Union Electric
Callaway Plant

PO Box 620
Fulton, MO 65251

April 12, 2002

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

ULNRC-04639

Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
FACILITY OPERATING LICENSE NPF-30
LICENSEE EVENT REPORT 2002-004-00
Reactor Protection System actuation while performing Main Turbine Shell warming in Mode 4

The enclosed licensee event report is submitted in accordance with 10CFR50.73(a)(2)(iv)(A) to report a Reactor Protection System actuation while performing Main Turbine Shell warming in Mode 4.

John T. Patterson
Superintendent,
Work Control, Mechanical

JTP/ewh

Enclosure

IE22

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NRC FORM 366 (7-2001)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

LICENSEE EVENT REPORT (LER)

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

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4. TITLE

Reactor Protection System actuation while performing Main Turbine Shell warming in Mode 4.

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER 05000
2	13	2002	2002	- 004 -	00	4	12	2002	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE	4
10. POWER LEVEL	0

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

	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)
	20.2203(a)(1)		50.36(c)(1)(i)(A)	X	50.73(a)(2)(iv)(A)		73.71(a)(4)
	20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)
	20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER
	20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		50.73(a)(2)(vii)		
	20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)		
	20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)		

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
MARK A. REIDMEYER	(573) 676-4306

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

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

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

On 2/13/02, Callaway Plant was in Mode 4 with Reactor Coolant System (RCS) temperature at 300 degrees F and RCS pressure at approximately 395 psig. The Reactor Trip Breakers were closed, Main Turbine Shell warming was in progress, and Auxiliary Feedwater system testing was being conducted. At 0434, a Reactor Protection System (RPS) signal was generated that tripped open the Reactor Trip Breakers. Subsequent investigation revealed the trip was due to pressure in the Main Turbine increasing above an interlock setpoint of 56 psig (P-13), which is equivalent to 10 percent power. When this interlock was satisfied, it in turn enabled a Low Pressurizer Pressure Reactor Trip permissive (P-7) with a setpoint of RCS pressure less than 1885 psig. Since RCS pressure was approximately 395 psig, an RPS signal was generated to open the Reactor Trip Breakers.

The cause of the event was operating procedures not clearly identifying plant conditions required to perform Main Turbine Shell Warming. Corrective actions taken were to revise plant procedures to reflect appropriate cautions and restrictions for performing Main Turbine Shell warming.

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

I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

This event is reportable under 10CFR50.73(a)(2)(iv)(A), a condition that resulted in a valid RPS actuation.

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

Callaway Plant was in Mode 4 with RCS temperature at 330 degrees F and RCS pressure at approximately 395 psig. Reactor Trip Breakers were closed, the Steam Generator (S/G) Blowdown system was secured, Main Turbine Shell warming was in progress, and Auxiliary Feedwater system testing was being conducted.

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

S/G Blowdown system was removed from service.

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

The following paragraph provides an abbreviated account of the RPS actuation event.

On 2/13/02, Callaway Plant was in Mode 4 with Reactor Coolant System (RCS) temperature at 300 degrees F and RCS pressure at approximately 395 psig. The Reactor Trip Breakers were closed, S/G Blowdown was secured, Main Turbine Shell warming was in progress, and Auxiliary Feedwater system testing was being conducted. At 0434, a Reactor Protection System (RPS) signal was generated that tripped open the Reactor Trip Breakers. Subsequent investigation revealed the trip was due to pressure in the Main Turbine increasing above an interlock setpoint of 56.12 psig (P-13), which is equivalent to 10 percent power. When this interlock was satisfied, it in turn enabled a Low Pressurizer Pressure Reactor Trip permissive (P-7) with a setpoint of RCS pressure less than 1885 psig. Since RCS pressure was approximately 395 psig, an RPS signal was generated to open the Reactor Trip Breakers.

These subsequent paragraphs provide a detailed narration of how various systems responded over a 5-day period with the cumulative effect of increasing the Main Turbine Shell pressure above an RPS actuation setpoint.

