

NRC Form 366  
(9-83)

U.S. Nuclear Regulatory Commission  
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L I C E N S E E E V E N T R E P O R T ( L E R )

FACILITY NAME (1) Arkansas Nuclear One, Unit Two DOCKET NUMBER (2) PAGE (3)  
0510101 31 61 8110F014

TITLE (4) Inoperable Reactor Coolant System High Point Vent System Mechanical Snubber Caused By Personnel Error During Development of a Plant Modification.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
Month	Day	Year	Sequential Number	Revision Number	Month	Day	Year	Facility Names	Docket Number(s)	
01	21	88	01	01	07	21	88	N/A	0510101	
OPERATING MODE (9) G									(Check one or more of the following) (11)	
POWER LEVEL (10)		20.402(b)	20.405(a)(1)(i)		50.73(a)(2)(iv)		73.71(b)			
		20.405(a)(1)(ii)	50.36(c)(1)		50.73(a)(2)(v)		73.71(c)			
		20.405(a)(1)(iii)	50.36(c)(2)		50.73(a)(2)(vii)		Other (Specify in			
		20.405(a)(1)(iv)	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		Abstract below and			
		20.405(a)(1)(v)	50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		in Text, NRC Form			
			50.73(a)(2)(iii)		50.73(a)(2)(x)		366A)			

Licensee Contact for this LER (12)  
Name: Julie D. Jacks, Nuclear Safety and Licensing Specialist  
Telephone Number: 5101916141-1311010

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	
A	A	B	S	N	B	A	3	9	3	Y

SUPPLEMENT REPORT EXPECTED (14)  
 Yes (If yes, complete Expected Submission Date)  No  
 EXPECTED SUBMISSION DATE (15) Month Day Year

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

In February 1988, during a refueling outage, a mechanical snubber located on a Reactor Coolant System high point vent line was found inoperable while performing an inservice inspection. During the previous refueling outage this snubber had been replaced. However, the replacement snubber had been installed without adequate remaining stroke to accommodate expected thermal growth of the attached piping. The root cause of the failure was a cognitive personnel error made during development of the design document used for the replacement. Calculations used to install the snubber were incorrectly based on the use of a snubber model with different dimensions than the snubber actually installed. This caused an incorrectly sized transition tube to be used to mount the snubber, resulting in over-compression of the snubber. The transition tube was modified to correct the discrepancy, and the snubber was replaced because internal wear resulted from over-compression caused by thermal growth of the piping during heatup. Based on the results of evaluations conducted to determine the consequences of a postulated failure of the affected line during normal operation or as a result of a seismic event, the safety significance of this event was concluded to be minimal. Similar events related to inoperable snubbers were reported in Licensee Event Reports 50-313/84-001 and 50-313/85-009.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		Sequential	Revision		
Arkansas Nuclear One, Unit Two	05000368	Year	Number	Number	
		88	--	013	--

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

I. Description of Event

A. Plant Status

At the time of discovery of this event, Arkansas Nuclear One, Unit Two (ANO-2) was in a refueling outage (Mode 6).

B. Component Identification

This event involves the discovery of an inoperable mechanical snubber [SNB] located on a Reactor Coolant System (RCS) [AB] high point vent line. The snubber, designated as 2CCB-76-H14, is a model number AD-41 manufactured by Anchor Darling [A393].

C. Sequence of Events

In February 1988, while performing inservice inspections of mechanical snubbers as required by the plant's Technical Specifications (TS), a mechanical snubber located on an RCS high point vent line was discovered inoperable in the as-found condition. The affected line is part of a piping system used for venting the reactor vessel head and pressurizer steam space to the containment building atmosphere. An initial visual inspection of the snubber performed on 2/19/88 indicated that the snubber might not have adequate remaining stroke to accommodate expected thermal growth of the attached piping. This inspection was performed shortly after plant shutdown and the attached piping was still warm. A second visual inspection was performed on 2/23/88 after allowing the piping to reach a cold condition. Measurements taken during this inspection confirmed that in a cold condition the snubber did not have enough remaining stroke to allow for the amount of thermal expansion of the pipe expected to occur during a heatup to normal operating temperature. The snubber was removed and functionally tested on 3/1/88 and failed a tension velocity test.

