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1CAN040904

April 3, 2009

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

Subject: Licensee Event Report 50-313/2009-001-00
Arkansas Nuclear One – Unit 1
Docket Nos. 50-313
License Nos. DPR-51

Dear Sir or Madam:

In accordance with 10CFR50.73(a)(2)(iv)(A), enclosed is the subject report concerning a manual reactor trip from power.

There are no new commitments contained in this submittal.

Sincerely,

A handwritten signature in black ink, appearing to be "DBB", with a long, sweeping horizontal line extending to the right.

DBB/dce
Enclosure

cc: Mr. Elmo Collins
Regional Administrator
U. S. Nuclear Regulatory Commission
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Arlington, TX 76011-4125

NRC Senior Resident Inspector
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NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (9-2007)				APPROVED BY OMB NO. 3150-0104 EXPIRES 8/31/2010 Estimated burden per response to comply with this mandatory information collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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 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.							
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)											
1. FACILITY NAME Arkansas Nuclear One				2. DOCKET NUMBER 05000313		3. PAGE 1 OF 4					
4. TITLE Manual Reactor Trip From Power in Response to a Loss of Control Rod Drive Cooling Water Flow Due to a Gasket Failure Which Resulted in Air Intrusion Into the Intermediate Cooling Water System											
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	
02	05	2009	2009	- 001 -	00	04	03	2009	FACILITY NAME	DOCKET NUMBER	
									05000		
									05000		
9. OPERATING MODE 1			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)								
			☐ 20.2201(b) ☐ 20.2201(d) ☐ 20.2203(a)(1) ☐ 20.2203(a)(2)(i)	☐ 20.2203(a)(3)(i) ☐ 20.2203(a)(3)(ii) ☐ 20.2203(a)(4) ☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(i)(C) ☐ 50.73(a)(2)(ii)(A) ☐ 50.73(a)(2)(ii)(B) ☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(vii) ☐ 50.73(a)(2)(viii)(A) ☐ 50.73(a)(2)(viii)(B) ☐ 50.73(a)(2)(ix)(A)					
10. POWER LEVEL 61			☐ 20.2203(a)(2)(ii) ☐ 20.2203(a)(2)(iii) ☐ 20.2203(a)(2)(iv) ☐ 20.2203(a)(2)(v) ☐ 20.2203(a)(2)(vi)	☐ 50.36(c)(1)(ii)(A) ☐ 50.36(c)(2) ☐ 50.46(a)(3)(ii) ☐ 50.73(a)(2)(i)(A) ☐ 50.73(a)(2)(i)(B)	☒ 50.73(a)(2)(iv)(A) ☐ 50.73(a)(2)(v)(A) ☐ 50.73(a)(2)(v)(B) ☐ 50.73(a)(2)(v)(C) ☐ 50.73(a)(2)(v)(D)	☐ 50.73(a)(2)(x) ☐ 73.71(a)(4) ☐ 73.71(a)(5) ☐ OTHER- Specify in Abstract below or in NRC Form 366A					
12. LICENSEE CONTACT FOR THIS LER											
FACILITY NAME David B. Bice, Acting Manager, Licensing						TELEPHONE NUMBER (Include Area Code) 479-858-5338					
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT											
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX		
B	LF	CMP	I075	N	D	LF	CMP	I075	N		
14. SUPPLEMENTAL REPORT EXPECTED						15. EXPECTED SUBMISSION DATE			MONTH	DAY	YEAR
☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE)									☒ NO		
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)											
On Thursday, February 5, 2009, at approximately 1524 CST, Arkansas Nuclear One, Unit 1 was manually tripped from 61 percent power due to increasing temperatures of the Control Rod Drive (CRD) Motors resulting from a loss of CRD cooling water flow. The CRD Motors share cooling water flow from the Non-Nuclear Intermediate Cooling Water (ICW) system with Service Air Compressors and other non-nuclear loads. A failed head gasket on the C-3A Service Air Compressor resulted in the introduction of large quantities of air into the ICW system which resulted in cavitation of P-33A ICW pump and both P-79A and P-79B CRD Motor cooling pumps. This loss of CRD cooling flow caused CRD temperatures to approach 180°F which is the reactor trip criteria for OP-1203.003, CRD Malfunction Actions procedure. Post trip responses were normal with all plant systems functioning as expected and with no safety system actuations. The ICW supply and return lines to the Service Air Compressors were isolated restoring ICW and CRD Motor cooling flow. An alternate source of Service Air was provided, and the unit was returned to power on February 6, 2009, at 2219 CST. The root causes of this event were inadequate original design and inadequate maintenance instruction. Corrective actions include providing an alternate source of Service Air, evaluating the equipment for upgrade, and evaluating similar equipment for the same failure scenario.											

