

November 18, 1996

1CAN119601

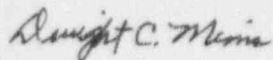
U. S. Nuclear Regulatory Commission  
Document Control Desk  
Mail Station P1-137  
Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 1  
Docket No. 50-313  
License No. DPR-51  
Licensee Event Report 50-313/96-009-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(x), enclosed is the subject report concerning a fire in the Reactor Building.

Very truly yours,



Dwight C. Mims  
Director, Nuclear Safety

DCM/tfs

enclosure

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U. S. NRC

November 18, 1996

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cc: Mr. Leonard J. Callan  
Regional Administrator  
U. S. Nuclear Regulatory Commission  
Region IV  
611 Ryan Plaza Drive, Suite 400  
Arlington, TX 76011-8064

Institute of Nuclear Power Operations  
700 Galleria Parkway  
Atlanta, GA 30339-5957

## LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Arkansas Nuclear One - Unit 1

DOCKET NUMBER (2)

05000313

PAGE (3)

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TITLE (4) Fire In the Reactor Building During Heatup Resulted From A Cracked Weld In An Oil Line On A Reactor Coolant Pump Motor

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 NAME	DOCKET NUMBER
10	17	96	96	009	00	11	18	96	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)							
POWER LEVEL (10)		00	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	
			20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		Specify in Abstract Below and in Text	
			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)		X 50.73(a)(2)(x)			

## LICENSEE CONTACT FOR THIS LER (12)

NAME

Thomas F. Scott, Nuclear Safety and Licensing Specialist

TELEPHONE NUMBER (Include Area Code)

501-858-4623

## 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	AB	PSF	J087	Y					

## SUPPLEMENTAL REPORT EXPECTED (14)

YES		NO		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
(If yes, complete EXPECTED SUBMISSION DATE)		X					

## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

A fire was discovered in insulation around the Main Feedwater nozzle ring on "B" Once Through Steam Generator (OTSG) during heatup of the Reactor Coolant System (RCS). A weld located in the discharge line of a Reactor Coolant Pump (RCP) motor oil lift pump had cracked due to a fabrication defect. The failure, believed to have occurred at the start of the outage, resulted in oil being introduced onto the insulation. Oil on the insulation allowed a wicking effect that reduced the auto-ignition point of the oil to a value lower than the documented value. The fire originated when the RCS temperature was approximately 439 degrees. Application of a light water fog from a fire hose extinguished the fire approximately 16 minutes after it was discovered. A Notification of Unusual Event was declared when the fire was not extinguished within 10 minutes. The plant returned to cold shutdown conditions to evaluate damage. Other than some minor damage to insulation, the fire did not damage any systems or components. Enhancements were made to the oil collection systems of all RCP motors, and damaged insulation was repaired or replaced prior to the subsequent heatup.

NRC FORM 366A (5-92)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95	
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

#### A. Plant Status

At the time of this event, Arkansas Nuclear One Unit 1 (ANO-1) was being heated up following a refueling outage. Reactor Coolant System (RCS) [AB] temperature was approximately 439 degrees and pressure approximately 1180 psig.

#### B. Event Description

At 1607 on October 17, 1996, a fire was detected in the ANO-1 Reactor Building (RB) [NH].

The ANO Fire Prevention Coordinator was conducting a tour of the RB to check the air quality (oxygen, combustibles, and toxins). He noticed a smoke cloud in the area of "B" Reactor Coolant Pump (RCP). As he approached to investigate, he saw fire around the "B" Once Through Steam Generator (OTSG) Main Feedwater (MFW) nozzle ring. He made a report to the Control Room. At 1607 the condition was announced by a message on the site communication system and activation of the fire tone alarm. Two Operators qualified as fire brigade members were in the RB. Upon hearing the announcement of the fire, they proceeded to the area. They found flames in an area on the "B" OTSG extending approximately two feet high from the bottom of the MFW nozzle ring with a circumferential length of approximately eight feet. The fire was burning in insulation between the OTSG and the insulation metal cover with flames coming from between the insulation panels. One of the Operators discharged a carbon dioxide fire extinguisher and extinguished flames from the closest feed nozzle insulation panel. The fire immediately re-flashed. A Notification of Unusual Event (NUE) was declared at 1617 due to the fire lasting greater than ten minutes. Additional fire brigade members arrived and provided a fire hose to the Operators closest to the fire. Water from the hose was used to extinguish the fire with three to five minutes of light fog application. Only the OTSG in the area of the fire was subjected to the spray. Fire brigade members estimated that less than fifty gallons of water was required to extinguish the fire. The fire was under control at 1621 and extinguished at 1623. A fire brigade member was stationed as a re-flash watch. The NUE was terminated at 1735.

