AmerenUE
Callaway Plant

PO Box 620
Fulton, MO 65251

September 2, 2003

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

ULNRC-04895

Ladies and Gentlemen:

DOCKET NUMBER 50-483
Callaway PLANT UNIT 1
UNION ELECTRIC CO.
FACILITY OPERATING LICENSE NPF-30
LICENSEE EVENT REPORT 2003-006-00

Incorrect sequencing of procedure steps could have resulted in delayed recovery from a steam generator tube rupture.

The enclosed licensee event report is submitted in accordance with 10CFR50.73(a)(2)(V)(C) and 10CFR50.73(a)(2)(V)(D) to report a problem with incorrect sequencing of steam generator tube rupture procedure steps that could have resulted in delaying recovery from a tube rupture event.

Very truly yours,

Warren A. Witt

Warren A. Witt
Manager, Callaway Plant

WAW/ewh

Enclosure

IE22

cc: Mr. Thomas P. Gwynn
Acting Regional Administrator
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-4005

Senior Resident Inspector
Callaway Resident Office
U.S. Nuclear Regulatory Commission
8201 NRC Road
Steedman, MO 65077

Mr. Jack N. Donohew (2 copies)
Licensing Project Manager, Callaway Plant
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop 7E1
Washington, DC 20555-2738

Manager, Electric Department
Missouri Public Service Commission
PO Box 360
Jefferson City, MO 65102

Records Center
Institute of Nuclear Power Operations
700 Galleria Parkway
Atlanta, GA 30339

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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

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

Estimated burden per response to comply with this mandatory information 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 Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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 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.

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE
Incorrect sequencing of steam generator tube rupture procedure steps could have resulted in delaying recovery from a tube rupture.

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
7	3	2003	2003	- 006 -	00	9	02	2003	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE	1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
10. POWER LEVEL	100		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)		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 Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iii)		50.46(a)(3)(ii)	X	50.73(a)(2)(v)(C)		
			20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)	X	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 7/3/03, with Callaway Plant operating in Mode 1 at 100 percent power, and during development of Licensed Operator Continuing Training (LOCT), it was discovered that an error existed in emergency procedure E-3, STEAM GENERATOR TUBE RUPTURE. The postulated accident involved a reactor trip due to a loss of off-site power compounded by a steam generator tube rupture (SGTR) on "D" loop of the reactor coolant system, and a stuck open auxiliary feedwater flow control valve. Early in the procedure, the Pressurizer Power Operated Relief Valves (PORV) were being armed in order to provide cold overpressure protection during the cool down phase. By arming the PORVs early, this made it difficult to meet the conditions required to secure Safety Injection later in the SGTR recovery, which potentially could prolong recovery from the SGTR. Prolonged recovery would result in additional liquid being released to the atmosphere via the ruptured steam generator's atmospheric dump valve and additional dose to the public. Once the procedure error was identified, a procedure revision was issued which corrected the problem.

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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 has been classified as reportable per 10CFR50.73(a)(2)(v)(C) and 10CFR50.73(a)(2)(v)(D), an event or condition that could have prevented the fulfillment of a safety function to control the release of radioactive material, or mitigate the consequences of an accident.

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

Callaway Plant was in Mode 1 at 100 percent power.

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

Not Applicable to this event.

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

On 7/3/03, during development of Licensed Operator Continuing Training (LOCT), it was discovered that an error existed in emergency procedure E-3, STEAM GENERATOR TUBE RUPTURE. The postulated accident involved a reactor trip due to a loss of off-site power compounded by a steam generator tube rupture (SGTR) on "D" loop of the reactor coolant system, and a stuck open auxiliary feedwater flow control valve. Early in the procedure, at step 5 of 39, the Pressurizer (PZR) Power Operated Relief Valves (PORV) were being armed in order to provide cold overpressure protection during the cool down phase. By arming the PORVs early, this made it difficult to secure Safety Injection later in the SGTR recovery. Cool down of the reactor coolant system (RCS) was accomplished using the intact S/G Atmospheric Steam Dump (ASD) valves. The cool down was initiated in order to equalize RCS pressure with that of the ruptured S/G, thereby securing flow from the RCS to the faulted S/G. As the cool down progressed, cold Safety Injection water migrated into the Tcold portion of the faulted RCS loop as flow to the ruptured S/G was decreasing. The PZR PORVs actuate based upon the auctioneered lowest Tcold temperature and as the Tcold temperature decreased in the faulted loop, the PORV setpoint would decrease until a PORV actuation would occur. This PORV actuation would then rapidly lower RCS pressure and jeopardize maintaining the required RCS subcooling margin. With actuation of the PORV, an inflow of water into the Pressurizer would also occur in the "D" loop surge line. This influx of water from the loop via the surge line allowed additional cold Safety Injection water to flow into the faulted loop and further reduced the PORV actuation setpoint, increasing the possibility of additional PORV actuations.

