



**Entergy  
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January 8, 1992

1CAN019202

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Mail Station F1-137  
Washington, D. C. 20355

SUBJECT: Arkansas Nuclear One - Unit 1  
Docket No. 50-313  
License No. DPR-51  
Licensee Event Report 50-313/91-008-01

Gentlemen:

In accordance with 10CFR50.73(a)(2)(ii)(B), enclosed is the subject report concerning the seismic qualification of safety related instrumentation.

This upplement is being submitted to revise a commitment completion date for clarification of design review requirements for Design Change Package development from December 31, 1991 to January 31, 1992 as discussed with Mr. Mark Satorius of the Region IV staff.

Very truly yours,

James J. Fisicaro  
Director, Licensing

JJF/RHS/mmg

Enclosure

cc: Regional Administrator  
Region IV  
U. S. Nuclear Regulatory Commission  
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1100 Circle, 75 Parkway  
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*Handwritten initials and date*

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Arkansas Nuclear One, Unit One

DOCKET NUMBER (2) 050003131  
PAGE (3) 1 OF 5

TITLE (4) Safety Related Instrument not installed in a Seismically Qualified Configuration Due to an Inadequate Design Change Review

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 Names													
0	8	2	7	9	1	9	1	--	0	0	8	--	0	1	0	1	0	8	9	2	ANO-2	Docket Number(s)
										0	5	0	0	0	3	6	8					
										0	5	0	0	0								

OPERATING MODE (9) N THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

POWER LEVEL (10)	20.402(b)	20.405(a)(1)(i)	20.405(a)(1)(ii)	20.405(a)(1)(iii)	20.405(a)(1)(iv)	20.405(a)(1)(v)	20.405(c)	50.36(c)(1)	50.36(c)(2)	50.73(a)(2)(i)	50.73(a)(2)(ii)	50.73(a)(2)(iii)	50.73(a)(2)(iv)	50.73(a)(2)(v)	50.73(a)(2)(vi)	50.73(a)(2)(vii)	50.73(a)(2)(viii)(A)	50.73(a)(2)(viii)(B)	50.73(a)(2)(ix)	73.71(f)	73.71(c)	Other (Specify in Abstract below and in Text, NRC Form 366A)
(10) 1																						

LICENSEE CONTACT FOR THIS LER (12)

Area Code	Telephone Number
5	0
1	9
9	6
4	-
5	0
0	0
0	0

Richard H. Scheide, Nuclear Safety and Licensing Specialist

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

Cause	System	Component	Manufacturer	Reportable to NRC	Cause	System	Component	Manufacturer	Reportable to NRC

SUPPLEMENT 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 fifteen single-space typewritten lines) (16)

On August 28, 1991 at 1523, ANO-1 entered Technical Specification Limiting Condition For Operation (LCO) 3.0.3 based on an Engineering determination that certain safety related ANO-1 Foxboro Specification 200 instruments were inoperable due to inadequate seismic qualification. Although the condition was determined to be applicable to ANO-2 also, the extent of involvement was less and repairs were able to be performed within the framework of specific system LCOs. A day 'Temporary Waiver of Compliance' from the shutdown requirements of the applicable LCOs was granted to ANO-1 by the NRC to allow sufficient time to make repair without subjecting the plant to an unnecessary transient. Repairs were completed on August 31, 1991 and for ANO-2 on September 10, 1991. The causes of this condition were determined to be obscure vendor documentation and an inadequate plant modification process review of vendor documentation. Technical manuals for seismically qualified Foxboro Specification 200 components were revised to include appropriate instructions for maintaining seismic configuration. Design review requirements for Design Change Package development will be clarified to ensure clear and specific instructions are provided concerning the qualified configuration of components or systems.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)	
		Sequential		Revision					
		Year	Number	Number					
Arkansas Nuclear One, Unit 1 (AN	05000313	91	--	008	--	0	1	02CF05	

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

A. Plant Status

At the time of this event, Arkansas Nuclear One, Unit 1 (ANO-1) and Unit 2 (ANO-2) were operating at approximately 100 percent of rated power.

