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2CAN120601

December 21, 2006

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

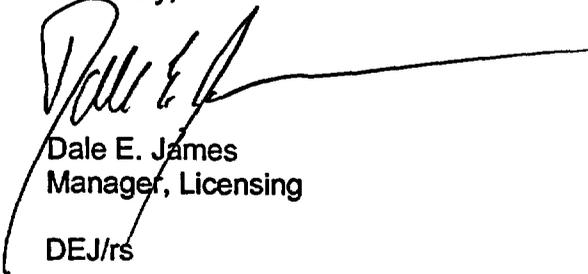
Subject: Licensee Event Report 50-368/2006-001-00
Arkansas Nuclear One – Unit 2
Docket No. 50-368
License No. NFP-6

Dear Sir or Madam:

In accordance with 10CFR50.73(a)(2)(i)(A), enclosed is the subject report concerning completion of a plant shutdown required by Technical Specifications.

Commitments made in this submittal are identified in the attachment to the enclosure.

Sincerely,



Dale E. James
Manager, Licensing

DEJ/rs

Enclosure

IE22

cc: Dr. Bruce S. Mallett
Regional Administrator
U. S. Nuclear Regulatory Commission
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LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Arkansas Nuclear One – Unit 2	2. DOCKET NUMBER 05000368	3. PAGE 1 OF 5
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4. TITLE Completion of a Plant Shutdown Required by Technical Specifications Due to Loss of Motive Power to Certain Containment Isolation Valves as a Result of a Phase to Ground Short Circuit in a Motor Control Cubicle

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	30	2006	2006	- 001 -	00	12	21	2006		05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)									
10. POWER LEVEL 67	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)							
<input type="checkbox"/> 20.2203(a)(2)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER							
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A							

12. LICENSEE CONTACT FOR THIS LER

NAME R.H. Scheide, Nuclear Safety and Licensing Specialist	TELEPHONE NUMBER (Include Area Code) 479-858-4618
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
B	ED	52	I005	Y					

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

At 1925 CST, on October 30, 2006, Arkansas Nuclear One, Unit 2 (ANO-2), initiated a plant shutdown as required by Technical Specifications because certain containment isolation valves were inoperable as a result of loss of their motive power. The reactor was manually tripped at 2134 CST, in accordance with the plant shutdown procedure. Power was lost to the valves at 1238 when the supply circuit breaker for 480 VAC motor control cubicle (MCC) 2B-53 tripped as a result of a bus to ground electrical fault. At 1244, operators dispatched to investigate the breaker trip discovered a small fire in the MCC, which they immediately extinguished. ANO-2 declared an Alert at 1304 due to a fire which affected one train of safety related equipment. Plant conditions remained stable at 67 percent power while the extent of damage was evaluated until 1925, when plant shutdown was initiated to facilitate repairs. The alert was terminated at 2000 on October 30, 2006. Repairs were completed and the unit returned to power operation at 0609 CST, on November 1, 2006. The root cause of this event was determined to be an inadequate MCC design that resulted in improper placement of a circuit breaker in the MCC. One of the three phase stabs did not make up to its associated bus bar correctly, resulting in a high resistance connection that caused melting of the stab's spring clip. An acceptable method for verifying proper stab engagement during breaker installation will be developed and incorporated into appropriate procedures.

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Arkansas Nuclear One – Unit 2	05000368	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 5
		2006	- 001	- 00	

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

A. Plant Status

At the time of this event, Arkansas Nuclear One, Unit 2 (ANO-2) was operating in Mode 1 at approximately 67 percent power. Power ascension to full power was in progress after Refueling Outage 2R18.

B. Event Description

At 1238 CST, on October 30, 2006, the ANO-2 Control Room received several alarms concurrent with the attempted start of Containment Cooling Fan 2VSF-1A [BK]. Investigation revealed that the supply circuit breaker for Motor Control Cubicle (MCC) 2B-53 [EC] had tripped. This MCC supplies power to 2VSF-1A and several additional Technical Specifications (TS) related components (Red Train).

