Entergy

Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802
Tel 501 858 5000

1CAN010602

January 27, 2006

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

Subject: Licensee Event Report 50-313/2005-002-00
Arkansas Nuclear One – Unit 1
Docket No. 50-313
License No. DPR-51

Dear Sir or Madam:

In accordance with 10CFR50.73(a)(2)(i)(B), enclosed is the subject report concerning operation prohibited by Technical Specifications.

This submittal does not contain any new commitments.

Dale E. James
Manager, Licensing

DEJ/rs

attachment
enclosure

IE22

cc: Dr. Bruce S. Mallett
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

NRC Senior Resident Inspector
Arkansas Nuclear One
P.O. Box 310
London, AR 72847

Institute of Nuclear Power Operations
700 Galleria Parkway
Atlanta, GA 30339-5957
LEREvents@inpo.org

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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 an 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.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Arkansas Nuclear One – Unit 1	05000 313	1 OF 4

4. TITLE

Movement of Irradiated Fuel Assemblies with one Channel of Source Range Nuclear Instrumentation Inoperable due to a Power Supply Failure Resulted in Operation Prohibited by Technical Specifications

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
12	01	2005	2005	- 002 -	00	01	27	2006	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE

6

10. POWER LEVEL

000

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☒ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Arkansas Nuclear One / Richard H. Scheide	479-858-4618

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	IG	JX	G077	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

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

At 2134 on December 1, 2005, during reactor core reload activities, operators identified that source range nuclear instrumentation channel NI-0502 was inoperable. The reload sequence had begun with the loading of four twice-burned fuel assemblies. As the fourth assembly was placed near NI-0501, operators noticed a disparity between the two source range channels. When the second fuel assembly was placed close to NI-0501, its indication increased to approximately 0.12 cps, whereas NI-0502 indicated approximately 0.04 cps with two assemblies close to it. Upon identification of the disparity, core alterations were immediately secured. The source range channel failed due to failure of its high voltage power supply. Prior to resumption of reload activities, the failed power supply was replaced and the channel was proven operable. The source range instrumentation design does not provide sufficient continuous functional monitoring capability for detection and annunciation of a channel failure during core alterations when indicated count rates are at the extreme low end of the scale. However, an alarm inside the source range signal processing drawers does provide indication of power supply failure. The "Control of Unit 1 Refueling" procedure was revised to require inspection of these drawers prior to beginning refueling activities.

NRC FORM 366AU.S. NUCLEAR REGULATORY COMMISSION
(1-2001)

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Arkansas Nuclear One – Unit 1	05000313	2005	- 002 -	00	2 OF 4

17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

A. Plant Status

At the time this condition was discovered, Arkansas Nuclear One, Unit 1 (ANO-1) was shutdown and in Mode 6 for refueling outage 1R19. Reactor core reload activities were in progress.

B. Event Description

ANO-1 Technical Specifications (TS) requires one source range nuclear instrumentation [IG] channel to be operable in Mode 6 and one additional channel to be operable during core alterations.

At 2134 on December 1, 2005, during the initial phase of reactor core reload activities, operators identified that source range nuclear instrumentation channel NI-0502 was inoperable.

During the initial phase of core reload, source range counts are typically less than 0.1 counts per second (CPS) until several fuel assemblies are placed near a detector. The reload sequence had begun with the loading of four twice-burned fuel assemblies, the first near NI-0502, the second near NI-0501, the third near NI-0502, and the fourth near NI-0501. As the fourth assembly was placed near NI-0501, operators noticed a disparity between the two source range channels. When the second fuel assembly was placed close to NI-0501, its indication increased to approximately 0.12 cps, whereas NI-0502 indicated approximately 0.04 cps with two assemblies close to it. Upon identification of the disparity, core alterations were immediately secured, as required by Technical Specifications.

The control room staff initiated an investigation to determine the cause of the disparity in readings between the two channels. Upon opening the signal processing drawer for NI-0502, operators discovered that the "non-operate" alarm light inside the drawer was illuminated. This alarm indicates either a loss of minimum signal expected due to alpha decay within the detector, or power supply low voltage. It was subsequently determined that the high voltage power supply for NI-0502 had failed.

Due to the extremely low source range counts during the initial phase of core reload, the operator logs did not provide conclusive proof as to the time of failure of NI-0502; however, it was concluded that at least two fuel assemblies had been moved with only one source range channel operable.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Arkansas Nuclear One – Unit 1	05000313	2005	- 002 -	00	3 OF 4

17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

C. Root Cause

The cause of the failure of the source range channel was a random failure of its high voltage power supply. The successful completion of surveillance testing prior to core reload did not identify any high voltage power supply degradation.

The root cause of this event involves the design of the source range instrumentation, which does not provide sufficient continuous functional monitoring capability for detection and annunciation of a channel failure during core alterations when indicated count rates are at the extreme low end of the scale. Although annunciation is available to indicate low count rates, there is no annunciation outside the signal processing drawer that would identify a power supply failure during low count rate conditions.

D. Corrective Actions

Prior to resumption of reactor core reload, the failed power supply was replaced and the instrument channel was tested and proven operable.

As stated previously, an alarm located inside each source range signal processing drawer indicates either a loss of minimum signal expected due to alpha decay within the detector, or power supply low voltage. The "Control of Unit 1 Refueling" procedure was revised to require inspection of these drawers prior to beginning refueling activities.

E. Safety Significance

The basis for the requirement for an additional channel of source range nuclear instrumentation during core alterations is to ensure redundant monitoring capability when positive reactivity changes are being made to the core. At the time of this event, ANO-1 was in Mode 6 with core reload in progress. When NI-0502 was identified as being inoperable, only four fuel assemblies were loaded in the reactor vessel. Additionally, the redundant source range channel (NI-0501) was unaffected by this condition and remained operable and capable of alerting the operators of any unexpected reactivity changes. The unavailability of one channel of source range instrumentation did not adversely impact the operator's ability to perform required actions based on this parameter. Therefore, the safety significance of this event was determined to be minimal.

NRC FORM 366AU.S. NUCLEAR REGULATORY COMMISSION
(1-2001)

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Arkansas Nuclear One – Unit 1	05000313	2005	- 002 -	00	4 OF 4

17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

F. Basis for Reportability

ANO-1 Technical Specifications requires that two channels of source range nuclear instrumentation be operable whenever core alterations are in progress. Since at least two fuel assemblies were moved with less than two channels operable, this condition represented operation prohibited by Technical Specifications and is reportable pursuant to 10CFR50.73(a)(2)(i)(B).

G. Additional Information

A previous similar event was reported in ANO Licensee Event Report 50-313/2004-001-01 dated August 16, 2004. Although the corrective actions associated with this report addressed identification of source range instrument signal failures, they were not adequate to identify a power supply failure during low count rate conditions.

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