B. Event Description

On August 28, 1991 at 1523, ANO-1 entered Technical Specifications Limiting Condition For Operation (LCO) 3.0.3 due to an Engineering determination that certain instrument modules (IMOD) contained in the ANO-1 Foxboro Specification 200 instrument cabinets (CAB) were not seismically qualified and that this condition rendered the instrumentation associated with several safety related systems inoperable.

The ANO-1 instrument cabinets affected by this condition were C539A and B, C540 A and B, C543 and C544. Most of these cabinets and their associated instrumentation were installed during refueling outage 1R6 (October, 1984 - January, 1985) as part of ANO's post TMI modification commitment. The safety related systems affected by this condition are listed on the enclosure.

On August 27, 1991, while installing dummy load modules in vacant slots in the ANO-1 Class 1E Foxboro Specification 200 instrument cabinets, ANO personnel identified that several instrument modules did not have vibration dampening material installed. It was also determined that instrument module guide rails were not installed for some of the cards and that some of the cabinet power supply brackets were missing. An engineering evaluation was initiated to determine the significance of the identified deficiencies and the extent of equipment involvement. The NRC resident inspector was informed of the condition.

At 1400 on August 28, 1991, a conference call was conducted between ANO management and the NRC to brief the commission on the condition and the status of the ongoing evaluations. At 1523 on August 28, based on the results of the initial evaluations, cabinet inspections, and discussions with the vendor which indicated that the seismic qualification of the cabinets had been compromised, the affected instrumentation was declared inoperable. Due to the extent of involvement in ANO-1, Technical Specifications LCO 3.0.3 was entered at that time. This specification requires that, when a LCO is not met, action must be initiated within one hour to place the plant in Hot Standby within the next six hours and in Hot Shutdown within the following six hours. Although the condition was determined to be applicable to ANO-2 also, the extent of involvement was less and repairs were able to be performed within the framework of specific system LCOs.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

At 1600 on August 28, a second conference call was initiated with the NRC, during which a seven day 'Temporary Waiver of Compliance' from the shutdown requirements of the applicable LCOs was requested and granted. The Waiver was requested based on the compensatory measures established (see Section D) and the low probability of the occurrence of a seismic event during the repair effort. The waiver allowed sufficient time to make repairs without subjecting the plant to an unnecessary transient.

At 0545 on August 29, sufficient ANO-1 instrumentation was returned to operable status to allow exiting Technical Specification LCO 3.0.3. On August 31, 1991, all of the affected ANO-1 instrumentation was returned to operable status. Repairs to ANO-2 instrumentation were completed on September 10, 1991.

C. Root Cause

ANO purchased the Foxboro Specification 200 instrument nests and modules as qualified assemblies which were shipped as separate parts and had them assembled on site by ANO's general contractor. The subject vibration dampening material, guide rails and power supply brackets were supplied with the equipment. However, there was no parts list or any specific installation instructions for these components included in the package. ANO also procured the applicable vendor manuals which included the manufacturers instructions for installation and checkout of the modules as well as the Foxboro Class 1E qualification test results and the associated seismic analysis. The manufacturers instructions were for the general line of Specification 200 instruments and did not contain information regarding special installation instructions for Class 1E instruments since Foxboro had not developed specific instructions for Class 1E installations at the time of purchase. Additionally, there were no detailed installation drawings included in the vendor documentation. The Class 1E qualification test results did contain a paragraph referencing the need for modifications to standard modules to meet seismic qualification. However, no specific instructions were discussed in the report. The Design Change Packages prepared by ANO specified to the field to follow the vendor manual instructions regarding installation and checkout of the modules.

An in-depth investigation of this event concluded that there were two causes.

