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1CAN051001

May 14, 2010

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

Subject: Licensee Event Report 2010-001-00
Arkansas Nuclear One – Unit 1
Docket No. 50-313
License No. DPR-51

Dear Sir or Madam:

In accordance with 10 CFR 50.73(a)(2)(i)(B), attached is the subject report concerning main steam safety valve testing.

There are no new commitments contained in this submittal. If you have any questions or require additional information, please contact me.

Sincerely,

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

DBB/nbm

Enclosure

cc: Elmo Collins
Regional Administrator
U. S. Nuclear Regulatory Commission
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NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (9-2007)				APPROVED BY OMB NO. 3150-0104				EXPIRES 8/31/2010																																									
LICENSEE EVENT REPORT (LER)										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.																																							
1. FACILITY NAME Arkansas Nuclear One, Unit 1						2. DOCKET NUMBER 05000313				3. PAGE 1 OF 4																																							
4. TITLE Multiple Main Steam Safety Valves not within Limits due to Seat Bonding and Transient-Induced Drift resulting in a Condition Prohibited by Technical Specifications																																																	
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED																																								
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9. OPERATING MODE <div style="text-align: center; font-size: 24px;">1</div>			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) <table style="width:100%; font-size: small;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER- Specify in Abstract below or in NRC Form 366A</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td></td> </tr> </table>											<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 type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER- Specify in Abstract below or in NRC Form 366A	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	
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12. LICENSEE CONTACT FOR THIS LER																																																	
FACILITY NAME David B. Bice, Acting Manager, Licensing								TELEPHONE NUMBER (Include Area Code) 479.858.4710																																									
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT																																																	
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX																																													
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)																																																	
<p>On March 18-19, 2010, during setpoint testing of the main steam safety valves (MSSVs), four valves (PSV-2686, PSV-2691, PSV-2697, and PSV-2698) were discovered out-of-tolerance (OOT) with respect to the technical specification (TS) +/-3% surveillance requirement (SR) 3.7.1.1. PSV-2686 was 3.75% OOT, PSV-2691 was 3.86% OOT, PSV-2697 was -3.02% OOT, and PSV-2698 was -3.18% OOT. There were two apparent causes for these conditions. The PSV-2686 and PSV-2691 OOT condition was due to seat bonding, which is characterized by the formation of an oxide adhesion layer between metal parts. The PSV-2697 and PSV-2698 OOT condition was due to transient-induced drift, characterized by a valve lifting below the desired setpoint, which occurs when the spring is exercised due to valve actuations. The MSSVs were reset to within +/-1% tolerance. Current planned follow-up actions include retesting the affected valves after six months of operation and to continue exercising newly refurbished and installed valves within four months of installation as required by the model work order.</p>																																																	

(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
		2010	- 001	- 00	

NARRATIVE**A. Plant Status**

At the time the condition was discovered, Arkansas Nuclear One, Unit 1 (ANO-1) was operating at 100% power. There were no structures, systems, or components inoperable at the start of the main steam [SB] safety valve testing that contributed to the condition.

B. Event Description

ANO-1 has a total of 16 MSSVs (eight valves on each main steam header). The ANO-1 MSSVs are model Type 3707R six-inch valves manufactured by Dresser Industries (Manufacturer Code D243). During setpoint testing of the MSSVs on March 18-19, 2010 (testing was conducted at different times over this two-day period), four of the valves (PSV-2686, PSV-2691, PSV-2697, and PSV-2698) were discovered out-of-tolerance (OOT) with respect to the TS +/-3% SR 3.7.1.1 limit. PSV-2686 and PSV-2691 experienced lifts at pressures greater than expected. PSV-2697 and PSV-2698 experienced lifts at pressures less than expected. PSV-2686 was 3.75% OOT, PSV-2691 was 3.86% OOT, PSV-2697 was -3.02% OOT, and PSV-2698 was -3.18% OOT.

C. Root Cause

There were two apparent causes for these conditions. The PSV-2686 and PSV-2691 OOT condition was due to seat bonding, which is characterized by the formation of an oxide adhesion layer between metal parts and most likely occurs due to valve replacement/refurbishment, iron transport, and moisture carryover. PSV-2697 and PSV-2698 OOT condition was due to transient-induced drift, characterized by a valve lifting below the desired setpoint, which occurs when the spring is exercised due to valve actuations.

