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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 50-368/2002-002-00

Dear Sir or Madam:

In accordance with 10CFR50.73(a)(2)(iv)(A), enclosed is the subject report concerning actuation of the Reactor Protection System. The enclosure contains no commitments.

Sincerely,

Sherrie R. Cotton
Director, Nuclear Safety Assurance

SRC/tfs

enclosure

cc: Mr. Ellis W. Merschoff
Regional Administrator
U. S. Nuclear Regulatory Commission
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NRC FORM 366 (1-2001)						U.S. NUCLEAR REGULATORY COMMISSION						APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2001 Estimated burden per response to comply with this mandatory information collection request: 50 hours. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOF-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503.							
LICENSEE EVENT REPORT (LER)																			
FACILITY NAME (1) Arkansas Nuclear One - Unit 2												DOCKET NUMBER (2) 05000368				PAGE (3) 1 OF 3			
TITLE (4) Automatic Actuation of the Reactor Protection System Caused by a Main Turbine Trip due to Failure of the Main Generator Reverse Power Relay Resulted in a Reactor Trip																			
EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)										
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME				DOCKET NUMBER						
12	19	2002	2002	002	00	02	10	2003	FACILITY NAME				DOCKET NUMBER						
OPERATING MODE (9)		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)																
POWER LEVEL (10)		100	20.2201(b)			20.2203(a)(3)(i)			50.73(a)(2)(i)(C)				50.73(a)(2)(vii)						
			20.2201(d)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(A)				50.73(a)(2)(viii)(A)						
			20.2203(a)(1)			20.2203(a)(4)			50.73(a)(2)(ii)(B)				50.73(a)(2)(viii)(B)						
			20.2203(a)(2)(i)			50.36(c)(1)(i)(A)			50.73(a)(2)(iii)				50.73(a)(2)(ix)(A)						
			20.2203(a)(2)(ii)			50.36(c)(1)(ii)(A)			X 50.73(a)(2)(iv)(A)				50.73(a)(2)(x)						
			20.2203(a)(2)(iii)			50.36(c)(2)			50.73(a)(2)(v)(A)				73.71(a)(4)						
			20.2203(a)(2)(iv)			50.46(a)(3)(ii)			50.73(a)(2)(v)(B)				73.71(a)(5)						
			20.2203(a)(2)(v)			50.73(a)(2)(i)(A)			50.73(a)(2)(v)(C)				OTHER						
			20.2203(a)(2)(vi)			50.73(a)(2)(i)(B)			50.73(a)(2)(v)(D)				Specify in Abstract or						
															NRC Form 366A				
LICENSEE CONTACT FOR THIS LER (12)																			
NAME Thomas F. Scott, Nuclear Safety and Licensing Specialist												TELEPHONE NUMBER (Include Area Code) 479-858-4623							
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																			
CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX				CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX							
X	TB	32	G080	N															
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MO	DAY	YEAR			
YES (If yes, complete EXPECTED SUBMISSION DATE)												X	NO						
ABSTRACT (16) A trip of the Main Turbine while operating at 100 percent power resulted in automatic actuation of the Reactor Protection System and a reactor trip. Plant response was uncomplicated and the plant was promptly stabilized in hot standby conditions. The trip resulted from a failure of the Main Generator reverse power relay. The relay had been in service since initial plant construction in the late 1970s. Periodic testing and calibration of the relay had last been performed in 2000. Inspections and testing verified that the relay failure did not result from external conditions. Evidence obtained following the failure did not allow conclusive determination of the root cause, and the relay was sent to the manufacturer for further evaluation. The relay was replaced and the replacement was monitored during the plant startup. There have been no previous similar events at Arkansas Nuclear One.																			

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NARRATIVE (17)

A. Plant Status

At the time this event occurred, Arkansas Nuclear One Unit 2 (ANO-2) was operating in Mode 1 (Power Operation) steady-state conditions at approximately 100 percent power.

B. Event Description

At 0400 CST on December 19, 2002, a Main Turbine [TA] trip occurred. This resulted in automatic actuation of the Reactor Protection System (RPS) [JC] and a reactor trip. All Control Element Assemblies (CEAs) [AA] fully inserted. No actuation of an Emergency Core Cooling System (ECCS) [JE] occurred. Plant response to the trip was uncomplicated and the plant was promptly stabilized in Mode 3 (Hot Standby) conditions.

Troubleshooting revealed that the Main Turbine trip resulted from failure of the reverse power (anti-motoring) relay for the Main Generator [TB]. After the failed relay was replaced, the reactor was critical at 2146 on December 19, 2002. The unit returned to full power operation at 0251 on December 21, 2002.

C. Root Cause

The failed relay was a Model 12GGP53C1A manufactured by General Electric Company (manufacturer code G080). The relay is a sensitive three phase time delay power directional relay designed to provide anti-motoring protection for steam turbine generators upon loss of its prime mover.

The failed relay received a thorough inspection. There was internal damage in the form of metal particles, a broken pivot bearing on the lower rotating element, and a coating of black powder throughout the surfaces inside the relay. A failure mode analysis could not be completed without potentially destructive testing and disassembly. Inspections and tests verified that the failure had not resulted from conditions external to the relay. A review of maintenance history showed that this relay had been in service since initial plant construction in the late 1970s. Industry experience with this model relay indicates that the frequency of significant problems is low. One relay failure in the mid-1990s at another facility was determined to have resulted from a loose clutch mechanism (essentially a set screw). Periodic testing and calibration of this relay was last performed in October 2000.

The root cause of the relay failure is indeterminate pending completion of inspection and testing by the manufacturer.

D. Corrective Actions

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The relay was replaced. The replacement relay was monitored during the subsequent plant startup and performed satisfactorily.

The failed relay is being evaluated by the manufacturer to determine if additional information regarding the root cause of the failure can be obtained.

Based on the industry experience review, applicable procedures will be enhanced by a revision to add specific steps to check for clutch tightness during routine relay tests and calibrations.

E. Safety Significance

The RPS actuated as expected to cause a reactor trip when the Main Turbine tripped. All CEAs fully inserted. There was no ECCS actuation or radioactive release during this event. The electrical grid remained stable and all Emergency Diesel Generators [EK] were operable. The plant was stabilized in hot standby conditions without complications. Therefore, this condition had minimal actual safety significance.

F. Basis for Reportability

Automatic actuation of the RPS is being reported in accordance with 10CFR50.73(a)(2)(iv)(A). A notification of this event was made to the NRC Operations Center in accordance with 10CFR50.72(b)(2)(iv)(B) at 0443 CST on December 19, 2002.

G. Additional Information

There have been no previous similar events reported by ANO as Licensee Event Reports.

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