Shortly after the alarms were received, a fire alarm associated with the 2B-53 switchgear room was also received. At 1244, ANO-2 entered abnormal operating procedure OP-2203.034 (Fire or Explosion) due to a report of smoke emanating from the 2B-53 switchgear room. At 1248, operators on the scene reported that the source of smoke was a small fire in MCC 2B-53 and that the fire had been extinguished.

At 1304, ANO-2 declared an Alert Emergency Class based on a fire that affected one train of safety related equipment. Appropriate notifications to offsite organizations, including the NRC, were made, as required.

The loss of the 2B-53 MCC resulted in entry into several TS action statements, the most limiting of which was TS 3.6.3.1, Action D, which requires that an inoperable containment isolation valve be returned to operable status or the associated penetration be isolated within four hours or that the unit be placed in Hot shutdown in six hours and cold shutdown in the following 30 hours. Red train containment isolation valves affected by the loss of MCC 2B-53 were component cooling water supply and return to the reactor coolant pumps, main feedwater block valves, main steam [SJ] isolation valve bypass, and the main steam supply to emergency feedwater [BA] pump 2P-7A.

Other TS Action Statements entered included; TS 3.7.1.2 (red train of emergency feedwater inoperable), TS 3.6.2.3 (red train of containment coolers inoperable), TS 3.7.3.1 (red train of service water [BI] inoperable), and TS 3.8.1.1.b and TS 3.4.4 (#1 emergency diesel generator [EK] inoperable due to loss of its fuel oil transfer pump). As a result of declaring the red train of service water inoperable, the action statements of TS 3.5.2.b (ECCS), TS 3.6.2.1 (Containment Spray [BE]), and TS 3.7.6.1 (Control Room Emergency Ventilation) were also entered.

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

Plant conditions remained stable at approximately 67 percent while the extent of the damage to the MCC was evaluated. At 1925, plant shutdown was initiated as required by TS 3.6.3.1, Action D, in order to facilitate repairs. The Alert was terminated at 2000. The reactor was manually tripped at 2134, in accordance with the plant shutdown procedure. Repairs were completed and the plant was returned to power operation at 0609 on November 1, 2006.

C. Root Cause

The cause of the fire in MCC 2B-53 was determined to be a misalignment of the circuit breaker stabs that connect the 2VSF-1A circuit breaker to the bus bars that resulted in both sides of the "C" phase stab and its associated spring clip ending up on one side of the bus bar, thereby creating a high resistance connection. Subsequent starts of 2VSF-1A likely resulted in arcing which increased the resistance at the connection due to oxidation at the contact points. When an attempt to start 2VSF-1A was made on October 30, the large inrush current of the motor at the high resistance connection caused the spring clip to melt. It cannot be determined if the molten metal from the spring clip caused a fire in the bottom of the MCC which created a conductive vapor in the cabinet or if the clip simply vaporized, creating the conductive environment. Nonetheless, the result was that the conductive vapor created an arc path to ground between the bus bars and the metallic dust pan in the bottom of the MCC, resulting in significant damage to the bus bars. The upstream circuit breaker tripped immediately, terminating the over-current event.

The root cause of this event was determined to be an inadequate design of the MCC (manufactured by ITE), which allows flexing of the cubicle while the circuit breaker is being connected to the bus since alignment guides are installed only on the bottom of the cubicle. Additionally, the insulating barriers between the breaker cubicle and the bus bars are flimsy and the stab cutouts are too large. These factors make it possible to misalign the breaker stabs such that both stab fingers can be positioned on the same side of the bus bar.

