

August 3, 2006

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Stop P1-137  
Washington, DC 20555-0001

ULNRC05318



Ladies and Gentlemen:

**DOCKET NUMBER 50-483  
CALLAWAY PLANT UNIT 1  
UNION ELECTRIC CO.  
FACILITY OPERATING LICENSE NPF-30  
LICENSEE EVENT REPORT 2006-005  
Loss of 'A' Train off-site Vital Power due to Relay Testing in Switchyard**

The enclosed licensee event report is submitted in accordance with 10CFR50.73(a)(2)(iv)(A) to report loss of the 'A' train off-site power supply due to relay testing in the switchyard.

This letter does not contain new commitments.

Sincerely,

  
L. E. Thibault  
Director Plant Operations

CSP/slk  
Enclosure

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<b>NRC FORM 386</b> (6-2004)				<b>U.S. NUCLEAR REGULATORY COMMISSION</b>				APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007															
<b>LICENSEE EVENT REPORT (LER)</b>  (See reverse for required number of digits/characters for each block)												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 <a href="mailto:infocollect@nrc.gov">infocollect@nrc.gov</a> , 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.											
<b>1. FACILITY NAME</b> Callaway Plant Unit 1								<b>2. DOCKET NUMBER</b> 05000 483				<b>3. PAGE</b> 1 OF 6											
<b>4. TITLE</b> LOSS OF A TRAIN OFF-SITE VITAL POWER DURING RELAY TESTING IN SWITCHYARD																							
<b>5. EVENT DATE</b>				<b>6. LER NUMBER</b>			<b>7. REPORT DATE</b>			<b>8. OTHER FACILITIES INVOLVED</b>													
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME None					DOCKET NUMBER									
06	06	2006	2006	- 005 -	00	08	03	2006	FACILITY NAME					DOCKET NUMBER									
<b>9. OPERATING MODE</b>  1			<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)</b>  <div style="display: flex; flex-wrap: wrap;"> <div style="width: 25%;"> <input type="checkbox"/> 20.2201(b)  <input type="checkbox"/> 20.2201(d)  <input type="checkbox"/> 20.2203(a)(1)  <input type="checkbox"/> 20.2203(a)(2)(I)  <input type="checkbox"/> 20.2203(a)(2)(II)  <input type="checkbox"/> 20.2203(a)(2)(III)  <input type="checkbox"/> 20.2203(a)(2)(IV)  <input type="checkbox"/> 20.2203(a)(2)(V)  <input type="checkbox"/> 20.2203(a)(2)(VI)         </div> <div style="width: 25%;"> <input type="checkbox"/> 20.2203(a)(3)(I)  <input type="checkbox"/> 20.2203(a)(3)(II)  <input type="checkbox"/> 20.2203(a)(4)  <input type="checkbox"/> 50.36(c)(1)(I)(A)  <input type="checkbox"/> 50.36(c)(1)(II)(A)  <input type="checkbox"/> 50.36(c)(2)  <input type="checkbox"/> 50.46(a)(3)(II)  <input type="checkbox"/> 50.73(a)(2)(I)(A)  <input type="checkbox"/> 50.73(a)(2)(I)(B)         </div> <div style="width: 25%;"> <input type="checkbox"/> 50.73(a)(2)(I)(C)  <input type="checkbox"/> 50.73(a)(2)(II)(A)  <input type="checkbox"/> 50.73(a)(2)(II)(B)  <input type="checkbox"/> 50.73(a)(2)(III)  <input checked="" type="checkbox"/> 50.73(a)(2)(IV)(A)  <input type="checkbox"/> 50.73(a)(2)(V)(A)  <input type="checkbox"/> 50.73(a)(2)(V)(B)  <input type="checkbox"/> 50.73(a)(2)(V)(C)  <input type="checkbox"/> 50.73(a)(2)(V)(D)         </div> <div style="width: 25%;"> <input type="checkbox"/> 50.73(a)(2)(VII)  <input type="checkbox"/> 50.73(a)(2)(VIII)(A)  <input type="checkbox"/> 50.73(a)(2)(VIII)(B)  <input type="checkbox"/> 50.73(a)(2)(IX)(A)  <input type="checkbox"/> 50.73(a)(2)(X)  <input type="checkbox"/> 73.71(a)(4)  <input type="checkbox"/> 73.71(a)(5)  <input type="checkbox"/> OTHER          Specify in Abstract below or in NRC Form 366A       </div> </div>																				
<b>10. POWER LEVEL</b>  100																							
<b>12. LICENSEE CONTACT FOR THIS LER</b>																							
FACILITY NAME K.A. Mills, Supervising Engr Safety Analyses/Regional Regulatory Affairs										TELEPHONE NUMBER (Include Area Code) (573) 676-4317													
<b>13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT</b>																							
CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX																			
X	FK	50	G080	Y																			
<b>14. SUPPLEMENTAL REPORT EXPECTED</b>  <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO										<b>15. EXPECTED SUBMISSION DATE</b>			MONTH	DAY	YEAR								
<b>ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)</b> <b>LOSS OF A TRAIN OFF-SITE VITAL POWER DURING RELAY TESTING</b>  Callaway Plant was in MODE 1 at 100 percent power on June 6, 2006. Work was in progress calibrating B switchyard bus lockout devices. At approximately 1339 CDT during performance of this work, Callaway Plant experienced a loss of one of two switchyard buses. This resulted in loss of A train offsite power with subsequent actuations consistent with loss of one vital AC train.  The A diesel generator started and loaded. B train offsite vital power and emergency diesel generator were available. Emergency systems responded as expected.  Investigation of the switchyard bus trip revealed a set of contacts was stuck closed in a relay that was being returned to service. After the failure, the relay was tested several times without the contacts sticking. The contacts were burnished, and the relay was returned to service. The cause of the stuck contacts is indeterminate.  Callaway will develop a comprehensive procedure to improve control of the switchyard maintenance scope and access.																							