On 2/8/02, makeup water to the S/G was being provided by "B" Condensate pump flowing water through feedwater heaters and into the S/Gs. RCS temperature was being controlled by dumping steam to the Main Condenser using the main steam dumps and by S/G blowdown. At 0207, Main Turbine Shell warming was initiated. This directed a portion of the steam flow away from the Main Condenser and through the Main Turbine. This steam flow through the Main Turbine caused Shell pressure to increase from a vacuum to approximately 26 psig. Shell pressure remained near this value for the next 4.5 days. On 2/12/02, at 1343, S/G Blowdown was secured. With this method of RCS heat removal eliminated, flow through the main steam dumps increased with a resultant increase in condensate temperature. This increase in condensate temperature, in turn, reduced the effectiveness of the feedwater heaters to remove steam from the Main Turbine (this steam is supplied by a small exhaust line off the turbine and is used to heat the condensate water). With the reduction in steam removal and condensation, backpressure in the turbine Shell increased, raising the Shell pressure to approximately 42 psig. At approximately 0200, 2/23/02, testing on the Auxiliary Feedwater (AFW) system was initiated. This testing involved flowing water through automatic AFW flow control valves to the S/G's. In order to accommodate the increased supply of makeup water to the "B" and "C" S/G, level was lowered in the affected S/G's by reducing condensate flow to them. When AFW test flow was established, S/G level increased and condensate flow was reduced to the S/G. The AFW water being supplied was cooler than condensate water normally supplied to the S/G's, and as the cool water in the S/G's began to heat up, it caused S/G level to increase.

This increase in S/G level caused the S/G Feedwater Bypass valves to close down and further reduce the condensate flow going to the S/G.

The reduced condensate flow now going through the feedwater heaters caused a reduction in the feedwater heaters ability to remove steam from the Main Turbine Shell and thus an increase in backpressure inside the turbine Shell. When this backpressure increase occurred, it caused pressure to go above the P-13 setpoint.

There are two setpoints crtical to this event. One setpoint is permissive P-13. P-13 senses Main Turbine Shell pressure and this pressure is used as an indication of plant power. Whenever Shell pressure increases above the P-13 setpoint, this is normally an indication that the plant is at or above 10 percent power. With permissive P-13 actuated, it enables another permissive, P-7. P-7 enables various reactor trips (low Pressurizer pressure, high Pressurizer level), required to be active when above 10 percent power. For this particular event, when turbine Shell pressure peaked, it was above the P-13 setpoint of 56.12 psig and thus P-13 actuated and enabled the P-7 setpoints. P-7 enabled the Low Pressurizer Pressure Reactor Trip, which had a setpoint of 1885 psig. Since RCS pressure was approximately 395 psig, an RPS signal was generated to open the Reactor Trip Breakers.

As can be seen by this narrative, three separate systems/events were involved. Taken individually, none of the events could cause the RPS actuation. When the effects of these three events are combined in this unique sequence, the cumulative effect is to increase Main Turbine Shell pressure above a permissive setpoint causing a reactor trip signal to be generated.

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

After the RPS actuation occurred, an Event Review Team (ERT) was assembled to investigate the event and determine the cause. The ERT concluded that the operating procedures did not clearly identify the plant conditions required to perform Main Turbine Shell warming. A contributing cause was a lack of precautionary statements in the operating procedures that warned about the ability to reach the P-13 setpoint, which enabled the P-7 Low Pressurizer Pressure Reactor Trip signal.

II. EVENT DRIVEN INFORMATION

A. SAFETY SYSTEMS THAT RESPONDED

Reactor Protection System (RPS) actuated to open the reactor trip breakers.

B. DURATION OF SAFETY SYSTEM INOPERABILITY

Not applicable.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT.

This event occurred with the plant in Mode 4, shut down with the reactor subcritical, and was of no safety significance.

III. CAUSE OF THE EVENT

Operating procedures did not clearly identify the plant conditions required to perform Main Turbine Shell warming.

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

IV. CORRECTIVE ACTIONS

Plant procedures were revised to clarify required plant conditions for performing Main Turbine Shell warming.

V. PREVIOUS SIMILAR EVENTS

A review of historical data for the past three years did not reveal any similar LERs or Callaway Action Request documents.

VI. ADDITIONAL INFORMATION

The system and component codes listed below are from the IEEE Standard 805-1984 and IEEE Standard 803A-1984 respectively.

System: Not applicable.

Component: Not applicable.