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Jeremy G. Browning
Site Vice President
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2CAN101303

10CFR 50.73

October 21, 2013

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

Subject: Licensee Event Report 50-368/2013-003-00
Inoperable Offsite Power Supply Transformer
Arkansas Nuclear One – Unit 2
Docket Number 50-368
License Number NPF-6

Dear Sir or Madam:

Pursuant to the reporting requirements of 10CFR 50.73, attached is the subject Licensee Event Report concerning an inoperable offsite power supply transformer.

There are no new commitments contained in this submittal. Should you have any questions concerning this issue, please contact Stephenie Pyle, Licensing Manager, at 479-858-4704.

Sincerely,

Signature on file with original

JGB/slc

Attachment: Licensee Event Report 50-368/2013-003-00

cc: Mr. Steven A. Reynolds
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

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 (10-2010)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013 Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@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 Arkansas Nuclear One – Unit 2			2. DOCKET NUMBER 05000368		3. PAGE 1 of 4																																				
4. TITLE An Inoperable Offsite Power Supply Transformer Due to an Inadequate Design Configuration Results in a Condition Prohibited by Technical Specifications																																									
5. EVENT DATE MONTH DAY YEAR 08 20 2013		6. LER NUMBER YEAR SEQUENTIAL NUMBER REV NO. 2013 - 003 - 00		7. REPORT DATE MONTH DAY YEAR 10 21 2013																																					
8. OTHER FACILITIES INVOLVED <table style="width:100%;"> <tr> <td style="width:60%;">FACILITY NAME</td> <td style="width:40%;">DOCKET NUMBER</td> </tr> <tr> <td>FACILITY NAME</td> <td>DOCKET NUMBER</td> </tr> </table>						FACILITY NAME	DOCKET NUMBER	FACILITY NAME	DOCKET NUMBER																																
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10. POWER LEVEL <div style="text-align: center;">100</div>		<table style="width:100%; border: none;"> <tr> <td style="width:25%; border: none;"><input type="checkbox"/> 20.2201(b)</td> <td style="width:25%; border: none;"><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td style="width:25%; border: none;"><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td style="width:25%; border: none;"><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> 20.2201(d)</td> <td style="border: none;"><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> 20.2203(a)(1)</td> <td style="border: none;"><input type="checkbox"/> 20.2203(a)(4)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td style="border: none;"><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td style="border: none;"><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td style="border: none;"><input type="checkbox"/> 50.36(c)(2)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td style="border: none;"><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td style="border: none;"><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td style="border: none;"><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td style="border: none;"><input type="checkbox"/> OTHER</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td style="border: none;"><input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td style="border: none;"><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td style="border: none;">Specify in Abstract below or in NRC Form 366A</td> </tr> </table>				<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A
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12. LICENSEE CONTACT FOR THIS LER																																									
FACILITY NAME Stephenie L. Pyle, Licensing Manager				TELEPHONE NUMBER <i>(Include Area Code)</i> 479-858-4704																																					
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT																																									
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14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES <i>(If yes, complete 15. EXPECTED SUBMISSION DATE)</i> <input checked="" type="checkbox"/> NO						15. EXPECTED SUBMISSION DATE <table style="width:100%;"> <tr> <td style="width:33%;">MONTH</td> <td style="width:33%;">DAY</td> <td style="width:33%;">YEAR</td> </tr> <tr> <td>N/A</td> <td>N/A</td> <td>N/A</td> </tr> </table>				MONTH	DAY	YEAR	N/A	N/A	N/A																										
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ABSTRACT <i>(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)</i> <p>On August 20, 2013, a switchyard walkdown by engineering revealed an undocumented wiring configuration associated with the Arkansas Nuclear One Unit 2 (ANO-2) Startup Transformer 3 (SU3) voltage regulator (VR) circuit. (SU3 is one of two offsite power source transformers designed to supply ANO-2). Subsequent investigation revealed that the wiring configuration would have prevented the SU3 VR from operating as designed. The VR has an automatic tapchanger designed to step up SU3 voltage in response to a low voltage condition after a twenty second time delay to maintain a pre-defined voltage control band. This twenty second time delay is designed to be bypassed for three minutes in the event of a Main Turbine Generator lockout, to allow immediate voltage adjustments as ANO-2 station loads are fast transferred from the Unit Auxiliary Transformer to the offsite SU3 transformer during worst case accident load sequencing. The discovered wiring configuration of the SU3 VR prevented the bypass of the twenty second time delay, resulting in SU3 being declared inoperable. The wiring configuration for the SU3 VR appears to have been introduced in the 2005-2006 time frame, during a switchyard improvement project by Entergy Arkansas Transmission and Distribution, which was responsible for ownership of the subject VR at that time. On August 21, 2013, a temporary modification was installed to remove the SU3 VR tap change controller twenty second time delay, which restored the SU3 operability.</p>																																									

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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NARRATIVE

A. Plant Status

At the time of discovery of the subject event, Arkansas Nuclear One Unit 2 (ANO-2) was at approximately 100% power. There were no other structures, components, or systems that were inoperable that contributed to the event at the time of discovery.

