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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. 50-368/86-003-02

Gentlemen:

Attached is the subject report concerning inoperable fire dampers. This revision to the previous report dated July 21, 1988 (2CAN078805), discusses ANO's plans to discontinue periodic functional testing of fire dampers due to the potential for personnel injury or equipment damage as a result of the testing.

Very truly yours,

James J. Fisicaro

James J. Fisicaro
Manager, Licensing

JJF/GRA/mmg
Attachment

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NRC Form 366 U.S. Nuclear Regulatory Commission (6-89)

Approved OMB No. 3150-0104
Expires: 4/30/92

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4) Inoperable Fire Dampers Result in Technical Specification Violation Due to Failure to Perform Functional Testing Following Installation

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)
									ANO-1	0 5 0 0 0 3 1 3
0 3	1 2	8 6	8 6	-- 0 0 3	-- 0 2	0 2	1 5	9 1		0 5 0 0 0

OPERATING MODE (9)		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)	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
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	Abstract below and
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	in Text, NRC Form
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	366A)

LICENSEE CONTACT FOR THIS LER (12)

Name	Telephone Number (Area Code)
Glenn R. Ashley, Nuclear Safety and Licensing Specialist	5 0 1 9 6 4 - 3 1 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	
B	V F	B D M P	A 3 4 0	N							
B	V F	B D M P	R 4 1 1	N							

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)

During the initial performance of periodic functional testing of fire dampers, a total of 19 fire dampers were identified as inoperable. The testing involves removal of the fire damper fusible link and verifying that the fire damper completely closes in the presence of normal ventilation air flow. Of the 19 inoperable fire dampers, 9 failures were attributed to mechanical interference and 10 were attributed to a design deficiency of the fire damper. The cause of this event was inadequate functional testing of installed fire dampers in that the ability of the fire dampers to completely close with normal ventilation air flow had not been previously verified. As a result of this event, the fire dampers that failed to completely close due to mechanical interference were repaired and successfully tested. A plant modification has been implemented to replace the fire dampers that failed to completely close under normal ventilation air flow. Periodic functional testing will be discontinued to eliminate the potential for personnel injury or equipment damage. The performance of functional tests following maintenance or modification activities combined with the Technical Specification required visual inspections will ensure the continued operability of the fire dampers.

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

I. Description Event

A. Plant Status

At the time of discovery of this event on March 12, 1986, Unit 1 at Arkansas Nuclear One (ANO-1) was operating at approximately 85 percent of rated power and Unit 2 (ANO-2) was operating at approximately 100 percent of rated power.

B. Component Identification

The components involved in this event are three hour rated fire dampers [BDMP] installed in ventilation ductwork penetrating plant structures used as fire barriers (i.e., walls, ceilings, etc.). These fire dampers are normally open and contain a fusible link located on the damper operating arm. When the fusible link reaches a specified temperature, indicating a fire is present, the fusible link melts allowing the fire damper to automatically close. This actuation provides a three hour fire barrier for the affected penetration. The fire dampers involved in this event at ANO-1 and ANO-2 are manufactured by American Warming and Ventilating, Inc. and Ruskin Manufacturing Company. The ventilation system involved in this event includes the Auxiliary Building Ventilation System [VF].

C. Sequence of Events

In February 1986, Periodic Test 2305.15, "Fire Damper Surveillance Test," was initiated to perform functional testing of penetration fire dampers. This testing involves removal of the fire damper fusible link and verifying that the fire damper completely closes in the presence of normal ventilation air flow. On March 12 at 1100 hours, fire damper 2FD-2123-33 failed to completely close upon removal of its fusible link. Investigation revealed that a sheet metal screw penetrating the ventilation duct was interfering with the operation of the fire damper. Testing was continued and on March 13 at 1400 hours, fire damper 2FD-2198-9 also failed to completely close upon removal of its fusible link. Investigation of this problem found a metal tab on the fusible link assembly for the fire damper that prevented the fire damper from completely closing. Both fire dampers were repaired and successfully tested on March 14 (2FD-2123-33) and April 3 (2FD-2198-9). As a result of these events, Revision 0 of this Licensee Event Report (LER) was submitted on April 12, 1986. At that time, testing of all fire dampers for ANO-1 and ANO-2 had not been completed.