II. Event Analysis

A. Event Cause

The RCS is equipped with a high point vent system provided to allow remote venting of the reactor vessel head and the pressurizer steam space to remove non-condensable gases from these areas if necessary. The reactor vessel head high point vent piping and the pressurizer high point vent piping tie into a common header, which can be remotely aligned to direct vent flow to either the Quench Tank or to the containment building atmosphere. The high point vent line snubber found inoperable during the 2R6 refueling outage inspections is located on a one-inch vent line, downstream of normally closed, solenoid operated isolation valves (SOVs) in the vent path to the containment atmosphere. The snubber and all of the associated piping and SOVs are located inside the containment building.

During the previous refueling outage (2R5) in 1986, a Design Change Package (DCP) was implemented to replace snubbers manufactured by Pacific Scientific Associates (PSA) with Anchor Darling snubbers. Approximately eighty PSA snubbers were replaced with Anchor Darling snubbers, model numbers AD-41 and AD-71R. The snubber installed on the RCS high point vent line was one of the PSA snubbers and was replaced with a model AD-41 snubber as required by the DCP. However, during development of the DCP some of the design calculations for replacing this snubber were inadvertently based on the use of an AD-71R snubber at this location. An AD-71R snubber does not have the same physical dimensions as an AD-41 snubber. As a result of this error, the transition tube required to mount the snubber in place was assembled incorrectly. When the snubber was installed with this incorrect transition tube, which was too long, the snubber was overly compressed, leaving an inadequate amount of remaining snubber stroke to accommodate the expected thermal growth of the attached piping.

As-built verifications of the snubber installation were performed by the responsible engineering personnel as part of the DCP process. These verifications are performed by measuring a dimension termed the "pin to flange" length, which is the actual length of the installed snubber. The snubber cold setting is not directly measured at this time because verification of the "pin to flange" length normally ensures the cold setting is correct.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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Arkansas Nuclear One, Unit Two	055010103	88	013	00	03 OF 04

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

However, in this case, because of the error in the design development, i.e., use of the wrong snubber dimensions, the "pin to flange" length of the installed snubber agreed with the length specified for this measurement in the DCP, causing personnel performing the installation verifications to believe that the snubber was installed correctly.

Additionally, following installation of the snubber, a pre-service visual inspection of the snubber was performed by an AP&L contract employee. This inspection is independent of the "pin to flange" measurements recorded by Engineering personnel and includes a direct measurement of the snubber cold setting. A snubber cold setting of one inch was recorded as part of this inspection. However, the hanger drawing for this snubber specified a cold setting of 2-5/8 inches. This discrepancy between the actual cold setting and the specified cold setting was caused by the incorrect length of the transition tube. The documentation for this visual inspection was reviewed by an AP&L snubber coordinator who had overall responsibility for the snubber program. He apparently either overlooked the discrepancy with the cold settings or failed to recognize its significance.

The lack of adequate remaining stroke of the snubber resulted in degradation of the snubber internals at some time following plant heatup after 2R5, causing the snubber to fail a tension velocity functional test during 2R6.

B. Safety Significance

The RCS high point vent line snubber is considered to have been inoperable from the time it was installed in 1986. If a seismic event had occurred during this time, it is possible (although unlikely) that the attached piping may have failed. Based on engineering judgement without a detailed analysis, the most likely failure location would have been at a tee downstream of the normally closed, remotely operated reactor vessel head and pressurizer high point vent isolation valves. A postulated break at this location would have remained isolated from the RCS. Also, it is important to note that even considering a potential pipe break at a location between the reactor vessel head or pressurizer steam space and the isolation valves, the high point vent system was designed with flow limiting orifices such that the resulting RCS mass loss would be less than the definition of a LOCA in 10CFR50, Appendix A. Therefore, based on these considerations, the safety significance of this event is minimal.