If the subcooling margin could not be maintained, then the Licensed Operators (LO) could not proceed with the accident recovery procedure until conditions were re-established to allow reducing RCS temperature and pressure in a controlled manner per the E-3 procedure. This cooldown would be repeatedly interrupted by actuation of the PORV's and delay reaching conditions where Safety Injection could be terminated. This in turn, prolonged the event and resulted in additional primary water being released to the atmosphere via the ruptured S/G which increased radiation dose to the public.

A review of superceded revisions of E-3 determined that in 1988, the statement arming the PZR PORVs was added to the E-3 procedure, with the "reason for change" stated as to comply with Westinghouse Emergency Response Guides (ERGs). It should be noted that research indicates no specific directions concerning the operation of cold overpressure protection systems has been contained in ERGs. In Westinghouse Direct Work DW-87-047, it stated that the ERGs address a Cold Overpressure Protection System (COPS) to ensure that utilities consider this system operation in the process of developing the EOPs. Not until DW-98-001 were instructions given to add the

cold overpressure protection system in-service temperature and limit as criteria for depressurizing the RCS in FR-P.2.

The reason the PORV's were armed for the cold overpressure mitigation system (COMS) in the Emergency Operation Procedures (EOP's) was that below 2185 PSIG PZR Pressure, the interlock 2 of 4 pressure channel coincidence closed the PZR block valves. The associated ERG required the PZR PORV block valves to be OPEN. Therefore in order to have the PZR PORV's available for use, COMS was armed and allowed the block valves to remain OPEN. Note Westinghouse Direct Work 98-044 recognized that the initiation of COMS was a plant specific item and thus no change was made to the generic EOP's. In Callaway Plant Refuel 11 the 2185 PSIG interlock was deleted in order to make the PZR PORV control circuits' safety grade and made the arming of the PZR PORVs unnecessary. It should be noted that until 1999, the Callaway plant simulator did not exhibit these conditions due to computer modeling limitations.

It must be noted that the condition described in this LER potentially would have delayed recovering from a SGTR but it did not prevent recovery. Several crews of Licensed Operators used the flawed procedure in simulator exercises to determine potential responses, with the results ranging from minor delays accompanied by few PORV operations, to crews being delayed long enough that they were procedurally directed to alternate recovery procedures which would then eventually accomplish the necessary final recovery solution. Those crews that were sufficiently delayed so that they were required to use alternate procedures had two alternate resolution flow paths. One flow path required transitioning to a procedure for SGTR with loss of reactor coolant and subcooled recovery required. The other flow path involved a one hour soak period to restore compliance with RCS cool down rates. However, recovery was always possible, just delayed by varying amounts of time dependent upon operator response times to conditions experienced during the simulations.

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

This procedure error was discovered during development of Licensed Operator Continuing Training.

II. EVENT DRIVEN INFORMATION

A. SAFETY SYSTEMS THAT RESPONDED

Not applicable to this event because this LER details hypothetical accidents and corresponding actions to recover from a SGTR.

B. DURATION OF SAFETY SYSTEM INOPERABILITY

No safety systems were rendered inoperable as a result of the event described in this LER.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT.

A Probablistic Risk Assessment determined that the event was of very low/no risk significance.

III. CAUSE OF THE EVENT

The procedure error was due to incorrect evaluation of Westinghouse correspondence, which led to the insertion of the extra step in procedure E-3 to arm the PZR PORVs and enabling operation of COMS.

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

IV. CORRECTIVE ACTIONS

Once the procedure error was identified, a new revision was issued which corrected the problem.

A Self Assessment was conducted from August 25 through 29, 2003 to review Callaway's process for controlling Emergency Operating Procedures. No other Emergency Operating Procedure deficiencies were identified that would have prevented the fulfillment of a safety function or the mitigation of the consequences of an accident. As a result of this Self Assessment, the following actions will be taken:

- Westinghouse EOP correspondence will be evaluated for applicability to Callaway.
- Emergency Operating Procedures will be revised as necessary, based upon the results of the previously mentioned correspondence evaluation.
- Callaway's administrative procedure governing the revision of Emergency Operating Procedures will be revised to incorporate a formal review and documentation process of Westinghouse correspondence applicable to Callaway.

V. PREVIOUS SIMILAR EVENTS

On 7/3/03, Callaway Action Request (CAR) 200304922 was written to document the present issue. In reviewing the Callaway Action Request System (CARS) historical records for the past 3 years, no additional CARs were identified that were associated with the problem identified in this LER.

A review of LERs for the last three years did not reveal any LERs submitted for an issue similar to the one documented in this LER.

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. There was no equipment failure as described in this LER.

Component: Not Applicable. There was no equipment failure as described in this LER.