As the result of continued fire damper testing, several other dampers were identified as failing to completely close as designed. Table 1 provides information relevant to these additional failures. Upon discovery of each inoperable fire damper, appropriate actions were taken in accordance with the Technical Specification (TS) for the affected unit.

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II. Event Cause

A. Event Analysis

LER 50-368/84-016 previously documented a concern that although installed fire barriers are visually inspected as required by Technical Specifications, the capability of a fire damper to act as a fire barrier cannot be ensured unless functional testing is performed. Additionally, a 10CFR21 report submitted by Ruskin Manufacturing Company on November 6, 1984 identified a deficiency related to the ability of some fire dampers to completely close with normal air flow present in the ventilation ductwork. As a result of these identified problems, test procedures for ANO-1 and ANO-2 were developed to perform functional test of fire dampers protecting safety related areas. This testing verified complete closure of the fire damper with normal ventilation air flow in the affected duct after the removal of the fire damper fusible link. Removal of the fusible link simulates actuation of the fire damper from the heat produced by an actual fire. By ensuring normal ventilation air flow is established in the affected duct prior to the removal of the fusible link, the fire damper is verified to close as designed with ventilation air flow present. If the damper closes completely during this test, the damper is considered operable in accordance with TS. The fire damper discrepancies discussed in this report were identified during the first performance of this type of testing at ANO.

These initial functional tests were performed during refueling outages 1R7 and 2R5. Initial damper testing was lengthy due to factors such as availability of the affected systems and the difficulty of gaining access into the ventilation ducts to operate the fusible link. As a result of this testing, 19 fire dampers were identified that failed to close completely when tested. Table 1 is a list of these fire dampers, the discovery date of each failure, the cause of each failure, and the model number of each damper. Of the 19 inoperable fire dampers, 9 failures were attributed to mechanical interference and 10 were attributed to a deficiency of the fire damper to close with normal ventilation air flow.

Based on the results of the fire damper functional tests, it was determined that the 19 fire dampers would have failed to completely close as designed in the case of an actual fire. Extensive ability existed to identify, locate, contain, and suppress any fire occurring in the affected areas. Additionally, many of these affected areas are continuously occupied, monitored by smoke/heat detectors with control room alarms, and/or have automatic fire suppression systems. For these reasons, the overall effect on safety resulting from the failure of the identified dampers to function properly was judged to be of minor safety significance.

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

B. Root Cause

The cause of this event was determined to be a failure to perform functional testing of installed fire dampers. Although visual inspections were performed in accordance with Technical Specifications, the ability of the fire dampers to completely close with normal ventilation air flow in the event of a fire was not tested. As a result, any inadequate installation or modification of the affected fire dampers was not identified prior to relying upon the damper as a fire barrier. Contributing to this event is a design deficiency of some of the fire dampers to close as required by their design under normal ventilation air flow.

C. Basis for Reportability

This event is reportable under 10CFR50.73(a)(2)(i)(B), operation prohibited by Technical Specification. TS surveillance requirements 4.24 (ANO-1) and 4.7.11 (ANO-2) require that all penetration fire barriers protecting safety related areas be verified intact/functional by a visual inspection at least once per 18 months. With one or more of the fire barriers not intact/functional, TS 3.21.2 (ANO-1) and 3.7.11 (ANO-2) require a continuous fire watch (or operable smoke/heat detection with control room alarm, ANO-1 only) to be established within one hour. Although the required Technical Specification action requirements were taken within the time frame required after the discovery of each failure, it is reasonable to believe that these fire dampers had been inoperable since they were installed.