B. Event Description

On August 20, 2013, a switchyard walkdown by engineering revealed an undocumented wiring configuration associated with the ANO-2 Startup Transformer 3 (SU3) [FK][XFMR] voltage regulator (VR)[RG] circuit. The SU3 VR functions to regulate the primary voltage of the transformer and is required for operability of the transformer under certain offsite power distribution conditions. The VR employs an automatic tapchanger controller (Beckwith model M-0067E) [TTC] designed to automatically step taps to maintain the primary transformer voltage within a pre-defined control band. The SU3 tapchanger controller has a time delay set at twenty seconds to minimize excessive tapchanger cycles. This twenty second time delay is designed to be bypassed for three minutes in the event of a Main Turbine Generator lockout [86], to allow immediate SU3 voltage adjustments as ANO-2 station loads are fast transferred from the Unit Auxiliary Transformer to the offsite SU3 Transformer during worst case accident load sequencing. Engineering evaluation determined that the discovered wiring configuration of the SU3 VR prevented the bypass of the twenty second time delay and potentially challenged some of the assumptions made in the ANO-2 Millstone Study (Degraded Voltage) Calculations. SU3 was declared inoperable on August 21, 2013 at 1718 CDT.

C. Event Cause

The apparent cause investigation determined that there were not enough known facts available for this condition to accurately discern all applicable apparent or contributing causes; however, it is believed that the wiring configuration on the SU3 voltage regulator was most likely introduced in 2005-2006 during a switchyard improvement project by Entergy Arkansas Transmission and Distribution, which was responsible for ownership of the subject VR at that time.

D. Corrective Actions

Immediate corrective actions resulted in the installation of a temporary modification of the VR tapchanger controller circuit to restore operability of SU3. The temporary modification changed the VR tapchanger time delay from twenty seconds to zero seconds. SU3 was declared operable with compensatory measures on August 21, 2013, at 2345 CDT. Planned actions being tracked in the corrective action process include an engineering change to re-establish the timer bypass as intended by the original design, and the verification of wiring interface points and the equipment affected by previous switchyard upgrades identified in the apparent cause evaluation.

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E. Safety Significance Evaluation

In the event of loss of normal and preferred auxiliary power sources, the Engineered Safety Features (ESF) loads can be supplied from the onsite emergency power sources. The emergency onsite power sources consist of two independent and completely segregated emergency diesel generators (EDGs)[EK], each of which has an adequate capacity to meet the loads required for safe shutdown of the reactor and maintaining safe post-shutdown conditions.

Additionally, in the event of loss of normal and preferred auxiliary power sources and the on-site emergency power sources (i.e., station blackout), a bus of ESF loads can be supplied from the Alternate AC power source which has adequate capacity to meet the loads required for safe shutdown of the reactor and maintaining safe post-shutdown conditions.

The described condition in this report poses potential challenges to the SU3 transformer's ability to mitigate analyzed voltage drops during the most severe accident electrical load sequencing concurrent with low electrical grid voltage, as assumed in the ANO-2 Millstone Study Calculations. The most probable consequence for this condition would be an undervoltage condition sensed at the Degraded Voltage Relays [27] associated with ESF 480 volt load centers 2B5/2B6 [ED] after the reactor and turbine generator have tripped, and a transfer of electrical station loads has occurred from the Unit Auxiliary Transformer to SU3. If the voltage at load centers 2B5/2B6 drops to the Degraded Voltage Relays setpoint and remains low for eight seconds, the incoming breakers (preferred source breakers 152-309 and 152-409) to the 4160 volt ESF buses 2A3 [EB] and 2A4 [EB] will be tripped, thus isolating the 4160 and 480 volt ESF buses from the preferred offsite electrical power supply. (In this postulated scenario, the EDGs would have been automatically started by a Safety Injection Actuation Signal (SIAS) and are running at rated speed and voltage). The EDG output breakers will then automatically close, loads on buses 2A3 and 2A4 will be restarted in sequence, and power will be restored to 480 volt ESF buses 2B5/2B6. ESF loads required to maintain safe post-shutdown condition and provide accident mitigation would then be supplied by the EDGs, as analyzed in the ANO-2 Safety Analysis Report.

F. Basis For Reportability

This event is reported pursuant to the following criteria:

10CFR 50.73(a)(2)(i)(B): Any operation or condition which was prohibited by the plant's Technical Specifications.

NUREG-1022 Revision 3 states that conditions prohibited by Technical Specifications that have occurred within 3 years of the date of discovery are reportable in a Licensee Event Report. The apparent cause evaluation for this event states that the wiring configuration resulting in the inoperable offsite power supply (SU3) appears to have been introduced during the 2005-2006 switchyard upgrades.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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G. Additional Information

10CFR 50.73(b)(5) states that this report shall contain reference to “any previous similar events at the same plant that are known to the licensee.” NUREG-1022 reporting guidance states that term "previous occurrences" should include previous events or conditions that involved the same underlying concern or reason as this event, such as the same root cause, failure, or sequence of events.

A review of the ANO corrective action program and Licensee Event Reports for the previous three years revealed no relevant similar events.

Energy Industry Identification System (EIIS) codes and component codes are identified in the text of this report as [XX].