C. Root Cause

The root cause of the inoperable snubber was a cognitive personnel error made during development of the DCP used to replace the snubber during 2R5. Design personnel had incorrectly used the dimensions for a snubber model of a different size than the snubber actually installed. A contributing cause was that the resulting discrepancy between the as-left cold setting of the snubber and the required cold setting was not identified by the snubber coordinator responsible for verifying the snubber installation.

D. Reportability

ANO-2 TS 3.7.8 requires all safety-related mechanical snubbers to be operable whenever the plant is in Operational Modes 1, 2, 3, or 4. The associated action statement requires that an inoperable snubber be replaced or restored to an operable condition within 72 hours or the affected system must be declared inoperable. Additionally, an engineering evaluation is required to determine the cause of the failure and if the components to which the inoperable snubber was attached were adversely affected by the inoperable snubber. Based on evaluations of the as-found condition of the snubber located on the RCS high point vent system piping it was concluded that the snubber had been inoperable since installation during the 2R5 refueling outage in 1986. Plant Operation in Modes 1, 2, 3, and 4 subsequently occurred with the snubber in an inoperable condition and without the requirements of the TS action statement being satisfied. Therefore, it was concluded that operation prohibited by the plant's Technical Specifications occurred and the event is reportable per 10CFR50.73(a)(2)(i)(B).

The time period between the discovery of the inoperable snubber and the submittal of this report exceeds the 30 days required by 10CFR50.73(a)(1). This was due primarily to the length of time necessary to conduct engineering evaluations concerning the root cause of the failure and to perform an adequate analysis of the event.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)
		Year	Sequential Number	Revision Number		
Arkansas Nuclear One, Unit Two	0500036888	0	13	0	0	104

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

III. Corrective Actions

A. Immediate

When the inoperable snubber was discovered, the unit was already shut down for refueling and the affected system was not required to be operable. Thus, immediate actions consisted of initiating the necessary corrective maintenance and engineering evaluations of the event.

B. Subsequent

The high point vent system snubber was replaced and the transition tube used to install the snubber was modified to ensure adequate travel was available to allow for thermal growth of the pipe. An engineering calculation was performed which determined that no excessive stress had been placed on the piping as a result of the incorrect installation of the snubber. Therefore, no additional examinations of the piping were necessary.

C. Future

No further action is planned. Design calculations for a DCP are currently reviewed by an independent reviewer and by the engineer's supervisor. Snubber installations covered by a DCP are verified by an engineering walkdown performed to ensure that the installation conforms to the design requirements. The as-left documentation is also reviewed by a snubber coordinator who has overall responsibility for the snubber program. These independent reviews should be sufficient to identify any discrepancies. Also, snubbers are visually inspected each refueling outage to identify possible problems.

IV. Additional Information

A. Similar Events

Similar events related to the discovery of inoperable piping system mechanical snubbers while performing inservice inspections were previously reported in Licensee Event Reports:

- 50-313/84-001
- 50-313/85-009

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



ARKANSAS POWER & LIGHT COMPANY

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July 22, 1988

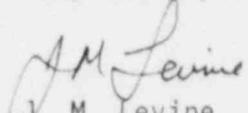
U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

SUBJECT: Arkansas Nuclear One - Unit 2  
Docket No. 50-368  
License No. NPF-6  
Licensee Event Report 50-368/88-013-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(i), attached is the subject report concerning an inoperable reactor coolant system high point vent system mechanical snubber caused by personnel error during the development of a plant modification.

Very truly yours,

  
J. M. Levine  
Executive Director,  
Nuclear Operations

JML:JDJ:cp

attachment

cc w/att: Regional Administrator  
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