A contributing cause of this event was inadequate corrective actions following a previous similar event. The inadequate design of the subject MCCs was identified in a root cause evaluation associated with a similar event in 1991. However, the corrective actions taken subsequent to that event did not, in this case, correct the design deficiency or implement effective procedural controls as a compensatory measure. For example, the procedure used to reinstall the subject circuit breaker in the MCC contains a statement that requires verification "to the best extent possible" that positive connection is made when the breaker is installed. This guidance is vague and was typically interpreted to mean that a voltage check should be performed after breaker installation. This practice would not necessarily identify a misaligned breaker stab.

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

D. Corrective Actions

Corrective actions completed to date include:

- Cleaned and repaired MCC 2B-53. New style insulating barriers of sturdier construction with smaller stab cutouts were installed.
- Tested the affected circuit breakers and associated loads.
- Inspected stab engagement on all ANO-2 MCCs with accessible panel backs. No additional stab engagement issues identified.
- Returned MCC 2B-53 to service.
- A memo was distributed to the electrical and relay shops of both ANO units stating that, until an acceptable stab alignment verification method is established, no circuit breakers will be inserted into energized MCCs. In addition, for those MCCs that are accessible from the rear, stab engagement will be visually verified after breaker installation.

Acceptable methods for verifying bus stab engagement for MCCs which cannot be accessed from the panel back will be developed and incorporated into applicable plant procedures and work instructions. This action is expected to be completed by March 15, 2007, for ANO-1 and June 15, 2007, for ANO-2.

In addition, an evaluation will be completed by March 13, 2007, to determine if the new style insulating barriers, which are of sturdier construction than the original barriers and have smaller stab cutouts, should be installed in all ANO-1 and 2 ITE MCCs to eliminate the potential for stab misalignment during breaker installation activities.

E. Safety Significance

2B-53 is a Class 1E 480 VAC MCC that supplies power to various red train safety related loads. Class 1E electrical systems are designed such that a single failure will not prevent a safety system from performing its design function(s). Throughout this event, the redundant green train safety systems remained operable and capable of ensuring safe shutdown of the plant and maintaining safe shutdown conditions.

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

E. Safety Significance (Continued)

ANO electrical systems are designed to provide protection from extended overload and fault current conditions that could result in significant damage to the plant. During this event, the supply circuit breaker for 2B-53 opened upon sensing the fault current condition, thereby removing the source of energy that was feeding the fire. The fire was completely contained within the MCC and was quickly extinguished.

Considering that redundant safety related systems remained operable and capable of mitigating any design basis event had the need arisen, and that the fire was contained within a single MCC and quickly extinguished, thereby minimizing damage to plant equipment, this event was of minimal safety significance.

F. Basis for Reportability

10CFR50.72(a) requires immediate NRC notification of the declaration of an emergency class.

In addition, 10CFR50.72(b)(2)(i) requires an 8 hour notification regarding the initiation of any nuclear plant shutdown required by the plant's Technical Specifications whereas 10CFR 50.73(a)(2)(i)(A) requires a 60 day report regarding the completion of any nuclear [plant shutdown required by the plant's Technical Specifications.

As this event involved the declaration of an emergency class and the initiation and completion of a plant shutdown required by the plant's Technical Specifications, it is reportable pursuant to the above referenced criteria.

All required reports were made, as required by regulation.

G. Additional Information

A previous similar event was reported by ANO in Licensee Event Report 50-368/1991-007-00. However, the corrective actions implemented in association with that event were not adequate in preventing the event discussed in this report.

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

Attachment

2CAN120601

List of Regulatory Commitments

List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check One)		SCHEDULED COMPLETION DATE (If Required)
	ONE TIME ACTION	CONTINUING COMPLIANCE	
Develop an acceptable method to verify proper bus stab engagement for motor control cubicles which cannot be accessed from the panel back and incorporate into appropriate procedures and work instructions.	X		ANO-1: 3/15/2007 ANO-2: 6/15/2007
Determine if installation of new style insulating barriers in all ANO-1 and 2 ITE MCCs is appropriate.	X		3/13/2007