(9-2007)

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Arkansas Nuclear One – Unit 1	05000313	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2009	- 001	- 00	

NARRATIVE

A. Plant Status

At the time of the occurrence of this event, Arkansas Nuclear One, Unit 1 (ANO-1) had been operating at 100% power and was in the process of a controlled power reduction due to increasing temperatures in the Control Rod Drive (CRD) Motor [AA] cooling system.

B. Event Description

At 1452 CST, on February 5, 2009, a Service Air Compressor (SA) [LF] trouble alarm was received in the Unit 1 Control Room. The Inside Auxiliary Operator dispatched to investigate the alarm found no apparent cause. Non-Nuclear Intermediate Cooling Water (ICW) [CC] flow was verified, and it was noted that the compressor was hot. Cooling water for the SA Compressors is provided by ICW which also provides cooling water flow to the CRD Motors and other non-safety related loads. Within minutes the CRD Cooling Water Low Flow Alarm was received and the second CRD Cooling Pump automatically started. Power reduction was initiated at a rate of 3% per minute and was increased to 5% per minute due to rising CRD Motor temperature. When the CRD Motor temperatures reached approximately 178°F, the reactor was manually tripped at 1524 CST. The plant shutdown was uneventful with all plant systems responding as designed. Service Air was secured along with the ICW supply and return lines to the SA Compressors. The ICW and CRD Cooling Water systems were vented and flows returned to normal.

Investigation revealed that the head gasket had failed on SA Compressor C-3A resulting in large quantities of air being introduced into the ICW system which caused air binding of the CRD cooling pump.

Unit 1 returned to power operation, Mode 1, on February 6, 2009, at 2219 CST.

C. Root Cause

The Service Air System provides compressed air throughout the plant for pneumatic tool operation, pressurization, blow-down, and dry-out of tanks. In addition to providing un-filtered air, it also provides filtered air for use during testing of the Reactor Building spray headers and provides backup air to the Instrument Air (IA) system. Unlike the IA system, SA typically does not provide air for component control. The compressors for the SA system are Ingersoll-Rand reciprocating compressors that are cooled by a water jacket containing non-nuclear ICW. Inspection of the failed compressor head gasket, information obtained during repair, and research of the maintenance history for the compressors revealed that the torque values for the head bolts had been inappropriately reduced resulting in inadequate preload of the fasteners and subsequent failure of the joint tension over time. The root causes of this event were determined to be two fold.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER (2)	6. LER NUMBER			3. PAGE
Arkansas Nuclear One – Unit 1	05000313	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		2009	- 001	- 00	

NARRATIVE

Root Cause One was determined to be that the original design was inadequate in that the selection of the ICW as the cooling water for these compressors was inappropriate since the same water supply provides cooling for the CRD system which is critical for power production.

Root Cause Two was determined to be inadequate documentation of procedures, and instructions which contained erroneous or insufficient information to support the actual configuration and/or design of the components.

D. Corrective Actions

The SA compressors were secured and the ICW supply and return were isolated and the ICW system was vented restoring flow to the CRD cooling system. ICW and CRD Cooling Water flows both returned to normal.

An alternate source of SA without connection to the ICW system was placed in service and the water cooled SA and Instrument Air (IA) compressors were tagged out of service. The air-cooled IA compressors remain in service.

Development of a plant modification to replace the current ICW cooled SA Compressors with appropriately sized air cooled units is being considered.

E. Safety Significance

The event resulted in a plant manual trip from approximately 61% power. Any plant trip is considered a challenge to safety equipment; however, the plant shutdown was uneventful and all systems responded normally. The ICW system is not safety related and is not required to mitigate a design basis accident. Loss of ICW has an adverse affect on plant operation that requires the unit to be shutdown, but does not result in a loss of a safety function.

Nuclear safety, industrial safety, radiological safety and the general safety of the public were not challenged at any time during this event.

NRC FORM 366A (9-2007)		U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER) CONTINUATION SHEET		
1. FACILITY NAME	2. DOCKET NUMBER (2)	6. LER NUMBER		3. PAGE
Arkansas Nuclear One – Unit 1	05000313	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
		2009	- 001	- 00
				4 OF 4

F. Basis for Reportability

A manual reactor trip from power in response to actual plant conditions is reportable pursuant to 10CFR50.73(a)(2)(iv)(A).

G. Additional Information

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

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