1. The vendor information that documents the qualified configuration of the Specification 200 instrumentation was obscure.
2. The plant modification process review of the Foxboro 1E qualification test report and seismic analysis was not detailed enough to identify and document the qualified seismic configuration.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Arkansas Nuclear One, Unit One		Year	Sequential Number	Revision Number	
	05000313	91	008	01	04 OF 05

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

D. Corrective Actions

The repairs to the ANO-1 instrument modules were prioritized based on the safety function and procedural shutdown requirements of each instrument. During the repair effort, several compensatory measures were in place. These measures included:

- Placing an additional licensed operator on each shift with the responsibility for monitoring and diagnosing instrument failures if a seismic event should occur.
- Providing the operators with appropriate guidance regarding actions required to compensate for instrument failures.
- Instructing Operations personnel to initiate an immediate plant shutdown if a valid seismic monitoring instrumentation alarm occurred (i.e., greater than .1g).

As previously stated, the repairs to the ANO-1 instrumentation were completed on August 31, 1991 and ANO-2 repairs were completed on September 10, 1991.

Based on the causes identified and the specifics related to this condition, ANO believes that it is applicable to only Foxboro Specification 200 instrumentation and that it is not necessary to inspect other ANO constructed Class 1E cabinets. However, a review of other Class 1E instrumentation vendor manuals similar to the Foxboro Specification 200 manuals was conducted to determine if similar problems exist and no additional problems were found.

Of corrective actions initiated as a result of this event include:

- Technical Manuals containing seismically qualified Foxboro Specification 200 component information were revised to include appropriate instructions for maintaining seismic configuration.
- Design review requirements will be clarified by January 31, 1992 to ensure clear and specific instructions are provided concerning the qualified configuration of components or systems. These requirements were originally scheduled to be clarified by December 31, 1991, however, ANO engineering personnel attended a seismic seminar in mid-December which provided important information relevant to seismic qualification and in order to incorporate the information learned at the seminar into the design guide the due date was extended to January 31, 1992. A memorandum was issued to Design Engineering personnel to provide interim guidance related to design review requirements for Design Change Package development pending the above referenced action.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PWE (3)
		Year	Sequential Number	Revision Number				
Arkansas Nuclear One, Unit One	05000313	91	--	008	--	0	1	050005

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

- A training module regarding management expectations with respect to the Configuration Management Program was developed and will be presented to appropriate plant personnel by March 1, 1992.

E. Safety Significance

The applicable Foxboro instrument cabinets were reviewed against the Seismic Qualification Utility Group (SQUG) criteria. A walkdown was performed to ensure that the cabinets were anchored to the floor and that the instrument modules were secured to the cabinets. The review of the SQUG criteria showed that the instrument modules in question met all the appropriate criteria and should have performed their functions if a seismic event had occurred. The ruggedness of the components as supported by the SQUG earthquake experience data demonstrates a significant difference between the conservative qualification approach taken by the vendor (shaker table test) and the performance of equipment in the field during an actual seismic event. However, since the installed configuration of the instrumentation discussed in this report did not match the configuration tested by the vendor, the instrumentation was declared inoperable.

The significance of this condition is reduced in consideration of the low probability of the occurrence of a seismic event, the availability of alternate safety-grade instrumentation and the likelihood that the subject instrumentation would have remained functional if a seismic event had occurred.

F. Basis For Reportability

This condition is reportable pursuant to 10CFR50.73(a)(2)(ii)(B) as a condition that was outside the design basis of the plant since instrumentation that is necessary for safe shutdown of the plant following a seismic event was not installed in a seismically qualified configuration.

G. Additional Information

There have been no previous similar events reported by ANO.

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



SAFETY-RELATED SYSTEMS WITH  
FOXBORO INSTRUMENTATION

ANO-1

- Reactor Building Spray Pump Flow Indication
- Core Flood Tank Level Indication (non-seismic)
- Borated Water Storage Tank Level Indication
- Decay Heat/Low Pressure Injection Flow Indication
- Once Through Steam Generator Level and Pressure Indication
- Pressurizer Level and Temperature
- Reactor Coolant System T-Hot and T-Cold Leg Channels
- Condensate Storage Tank Level
- 2 Wide Range Reactor Coolant System Pressure Instruments
- Source Range Monitor Indication (less than 10% power)

ANO-2

- Pressurizer Level and Pressure
- Containment Sump Level
- Condensate Storage Tank Level
- Steam Generator Level and Pressure
- Reactor Coolant System T-Hot and T-Cold Leg Channels