III. Corrective Actions

A. Immediate

Upon discovery of each inoperable fire damper, the Shift Operations Supervisor was notified and compliance with Technical Specifications was ensured until the affected fire damper was repaired.

B. Subsequent

As a result of this event, the fire dampers that failed to completely close due to mechanical interference have been repaired and successfully tested. A plant modification has been implemented to replace the fire dampers that failed to completely close under normal ventilation air flow with a fire damper that will ensure complete closure as required.

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The testing which led to discovery of the damper deficiencies was the first performance of the functional test for the Technical Specification required fire dampers. Failures have been identified and corrected. Additionally, ANO procedures require that appropriate surveillance testing is identified and performed following any maintenance or modification activity. This surveillance testing will ensure that future installations or modifications of TS required fire dampers will include the appropriate functional testing prior to relying upon the damper as a fire barrier.

The periodic functional test was subsequently performed twice with no damper failures identified thus proving that the Technical Specification required fire dampers can close and latch under full air flow conditions. The air flow test requires personnel entry into confined spaces with extremely high air flow conditions. Also, repeated cycling of the fire dampers can cause damage to the fusible link retaining clips or the curtain assembly. Therefore, periodic functional testing will be discontinued to eliminate the potential for personnel injury or equipment damage. The performance of functional tests following maintenance or modification activities combined with the Technical Specification required visual inspections will ensure the continued operability of the fire dampers.

C. Future

None.

IV. Additional Information

A. Similar Events

A previous similar event was reported in LER 50-368/84-016. The commitment to perform periodic functional testing was also contained in this LER. The periodic functional testing will be discontinued for the reasons stated above.

B. Supplemental Information

None.

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

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TABLE 1

INOPERABLE FIRE DAMPER ANO-1 AND ANO-2
(AS IDENTIFIED DURING THE FIRST PERFORMANCE
OF THE FUNCTIONAL TESTS)

FIRE DAMPER NUMBER	FAILURE DISCOVERY DATE	CAUSE OF FAILURE *	MANUFACTURER AND MODEL NUMBER **
2FD-2153-068	02/11/86	1	R411 NIBD-23
2FD-2153-057	02/25/86	1	R411 NIBD-23
2FD-2123-033	03/12/86	2 (Screw)	R411 FDTD
2FD-2198-009	03/13/86	2 (Tab)	R411 IBD-23
2FD-2098-044	05/07/86	3	A340 DAF-P-FIRE
2FD-2146-013	08/19/86	1	R411 NIBD-23
2FD-2150-004	08/19/86	1	R411 IBD-23
2FD-2156-037	08/19/86	1	R411 NIBD-23
2FD-2156-036	09/09/86	1	R411 NIBD-23
2FD-2153-056	09/09/86	1	R411 NIBD-23
1FD-0097-058	09/12/86	1	A340 DAF-P-475L
1FD-0129-341	09/12/86	1	R411 IBD-23
1FD-0160-022	09/12/86	2 (Gasket)	A340 DAF-P-2217
1FD-0160-040	09/12/86	2 (Debris)	A340 DAF-P-2217
1FD-0160-041	09/14/86	2 (Damper Chain)	A340 DAF-P-2217
1FD-0160-042	09/16/86	2 (Damper Chain)	A340 DAF-P-2217
1FD-0138-006	09/29/86	2 (Debris)	R411 IBD-23
1FD-0183-019	10/01/86	2 (Damaged Duct)	R411 FDTD
1FD-0097-025	10/02/86	1	A340 DAF-P-475L

*Cause of Failure: 1 = Failure to Completely Close Under Normal Ventilation Flow.
2 = Mechanical Interference.
3 = Inaccessibility created interference.

**Manufacture and Model Number: A340 = American Warming and Ventilating, Inc.
R411 = Ruskin Manufacturing Company