. Immediately following this step, the normal offsite power feeder breaker (2A309) to the 4160 VAC ESF bus unexpectedly opened resulting in loss of power to bus 2A3. Since the handswitch for 2K4A was in a pull-to-lock position, the EDG did not automatically start to provide electrical power for 2A3 and its associated loads. When power was lost to 2A3, a Low Pressure Safety Injection (LPSI) pump [BP-P], which was supplying the shutdown cooling system (SDC) for decay heat removal, and a operating Service Water (SW) pump [BI-P] deenergized as designed.

Operations personnel restored SDC flow in approximately one minute by starting a standby LPSI pump powered from the redundant 4160 VAC ESF electrical bus. Bus 2A3 was reenergized in approximately three minutes from offsite power by reclosing breaker 2A309 and the SW pump restarted.

An evaluation of the event was conducted and it was determined that personnel developing and reviewing the test instructions failed to recognize that auxiliary relay 27-1X/2B5 was also used to automatically open the offsite power feeder breaker (2A309) to bus 2A3 and therefore, performance of the test as written would result in deenergizing the electrical bus.

C. Safety Significance

Electrical bus 2A3 deenergized as designed when the undervoltage condition was simulated on 2B5. Since the plant had been shutdown for several days prior to this event, core decay heat levels were low. The unexpected loss of decay heat removal flow did not result in any significant increase in RCS temperature or pressure.

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TEXT (If more space is required, use additional NRC Form 366A's) (27)

The loss of the Service Water pump resulted in the associated EDG being inoperable until the pump was returned to service. However, the EDG was already prevented from automatically starting by placing the EDG start handswitch in pull-to-lock as directed by the test in the job order.

As a result of this event, there were no significant safety concerns.

D. Root Cause

The root cause of this event was determined to be inadequate post maintenance test controls. The steps necessary to perform the post maintenance testing were determined by engineering personnel and it was decided to implement the test by including the test instructions in the maintenance job order used to correct the wiring problem. A formal technical review (e.g., independent review) of the testing steps was not performed prior to performing the activity.

E. Basis for Reportability

This event is being reported pursuant to 10CFR50.73(a)(2)(iv), as an unplanned actuation of an ESF system.

A 10CFR50.72(b)(2)(ii) notification to the NRC was made on November 17, 1989 at 0050 hours.

F. Corrective Actions

A test switch located in the electrical trip circuit for 2A309 should have been opened to preclude the inadvertent tripping of the breaker and loss of power to 2A3. The job order instructions were changed to include this test switch and the test was performed satisfactorily with no further unexpected events.

An interim memorandum is currently being prepared to require an impact statement on significant post maintenance tests, implemented by job orders. The memorandum will be issued by December 19, 1989. A procedure revision and training on the revision will be completed by January 15, 1990.

As a long term corrective action, an evaluation of the controls of the post maintenance testing that are currently in place will be performed. Necessary revisions to the appropriate station procedures identified by this evaluation will be made. The evaluation and implementation of the findings are expected to be completed by March 1, 1990.

G. Additional Information

A similar event due to inadequate work controls was reported in LER 50-313/88-023-00.

The 10CFR50.72 notification was not made in a timely manner following occurrence of the event due to a lack of understanding that the unplanned opening of the offsite power feeder breaker to the 4160 VAC ESF electrical bus should be considered an ESF actuation. Prior to this event, Arkansas Power and Light Company did not consider that the actuation of this auxiliary relay should be considered an ESF actuation and was, therefore, not reported under 10CFR50.72 or 10CFR50.73 reporting criteria.

To enhance the current process used in evaluating events or plant conditions for reportability, additional guidance will be provided by Plant Licensing to Operations personnel regarding 10CFR50.72 notifications. Additionally, training will be provided for Operations personnel on 10CFR50.72 reporting criteria. This training will be completed by June 22, 1990.

Energy Industry Identification System (EIIS) codes are included in the text as [XX].