A cooldown was initiated. By 1740, RCS temperature was less than 400 degrees. The plant proceeded to cold shutdown conditions. An assessment revealed no equipment damage other than some minor damage to insulation. The cause of the fire was determined, as discussed below. Following completion of the assessment, replacement of oily blanket insulation, and cleanup, a controlled heatup began on October 22. During the heatup, a fire watch was continuously posted and detailed inspections were conducted to ensure that prompt actions could be taken. The heatup and subsequent startup were completed without further complications.

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### C. Root Cause

During a refueling outage in February and March of 1995, the "B" RCP motor was replaced with one manufactured by Jeumont Schneider Industrie, a French company. The other RCP motors were manufactured by Allis Chalmers Corporation. On September 20, 1996, oil was drained from the "B" RCP motor reservoirs to install a modification to the oil level monitoring system. On October 9, after completing the modification and filling the oil reservoirs, the oil lift pump was started for post-modification testing. Electrical Maintenance personnel stationed at the motor noticed a misting oil leak and had the pump stopped after a total run time of approximately thirty seconds. No oil was sprayed on the OTSG at this time and very little oil escaped from the system. Oil in the area was wiped up at that time. The leak was determined to be from a crack in a weld in the discharge line from an oil lift pump. The crack was approximately 270 degrees around the weld circumference. The welder performing the repair reported that the vendor weld had only partial penetration over the entire weld area. The two sections being welded had been butted together without a specified 0.02 inch gap. Later in the outage when lagging was removed for In Service Inspection activities unrelated to the weld failure, no oil was noted on the section of RCS piping below "B" RCP. The cracked weld was repaired and successfully tested on October 13.

During plant heatup on October 17, several individuals reported some smoke in the RB. This was accepted as a normal condition at the end of a refueling outage. Approximately one hour before the fire was discovered, an Operator saw a puddle of oil below the "B" RCP. The amount of oil in the puddle was estimated to be one to two cups. No leaks or drips could be found and the oil was cleaned up.

Following the fire, a review of oil additions and operations indicated that the most likely time of oil coming into contact with the insulation was during a run of the oil lift pump during RCP shutdown on September 15, 1996, when the plant reached cold shutdown conditions at the start of the outage. At that time it is believed that oil sprayed from the cracked weld and onto thermal pad type insulation around the MFW nozzles. The oil being dispersed on the insulation allowed a wicking effect that reduced the auto-ignition point of the oil to a value lower than the published value and the operating equipment surface temperature. The root cause of this event has been determined to be a fabrication defect in the weld located in the discharge piping of the "B" RCP motor high pressure oil lift pump.

### D. Corrective Actions

The effects of the fire and fire suppression activities on equipment were evaluated following an inspection by a multi-discipline team. There were no concerns developed that prevented plant heatup.



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Oil-fouled and damaged insulation was replaced or restored to an acceptable condition.

The cracked weld was repaired and successfully tested prior to the fire being initiated. A determination was made that, with compensatory measures established, it will be safe to operate until the next refueling outage without inspecting other welds in the oil system for "B" RCP motor.

The design of the "B" RCP motor oil collection system was enhanced by installation of a modification to provide additional protection against potential oil spray from joint leakage. Oil collection systems for the other RCP motors also received enhancements.

As part of the root cause evaluation process for this event, the oil collection system for the ANO-2 RCP motors was reviewed. Although some potential deficiencies were identified, an evaluation concluded that the plant could be safely operated with the existing arrangement until the next refueling outage.

During a review of the generic implications of this event, ANO discovered that the phenomenon of the auto-ignition temperature of the oil being reduced to a value lower than the published value by being spread out on highly porous material such as fibrous insulation does not appear to be well understood in the industry. An Operating Plant Experience Report has been prepared to convey this information to other plants along with a description of the event.

#### E. Safety Significance

The fire did not cause any adverse effects upon instrumentation or other safety-significant components. Damage was limited to component insulation. No personnel injuries resulted from this event. Redundancy was not lost for systems or components required to safely shutdown the reactor or maintain it in a shutdown condition. For these reasons this event is judged to have had minimal actual safety significance.

#### F. Basis for Reportability

The location, magnitude, and duration of the fire were evaluated to have constituted an "event that posed an actual threat to the safety of the nuclear power plant or significantly hampered site personnel in the performance of duties necessary for the safe operation of the nuclear power plant including fires..." Therefore, this report is submitted in accordance with 10CFR50.73(a)(2)(x). A report of the event was made to the NRC Operations Center in accordance with 10CFR50.72(b)(1)(vi) at 1650 on October 17, 1996.

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### G. Additional Information

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

The "B" RCP motor is a model RNCY 167-112-6 manufactured by Jeumont Schneider Industrie, manufacturer code "J087".

Oil used in the "B" RCP motor is Mobilrad ISO Medium.

Insulation on the MFW nozzles in which the fire originated was Thermal-Wrap Blankets manufactured by Transco Products, Incorporated. This is a low density, light weight fiberglass insulation.

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