



**Entergy
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February 25, 1994

1CAN029403

U. S. Nuclear Regulatory Commission
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Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Licensee Event Report 50-313/94-001-00

Gentlemen:

In accordance with 10CFR50.73 (a)(2)(i)(A) and (B), enclosed is the subject report concerning an inoperable Emergency Feedwater System flowpath.

Very truly yours,

Dwight C. Mims
Dwight C. Mims
Director, Licensing

DCM/kjm

enclosure

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cc: Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
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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 One	DOCKET NUMBER (2) 05000313	PAGE (3) 1 OF 6
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TITLE (4) Emergency Feedwater System Flowpath Inoperable Longer Than Allowed by Technical Specifications as a Result of Failure to Identify Inoperable Instrumentation Due to Human Error and Subsequent Technical Specifications Required Shutdown.

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
01	31	94	94	--001--	00	02	25	94	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)	100	20.402(b)			20.405(c)			50.73(a)(2)(iv)		70.71(b)
		20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)		70.71(c)
		20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)		OTHER
		20.405(a)(1)(iii)			X 50.73(a)(2)(i)			50.73(a)(2)(viii)(A)		Specify in
		20.405(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)		Abstract Below
		20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)		and in Text

LICENSEE CONTACT FOR THIS LER (12)

NAME Kimberly J. Miller, Nuclear Safety and Licensing Specialist	TELEPHONE NUMBER (include Area Code) 501-964-8605
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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
X	JB	LT	R369	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On January 22, 1994, the low range level indication (LI-2622) for the "A" Once-Through Steam Generator was noted to be greater than the maximum normal channel difference during a routine channel check. A job request was written and a log notation was made as required by procedure. On January 28, 1994, the level indication exceeded the operability difference; however, this was not recognized until 2150 on January 31, 1994. The Emergency Feedwater (EFW) flowpath associated with the level control feature of the level transmitter (LT)-2622, was declared inoperable and the plant was shutdown as required by Technical Specifications. LT-2622 was replaced while the plant was in hot shutdown and was declared operable at 2204 on February 1, 1994 along with its associated EFW flowpath. The reactor was returned to power on February 2, 1994. The cause of the transmitter failure could not be determined on site; therefore, it was shipped to the manufacturer for failure testing. The root cause of the delay in identifying LT-2622 inoperability was operator inattention to detail while taking and reviewing logs. Corrective actions include Operations shift management and crew meetings to discuss lessons learned from the event and management expectations, enhancements to operator logs, and meetings with other ANO departments to discuss generic implications.

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TEXT CONTINUATION**

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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 One (ANO-1) was in normal power operations at 100 percent power. Reactor Coolant System (RCS) [AB] average temperature was approximately 579 degrees Fahrenheit and RCS pressure was 2155 psig.

B. Event Description

On February 1, 1994, at 1355 hours, ANO-1 completed a Technical Specifications required shutdown to hot shutdown conditions due to one flowpath of Emergency Feedwater (EFW) [BA] being declared inoperable as a result of the failure of a low range level transmitter for the "A" Once-Through Steam Generator (OTSG).

The EFW system is designed to provide a means of automatically supplying water to the OTSG(s) in the event of Engineered Safeguards Actuation System [JE] actuation, loss of main feedwater, steam line break, or feedwater line break. EFW is able to provide for cooldown of the RCS to the temperature and pressure at which the Decay Heat Removal system [BP] can be placed in operation. The EFW system employs one turbine driven pump, one motor driven pump, and independent feedwater flowpaths to each OTSG. Each train is capable of supplying either of the two OTSGs through normally open isolation valves which receive actuation signals from the Emergency Feedwater Initiation and Control system (EFIC) [JB]. EFIC actuates EFW upon low OTSG level, low OTSG pressure, or loss of both Main Feedwater Pumps with reactor power greater than 7 percent. The transmitter which failed, LT-2622, provides the low range level input which regulates the level control valve in the EFW flowpath from pump P-7A to the "A" OTSG and supplies EFIC Channel "B" OTSG low level actuation logic. EFIC logic requires 2 of the 4 channels of the parameter being monitored in order to actuate.