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
Callaway Plant Unit 1	05000483	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 6
		2006	- 005	- 00	

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

**I. DESCRIPTION OF THE REPORTABLE EVENT**

**A. REPORTABLE EVENT CLASSIFICATION**

10CFR50.73(a)(2)(iv)(A)- Manual or Automatic Actuation of Systems listed in 50.73(a)(2)(iv)(B).

- (3) Emergency core cooling systems (ECCS) for PWRs,
- (6) PWR auxiliary or emergency feedwater systems,
- (8) Emergency ac electrical power systems, and
- (9) Emergency service water systems which do not normally run.

**B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT**

Plant was in MODE 1 at 100 percent power at the time of the event. Relay and lockout devices calibration work was in progress in the switchyard.

**C. STATUS OF STRUCTURES, SYSTEMS OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT**

Not applicable for this event.

**D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES**

Callaway Plant was in MODE 1 at 100 percent power on June 6, 2006. Work was in progress calibrating B switchyard bus lockout relays. At approximately 1339 CDT during performance of this work, Callaway Plant experienced a loss of the B switchyard bus. The B switchyard bus supplies power to safeguards transformer B, which supplied power to transformer XNB01. Transformer XNB01 is the normal source of offsite power to the A train vital 4160 volt bus NB01.

System Relay Services was in the switchyard under an approved plant work document. During testing of relay MDV8550BF, Breaker Failure Relay for switchyard breaker MDV85, the relay had been isolated using test switches and removed for calibration and testing. Following bench testing, the relay was reinstalled in its case. When the test switches were closed to place the relay back in service, the B switchyard bus was lost.

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

Loss of the B switchyard bus resulted in loss of A train offsite power which, in turn, resulted in the following actuations:

- load shed on A train vital 4160 volt bus (NB01),
- shutdown sequencer actuation for bus NB01,
- A train emergency diesel generator start,
- A centrifugal charging pump (CCP) start (an ECCS pump),
- turbine driven auxiliary feedwater pump (AFP) start,
- realignment of A train essential service water (ESW) valves,
- A and B ESW pump starts,
- A train motor driven AFP start,
- steam generator blowdown and sample isolations.

A emergency diesel generator started and carried loads on NB01. B train offsite vital power and emergency diesel generator were available. The preceding actuations were consistent with loss of one vital AC train. Emergency systems responded as expected. These actuations were complete by 1342 CDT on June 6, 2006.

The steam generators (S/G) were being fed from the main feedwater system before and after loss of the B switchyard bus. The control room received steam generator (S/G) level deviation alarms after the turbine driven auxiliary feedwater pump started and began feeding additional flow to the S/Gs. Auxiliary feedwater flow to the S/G was throttled at approximately 1341 CDT to maintain S/G water level. The plant was stabilized after pumps mentioned above were sequenced on to bus NB01, which was being supplied power from the diesel generator. After S/G levels were stabilized, auxiliary feedwater flow to the steam generators was isolated. Operators carried out actions in procedure OTO-NB-00001, Loss of Power to NB01.

**E. METHOD OF DISCOVERY OF EACH COMPONENT, SYSTEM FAILURE, OR PROCEDURAL ERROR**

Switchyard bus B tripping was self revealing. After the bus trip, System Relay Services personnel checked the breaker failure relay (MDV8550BF) and found that one of the three trip contacts on the internal telephone relay was closed. This closed contact is the secondary relay that trips bus B secondary lockout.

