



# Entergy Operations

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March 20, 1992

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

SUBJECT: Arkansas Nuclear One - Unit 2  
Docket No. 50-368  
License No. NPF-6  
Licensee Event Report 50-368/92-001-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(i)(B) and 10CFR50.73(a)(2)(v) enclosed is the subject report concerning excise nuclear instrumentation time response testing.

Very truly yours,

*James J. Fisticaro*  
James J. Fisticaro  
Director, Licensing

JJF/TFS/mmg

Enclosure

cc: Regional Administrator  
Region IV  
U. S. Nuclear Regulatory Commission  
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Arkansas Nuclear One, Unit Two

DOCKET NUMBER (2) 050003681  
PAGE (3) 05

TITLE (4) Excore Nuclear Instrumentation Logarithmic Power Level Trip Response Times Not Measured As Required by Technical Specifications Due To Deficient Procedures

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)
0	2	79	001	0	0	3	20		050003681
<p>OPERATING MODE (9) 1 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)</p> <p>POWER LEVEL (10) 100</p> <p>20.402(b) 20.405(c) 50.73(a)(2)(iv) 73.71(b)</p> <p>20.405(a)(1)(i) 50.36(c)(1) X 50.73(a)(2)(v) 73.71(c)</p> <p>20.405(a)(1)(ii) 50.36(c)(2) 50.73(a)(2)(vii) Other (Specify in</p> <p>20.405(a)(1)(iii) X 50.73(a)(2)(i) 50.73(a)(2)(viii)(A) Abstract below and</p> <p>20.405(a)(1)(iv) 50.73(a)(2)(ii) 50.73(a)(2)(viii)(B) in Text, NRC Form</p> <p>20.405(a)(1)(v) 50.73(a)(2)(iii) 50.73(a)(2)(x) 366A)</p>									

LICENSEE CONTACT FOR THIS LER (12)

Name Thomas F. Scott, Nuclear Safety and Licensing Specialist

Telephone Number 501964-5000

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)

EXPECTED SUBMISSION DATE (15)

Month Day Year

Yes (If yes, complete Expected Submission Date) X No

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

During a review of procedures on February 27, 1992, it was discovered that previous surveillance testing of excore nuclear instrumentation logarithmic power level high trips had not been performed as required by Technical Specifications. This review was being performed as part of the ANO Business Plan (Item C.1.4) to verify that surveillance procedures adequately implement Technical Specification requirements. Technical Specifications require that response times be measured from the detector output or the input to the first electronic component. All surveillance tests for this trip response time since unit commercial operation in 1980 used a methodology that did not include the preamplifiers in the part of the circuit being tested. The root cause of the condition was determined to be inadequate procedures. A special test was performed satisfactorily on March 4, 1992, to verify that the response time for each channel met Technical Specification requirements. Surveillance procedures will be revised to incorporate the proper test method prior to their next use but no later than the next refueling outage. This condition is similar to one reported in Licensee Event Report 50-368/88-016-01 in that deficient procedures resulted in failure to verify compliance with response times specified by Technical Specifications.

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		Sequential		Revision					
		Year	Number	Number					
Arkansas Nuclear One, Unit Two	05000368	92	--	001	--	00		02 OF 05	

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

A. Plant Status

At the time this condition was discovered, Arkansas Nuclear One Unit 2 (ANO-2) was operating at approximately 100 percent power.

B. Event Description

During a review of procedures for Reactor Protective System (RPS)[JC] response time testing on February 27, 1992, it was discovered that previous surveillance testing of excore nuclear instrumentation (NI)[IG] logarithmic power level high trips had not been performed as required by Technical Specifications (TS). The review was being performed as part of the ANO Business Plan to verify that surveillance procedures adequately implement TS requirements. A note in TS Table 3.3-2 states, "Neutron detectors are exempt from response time testing. Response time of the neutron flux signal portion of the channel shall be measured from detector output or input of first electronic component in channel". Contrary to this requirement, all RPS response time testing conducted since the beginning of unit commercial operation in 1980 did not include the preamplifiers located at the output of the detectors. Test signals were initiated at the preamplifier input to the excore signal conditioning drawer in the RPS cabinets located outside of the Reactor Containment Building [NH].

The excore nuclear instrumentation includes neutron detectors located around the reactor core and signal conditioning equipment located in the Auxiliary Building [NF]. Neutron flux is monitored from source levels through full power and signal outputs are provided for reactor control, reactor protection, and for information display. There are eight channels of instrumentation; four of which are safety channels. The four safety channels provide neutron flux information from startup neutron flux levels to 200 percent of rated power covering a single range of approximately E-8 to 200 percent power (10 decades). Each safety channel consists of three fission chambers, a preamplifier and a signal conditioning drawer containing power supplies, a logarithmic amplifier, linear amplifiers, test circuitry and a rate-of-change of power circuit. Preamplifiers for the fission chambers are mounted outside the biological shield but inside the containment.