On January 22, 1994, LI-2622, the indicator for LT-2622, was noted to be greater than the required maximum normal difference between channels during the channel check performed every eight hours as part of the reactor operator (RO) log. To perform the channel check in question, three OTSG level indicators are compared by the RO, the maximum difference between channels is mentally calculated, and a comparison is made to the values for maximum normal difference and operability difference. These readings are reviewed once per shift by the Control Room Supervisor (CRS), and daily by the Operations Shift Superintendent (SS). The RO is procedurally required to initiate a job request if the difference exceeds the maximum normal difference of 5 inches. If the difference between the channels exceeds the operability difference of 8 inches, the RO is required to notify the SS/CRS immediately, and write a Condition Report.

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In this instance, the RO logged the reading as out of specification (difference greater than 5 inches) on January 22, 1994, circled the reading on the log sheet, and initiated a job request to repair the indicator as required by procedure. The job request number was annotated on the back of the log sheet as corrective action for the out of specification reading and subsequent readings were circled referencing the same note. During the midnight shift (2300-0700) on January 28, 1994, LI-2622 exceeded the operability difference of 8 inches; however, this was not recognized by the Control Room Operators.

LI-2622 was identified as being outside of its operability limits at 2150 on January 31, 1994, by the evening shift (1500-2300) RO while walking down the control panel. He then submitted a Condition Report and notified the Shift Superintendent per procedure. The unit entered a Technical Specification action requiring placing the plant in hot shutdown within 36 hours based on the inoperability of one EFW flowpath associated with the level control feature of LT-2622.

A Notification of Unusual Event (NUE) was declared when shutdown commenced at 0905 on February 1, 1994, based on the initiation of a shutdown required by Technical Specifications. The NRC Operations Center was informed of this condition at 0918, February 1, 1994, in accordance with 10CFR50.72(a)(i). The plant achieved hot shutdown at 1355 hours on February 1, 1994. LT-2622 was replaced while the plant was in hot shutdown and was declared operable along with its associated EFW flowpath at 2204 on February 1, 1994. The NUE was terminated at this time. The reactor was returned to criticality on February 2, 1994, at 1345 hours, and power escalation to return ANO-1 to 100 percent power commenced.

C. Root Cause

The failed transmitter is a Rosemont Model 1154DP4RB, Serial Number 0421869 which was placed in service during the IR11 outage completed in October 1993. It was calibrated at the time of installation in accordance with the ANO enhanced monitoring program in compliance with the recommendations of NRC Bulletin 90-01, Supplement 1 for medium pressure applications.

Instrument and Control personnel bench tested the inoperable transmitter after it was removed; however, the failure mechanism could not be determined. There was no obvious loss of fill oil noted and no evidence of internal or external physical damage. The transmitter has been shipped to the manufacturer for further failure testing. The cause for the failure remains indeterminate pending evaluation by the manufacturer.

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The root cause of the failure to identify LT-2622 being inoperable was determined to be inattention to detail on the part of ANO-1 licensed operators while taking and reviewing logs. Several factors were identified which contributed to this event. The RO log which contains the channel check requires a mental calculation to determine the channel difference that is then compared to a standard. This difference is not procedurally required to be written on the log. This task is performed many times for a single set of logs and requires attention to detail to avoid error. Also, a false sense of problem resolution was created as a result of the continued reference on the log sheet to the job request that had been initiated to correct the level indication discrepancy. This condition obscured the need to take further action when the difference increased beyond the operability limit.