D. Corrective Actions

Immediate corrective action reset the MSSVs to within +/-1% tolerance during MSSV testing. Once reset, TS compliance was achieved and the valves returned to operable status. Current planned follow-up actions include retesting the affected valves after six months of operation and to continue exercising newly refurbished and installed valves within four months of installation in accordance with the model work order.

(9-2007)

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		2010	- 001	- 00	
Arkansas Nuclear One, Unit 1	05000313	2010 - 001 - 00			3 OF 4

NARRATIVE**E. Safety Significance**

The secondary side pressurization analyses assume a full-power turbine trip coincident with loss of the condensate heat sink to establish the required MSSV relief capacity. The design basis of the MSSVs is to limit secondary system pressure to <110% of design pressure. The setpoint of the normally highest set MSSVs, including the +3% tolerance, is 1133 psig. Only one of the setpoints found during the testing was above this allowable setpoint, that being the as-found setpoint of PSV-2691. Since TS 3.7.1 requires only seven of the eight MSSVs on each main steam line to be operable, this condition would not prevent the MSSVs from performing the associated specified safety function of overpressure protection.

In addition to secondary side pressurization analyses, the MSSVs are credited in the safety analysis report (SAR). The Chapter 14 SAR events that assume availability of the MSSVs are those characterized by decreased heat removal events and include loss of load, loss of all alternating current (AC) power, steam generator tube rupture (SGTR), and small-break loss-of-coolant accident (SBLOCA). These safety analysis events could be negatively impacted, if a MSSV lift setpoint drifts greater than -3% from its nominal setpoint; therefore, the MSSV lift setpoints found to be outside of the -3% tolerance during testing were evaluated for impact on these safety analyses.

The loss of load transient assumes that steam is relieved from the MSSVs and through the condenser via turbine bypass. After turbine runback, excess steam is relieved to the atmosphere via the MSSVs until the once-through steam generator [SG] (OTSG) pressure drops below the setpoint of the lowest set MSSV. In the loss of all AC power transient described in the SAR, the plant trips, the condenser is lost, and the operator utilizes the atmospheric dump valves as a method of heat removal. Excess steam is also released via the MSSVs until pressure is reduced below the lowest setpoint utilizing the atmospheric dump valves. The SGTR assumes release of secondary inventory through the MSSVs until the ruptured OTSG is depressurized below the lowest set MSSV and is isolated. The SBLOCA analysis assumes that the OTSGs are removing heat from the core at a saturation pressure consistent with the MSSV having the lowest lift setting.

The safety analyses have a common input in that the setpoint of the MSSV with the lowest lift setting is limiting; therefore, the two MSSVs having an as-found setpoint greater than +3% of their nominal setpoint have no impact on these safety analyses. None of the setpoints identified during the testing were below the allowable setpoint of the MSSV having the lowest setpoint; therefore, these valves additionally had no impact on the subject analyses. Therefore, the loss of load, loss of all AC power, SGTR, and SBLOCA results remained valid for the given condition.

Based on the above, the MSSVs would have performed their specified safety function and would have operated accordingly such that no safety analysis bases would have been invalidated.

(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	4 OF 4
		2010	- 001	- 00	

NARRATIVE**F. Basis for Reportability**

The affected MSSVs discovered OOT is reportable under 10CFR50.73(a)(2)(i)(B) as a condition prohibited by TS that existed during plant operation. Guidance provided in NUREG-1022 states that the existence of similar discrepancies in multiple valves is an indication that the discrepancies may well have arisen over a period of time; therefore, the condition existed during plant operation and the event is reportable under 10CFR50.73(a)(2)(i)(B) as operation prohibited by TS.

G. Additional Information

There was one other previous similar event reported as LER-2002-001-00 for ANO-1 in which the lift settings of eight of the 16 MSSVs were OOT. Potential failure modes were spring relaxation, seat bonding, excessive spindle run out, a change to a different type of test device, and steam header pressure oscillations during the testing.

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