High logarithmic power level trips are provided from each excore neutron flux safety channel to ensure the integrity of the fuel cladding and Reactor Coolant System (RCS)[AB] pressure boundary in the event of unplanned criticality from a shutdown condition that could result from withdrawal of control element assemblies. The nominal setpoint for these trips is 0.75 percent power. The trip for each channel is manually bypassed when reactor power exceeds E-4 percent. The bypasses are automatically removed when reactor power decreases to less than or equal to E-4 percent.

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

Technical Specification 4.3.1.1.3 requires that the RPS response time of each reactor trip function be demonstrated to be within its limit at least once per 18 months and that all channels be tested at least once every N times 18 months (where N is the total number of redundant channels in a specific reactor trip function). Response time for the logarithmic power high level trip is required to be less than or equal to 0.40 seconds. Previous tests results, without the preamplifiers having been included in the part of the circuit being tested, were:

Date	Channel	Test Result (Sec.)
01/16/80	A	0.19
06/29/81	B	0.07
10/22/82	C	0.065
12/14/83	D	0.06
04/24/85	A	0.07
08/07/86	B	0.290
04/09/88	C	0.295
10/30/89	D	0.290
03/29/91	A	0.37

C. Root Cause

The root cause of this condition was inadequate procedures used to determine logarithmic power level high trip response times. These procedures utilized a test method that did not include preamplifiers in the portion of the circuit being tested. Personnel preparing the original test procedures following system startup testing apparently were not cognizant of the details of TS requirements.

D. Corrective Actions

On March 4, 1992, a special test was performed to verify that the response time for each channel met Technical Specification requirements. Response time for that part of the circuit omitted from prior tests was measured for each RPS channel. The results were added to the most recent response time measurements for the rest of the channel. The total response times did not exceed the TS limit.

Channel	Previous Surveillance	03/04/92 Measurement	Total Channel Response Time
A	0.37	0.027	0.397
B	0.29	0.018	0.308
C	0.295	0.0285	0.3235
D	0.29	0.027	0.317

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

Surveillance procedures for response time testing will be revised to incorporate the proper test method prior to their next use but no later than the start of the next refueling outage, currently scheduled for August 1992.

The deficient procedures were prepared in 1977. Since that time there have been significant improvements in the current ANO program for procedure preparation, review, verification, and approval. No additional corrective actions in this area are considered to be necessary.

A similar, self-identified condition involving defective procedures that caused Engineered Safety Features response times to be improperly tested was reported in Licensee Event Report 50-368/88-016-01. During evaluation of the earlier condition, RPS response time test procedure methodology was reviewed to verify compliance with TS response times. This review was inadequate in that it failed to discover the omission of preamplifiers from the testing scope. ANO Business Plan Item C.1.4 is being performed to review all surveillance procedures for adequate implementation of TS surveillance requirements. Completion of this review is expected to identify and correct any similar conditions that may exist. The review is scheduled to be completed by October 1, 1992.

#### E. Safety Significance

The ANO-2 accident analysis contained in the Safety Analysis Report (SAR) credits the logarithmic power high level trip for reactor protection in only one event, "Uncontrolled Control Element Assembly (CEA) Withdrawal from a Subcritical Condition". The scenario for this accident involves the withdrawal of CEAs from subcritical conditions. This CEA withdrawal adds reactivity to the reactor core and causes both the core power level and the core heat flux to increase. The RPS is designed to prevent such a transient from resulting in a DNBR of less than 1.3 by the logarithmic power high level trip. The trip function is required only in operating modes below power operation when a powered withdrawal of CEAs could occur. When the trip circuit breakers are open, the logarithmic power level channels are used for reactivity monitoring purposes and Control Room annunciation in the event of an unplanned criticality. Since results of the recent special test demonstrated that response times did not exceed the TS limits, it is reasonable to conclude that response times were within limits during previous periods when the trip was required to be operable. Therefore, this event is considered to have minimum safety significance.

#### F. Basis For Reportability

Not having performed response time testing as required by Technical Specifications, i.e., testing that omitted the preamplifiers, represents an operation prohibited by Technical Specifications reportable pursuant to 10CFR50.73(a)(2)(i)(B).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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The defective procedures represented a condition that alone could have prevented the fulfillment of a safety function required to mitigate the consequences of an accident. This is reportable pursuant to 10CFR50.73(a)(2)(v). A report was made to the NRC Operations Center pursuant to 10CFR50.72(b)(2)(iii) at 1433 on February 28, 1992.

G. Additional Information

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



*Southern California Edison Company*

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March 20, 1992

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

Subject: Docket No. 50-362  
30-Day Report  
Licensee Event Report No. 92-002  
San Onofre Nuclear Generating Station, Unit 3

Pursuant to 10 CFR 50.73(d), this submittal provides the required 30-day written Licensee Event Report (LER) for an occurrence involving the neutron flux monitoring system. Neither the health nor the safety of plant personnel or the public was affected by this occurrence.

If you require any additional information, please so advise.

Sincerely,

Enclosure: LER No. 92-002

cc: C. W. Caldwell (USNRC Senior Resident Inspector, Units 1, 2 and 3)

J. B. Martin (Regional Administrator, USNRC Region V)

Institute of Nuclear Power Operations (INPO)

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