D. Corrective Actions

The following corrective actions were taken immediately:

- A dedicated operator was stationed in the ANO-1 Control Room for the sole purpose of manually controlling level in the "A" OTSG should the need arise.
- Review of January 1994, Control Room logs was performed to identify any other errors associated with channel check comparisons. No significant deficiencies were noted.
- The Operations Manager for ANO-1 conducted a CRS/SS meeting to review this event emphasizing Technical Specifications requirements, Licensed Operator responsibilities, and management expectations. The ANO Vice President of Operations also attended the ANO-1 CRS/SS meeting to reinforce management expectations.
- ANO-1 Shift Superintendents conducted crew meetings attended by either the Operations Manager or Assistant Operations Manager to review this event with their respective operating crews emphasizing Technical Specification requirements, Licensed Operator responsibilities and management expectations.
- A Human Performance Enhancement System (HPES) evaluation was performed regarding this event and several human factor enhancements were identified for implementation.
- ANO-2 management reviewed this event with their Shift Superintendents on February 10, 1994, to address the generic human performance implications.

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- Human factor enhancements were added to the ANO-1 operator logs which required mental calculations/comparisons so that difference values could be visually compared to a standard. A Senior Reactor Operator performed an additional daily review of logs containing Technical Specification requirements until human factors such as mentioned above could be incorporated.

Further corrective actions planned include:

- Additional meetings will be conducted by the Shift Superintendents with their crews on or before March 5, 1994, to review the results of the January 1994 log review, discuss lessons learned from this event, and proper self-checking practices to avoid recurrence.
- ANO-1 Operations will evaluate feedback mechanisms used in addressing log taking errors by June 1, 1994, as a step toward future enhancements in human performance.
- Computerized log taking is being evaluated for adaptation to Control Room logs. This evaluation is scheduled for completion by May 15, 1994.
- The lessons learned from this event regarding performance of routine, repetitive tasks will also be discussed with Maintenance, Chemistry, Radiation Protection, and System Engineering personnel of ANO-1 and ANO-2 by March 15, 1994.

E. Safety Significance

In evaluating the safety significance of the inoperability of LT-2622, both EFW initiation and control must be considered. There are four low range level transmitters on the "A" OTSG, each feeding a separate EFIC channel. Since only two channels are required to initiate EFW and three channels remained operable, the initiation function of EFIC was unaffected. In addition, a review of the Operations Station Log indicated that during the time that LT-2622 was inoperable no EFIC maintenance was performed that would have reduced system redundancy. Level control by Train "B" EFIC was affected by the inoperability of LT-2622 as there is no redundancy within the train for automatic level control of the "A" OTSG. Redundancy is provided by the opposite train of EFIC. There would be no effect on manual level control and the operators are directed by procedure to verify that EFW is controlling level automatically at the proper level. Once it is verified that LT-2622 is not automatically controlling level, the operator would be expected to take manual control of feedwater using the redundant indicators as guidance. There would also be no effect from LT-2622 being inoperable as long as the motor-driven EFW pump (P-7B) remained operable with Train "A" EFIC operable since P-7B is capable of supplying sufficient flow to maintain both OTSGs at their programmed levels. Based on the above discussion, this event is considered to be of low safety significance.

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F. Basis for Reportability

This event is reportable pursuant to 10CFR50.73(a)(2)(i) (A) since the condition resulted in a Technical Specification required shutdown and in accordance with 10CFR50.73(a)(2)(i) (B) since an EFW flowpath was inoperable for 59 hours longer than allowed by Technical Specifications.

This event was also reported to the NRC Operations Center pursuant to 10CFR50.72(b)(i)(A) and 10CFR50.72(a)(i) at 0918 on February 1, 1994.

G. Additional Information

The transmitter installed February 1, 1994, is a Rosemont Model 1154DP4RB transmitter, Serial Number 0505041.

There have been no other similar events caused by Operations human performance errors reported as LERs by ANO-1. Previous similar events involving human error regarding operator logs were reported in ANO-2 LERs 50-368/88-021-01, 50-368/91-004-00 and 50-368/91-006-00. Corrective actions taken did not prevent the event discussed in this report because they were specific to ANO-2. This event and the lessons learned from it are being reviewed by the applicable departments of both ANO-1 and ANO-2. In addition, the HPES evaluation identified several log enhancements which should further reduce the probability of the occurrence of similar events.

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