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

**II. EVENT DRIVEN INFORMATION**

**A. SAFETY SYSTEMS THAT RESPONDED**

Safety systems that responded in the event included the following:

- Load Shed Emergency Load Sequencing (LSELS) load shed for NB01,
- LSELS shutdown sequencer for NB01
- Diesel Generator for NB01,
- A centrifugal charging pump (CCP) start (an ECCS pump),
- Essential Service Water (ESW) train A valve realignment,
- ESW pumps A and B start on shutdown sequencer,
- Turbine Driven Auxiliary Feedwater Pump (TDAFP) start,
- Motor Driven Auxiliary Feedwater Pump A start on shutdown sequencer,
- Steam Generator Blowdown Isolation

**B. DURATION OF SAFETY SYSTEM INOPERABILITY**

No safety structures, systems or components were inoperable during the event which contributed to the event.

The B switchyard bus tripped off on June 06, 2006, at 1339 CDT. Power was restored to the B switchyard bus on June 06, 2006 by 1533 CDT. Offsite power was restored to the A safety train (NB01) by June 06, 2006 at 1610 CDT.

**C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT.**

This event was evaluated with the Callaway PRA model. The evaluation determined that the incremental conditional core damage probability (ICCDP) of the event was of very low risk significance.

**III. CAUSE(S) OF THE EVENT AND CORRECTIVE ACTION(S)**

(Information was extracted from the root cause evaluation).

Causal Factor (CF) 1: A set of contacts was found stuck closed on a telephone style relay.

The root cause for the stuck contact is indeterminate. The relay was tested 10 additional times, and the failure was not repeatable. Contacts were subsequently burnished using a burnishing tool, and the relay has been recalibrated, reinstalled, and returned to service.

**NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION**  
(1-2001)  
**LICENSEE EVENT REPORT (LER)**

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

**Corrective Action (CA) 1:** Prior to restoration, the contacts will be verified to be in the proper state by: 1) checking across the test switches before closing, 2) on the relay itself before placing the relay back in the case, or 3) visually if it is not practical to use a meter. Verifying the contact state will not prevent a stuck contact, but will prevent placement in service with the contact in the wrong position.

**CF 2:** The Plant Staff did not understand the complete impact a failure of this relay would have on the plant or the grid.

**Root Cause (RC) 2.1:** There are no Operational Impact Statements associated with any risk to the plant because of work on switchyard subcomponents. It is a common practice in the nuclear industry to provide Operational Impact Statements so that the impact of performance of work is evaluated. Operational Impact Statements are statements that are developed to assess maintenance work and the impact of performing that work. Operational Impact Statements also take into account the plant operating status when the work is scheduled to be performed and therefore are not usually completed to just before the work is to be started.

**Corrective Action To Prevent Recurrence (CATPR) 2.1:** Develop an Operational Impact Statement for each protective relay for which a single failure can result in a reactor trip or ESFAS actuation, and identify all failure modes.

**RC 2.2:** Callaway's procedures for controlling the access and the maintenance of the switchyard need improvement with respect to work involving many of the switchyard's subcomponents.

**CATPR 2.2:** Develop one comprehensive procedure to control the following with respect to the maintenance of the switchyard:

1. The identity of the switchyard's single point of accountability (SPA)
2. Use of operational impact statements for all switchyard intrusive work.
3. Job brief of workers.
4. Control Room brief.
5. Definition of low risk and high risk jobs.
6. Levels of approval required for low risk and high risk jobs.

**NRC FORM 366AU.S. NUCLEAR REGULATORY COMMISSION**  
(1-2001)  
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CATPR 2.1 ensures the proper evaluations are performed to determine the appropriate time to schedule the work and the impact to the plant, and the appropriate contingency actions to be put in place will prevent a single failure of a relay from effecting the protected ESFAS safety train equipment without Operations prior knowledge.

CATPR 2.2 will mitigate this event because the work will be thoroughly evaluated using the Work Management process and the safety monitor so plant personnel understand the effect of the work on plant operation. This will allow for more rigorous risk assessment and mitigating actions.

**IV. PREVIOUS SIMILAR EVENTS**

In this event, the failure of a single contact provided an input to the protective relaying scheme. The single input resulted in a valid fault in the protective relaying system. Two previous occurrences were identified where single failures of a component associated with protective relaying resulted in a reactor trip. These reactor trips occurred in 2004 and were reported in LERs 2004-002 and 2004-003. The scope of corrective actions for the two previous events addressed only those protective relays that could cause a reactor trip, not those protective relays that would only cause an Engineered Safety Features actuation.

**V. ADDITIONAL INFORMATION**

IEEE System designator: FK  
IEEE Component designator (switchyard relay): 50