

March 15, 2002

U. S. Nuclear Regulatory Commission
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ULNRC-4624

Gentlemen:



**DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
FACILITY OPERATING LICENSE NPF-30
LICENSEE EVENT REPORT 2002-002-00**

**"A" Motor Driven Auxiliary Feedwater Pump Inoperable due to Auxiliary
Feedwater Calculation error**

The enclosed licensee event report is submitted in accordance with 10CFR50.73(a)(2)(i)(B) and 10CFR50.73(a)(2)(ii)(B) to report an event in which an error in a design calculation resulted in historical test data becoming unsatisfactory and making "A" Motor Driven Auxiliary Feedwater Pump Inoperable on five separate past occasions.

Warren A. Witt
Warren A. Witt
Manager, Callaway Plant

WAW/ewh

Enclosure

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LICENSEE EVENT REPORT (LER)

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

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.

FACILITY NAME (1)

Callaway Plant Unit 1

DOCKET NUMBER (2)

05000483

PAGE (3)

1 OF 4

TITLE (4)

"A" Motor Driven Auxiliary Feedwater Pump Inoperable due to Auxiliary Feedwater Calculation error

EVENT DATE (5)

LER NUMBER (6)

REPORT DATE (7)

OTHER FACILITIES INVOLVED (8)

MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	16	2002	2002	- 002	- 00	3	15	2002	FACILITY NAME	DOCKET NUMBER
										05000
										05000

OPERATING
MODE (9)

1

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

POWER
LEVEL (10)

100

20.2201(b)	20.2203(a)(3)(ii)	X	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)		50.73(a)(2)(v)(C)	
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)	
20.2203(a)(2)(v)	X 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)	

LICENSEE CONTACT FOR THIS LER (12)

NAME M. A. Reidmeyer, Supervisor, Regional Regulatorv

TELEPHONE NUMBER (Include Area Code)

(573)676-4306

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

CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU- FA CTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On 2/6/02, Callaway Engineering personnel completed final evaluation of a design calculation error associated with the Auxiliary Feedwater (AFW) system which impacted surveillance testing acceptance criteria. The design calculation error was made by Bechtel in 1984. This error resulted in a reduced operating margin between normal AFW Pump performance and Design Basis allowable acceptance criteria. A review of past pump performance data was conducted as part of a Past Operability review. The results of the review determined that the "A" Motor Driven Auxiliary Feedwater (MDAFW) pump did not meet the revised acceptance criteria five times within the last three years.

Corrective actions include a review of other applicable design calculations provided by Bechtel and evaluation of methods to regain margin for the AFW pumps which include procedure revisions, revised valve positions, and possible rotating element replacement.

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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)(i)(B), an operation or condition prohibited by T/S, and 10CFR50.73(a)(2)(ii)(B), a degraded or unanalyzed condition.

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT.

Callaway Plant was in Mode 1 at 100 percent reactor 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.

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

On 11/26/01, Callaway personnel identified an error with Bechtel design calculation M-AL-39 that had not been adequately resolved when it was first identified in 1997. This resulted in increased developed head requirements for Callaway's two Motor Driven Auxiliary Feedwater (MDAFW) pumps in order to assure design basis accident flow criteria were met. Based on a review of past pump surveillance data, there were no concerns with past operability identified at that time. A revision to the flawed calculation and evaluation of potential AFW system configuration changes were initiated, including consideration of surveillance test procedure revisions.

On 1/16/02, with Callaway in Mode 1, at 100 percent reactor power, surveillance testing of "A" MDAFW pump was completed. During this testing, it was determined that in order to satisfy design basis accident flow criteria and maintain the pump Operable per Technical Specification (T/S) requirements, it was necessary to operate with the recirculation line throttled to a value below the maximum recirculation flowrate. The potential for having to operate with reduced recirculation flow rates was known because of the design error identified in Bechtel calculation M-AL-39 which had reduced the available operating margin between actual pump operation flow and the amount required for accident conditions. Bechtel completed calculation M-AL-39 in 1984. This calculation reconciled the actual MDAFW pump curves associated with the installed pumps against those curves utilized within original design calculations. This calculation utilized a maximum Steam Generator (S/G) pressure that corresponded with the relief pressure of the Atmospheric Steam Dumps (1125 psig) for evaluating the performance of these pumps. However, design basis requirements specified that the lowest setpoint of the Main Steam Safety Valves (1221 psig, with 3 percent tolerance included) should be utilized for this evaluation, not the setting of the Atmospheric Steam Dumps. Although this did not impact the ability of the MDAFW pumps to meet design basis/Technical Specification requirements, the results of this flawed calculation were later utilized to evaluate and justify pump recirculation flowrates which were greater than those originally assumed in design calculations.

Since the 1/16/02 surveillance results indicated the need to throttle recirculation flow, a detailed review of past pump performance was instituted. This review revealed discrepancies in pump performance data taken during the last three years. On 2/6/02 Callaway Engineering personnel completed final evaluation of the design calculation error and determined the minimum accident analysis required differential pressure was 1562.6 psid versus the T/S requirement of 1535 psig discharge pressure. Using the increased acceptance criteria to compensate for the design calculation error, five tests on the "A" AFW pump over the last three years were determined to be unsatisfactory. These five tests were completed on 4/11/99, 7/6/99, 8/31/00, 11/21/00, and 12/5/01.

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

While pump performance data was being reviewed for past Operability determination, an analysis was conducted to determine if the Auxiliary Feedwater (AFW) system safety function was still maintained. The design basis of the AFW system is to supply feedwater to the steam generators to remove decay heat following any abnormal situation that requires plant shutdown. Testing the AFW system in accordance with Technical Specifications SR 3.7.5.2 is designed to verify the capability of each MDAFW pump to deliver a minimum of 250 gpm to two Steam Generators (S/G), at a pressure corresponding to the lowest S/G Main Steam Safety Valve (MSSV) setpoint. With the discharge pressure for "A" MDAFW pump in question for five testing periods, an alternate method was determined for demonstrating sufficient discharge pressure existed to assure flow to the two S/G. Calculations show that each MDAFW pump has the capacity to deliver a minimum of 250 gpm to two S/G, at a pressure corresponding to the setpoint of one of two safety-related S/G Atmospheric Steam Dumps (ASD) fed by the same MDAFW pump. By requiring the AFW pumps to provide flow against the reduced pressure controlled by the ASDs, it could be shown that sufficient flow would be available to satisfy accident criteria. A MDAFW pump differential pressure of 1530 psid (crediting only one of two ASDs fed by the same MDAFW pump) ensures this minimum accident analysis AFW flowrate can be met. A review of OSP-AL-P001A surveillance results for the past three (3) years shows that all sixteen (16) of the last surveillances met the 1530 psid acceptance criteria.

A review of Callaway Plant's Equipment Out-Of-Service (EOSL) log for those periods of time, revealed that at least one of two ASDs associated with "A" MDAFW pump, were always Operable. Based on the availability of the S/G ASDs, which are required to be operable in accordance with T/S 3.7.4 and are calibrated on an 18-month frequency with controller settings checked shiftly, during the time frame between 1/16/99 until 1/18/02, it can be demonstrated that there was no safety significance associated with this situation.

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

A review of past system performance prompted by surveillance results from 1/16/02, revealed the problem with the past pump data.

II. EVENT DRIVEN INFORMATION

A. SAFETY SYSTEMS THAT RESPONDED.

Not applicable.

B. DURATION OF SAFETY SYSTEM INOPERABILITY.

For LER purposes, data for the past three years is required to be evaluated per NUREG 1022, section 3.1.2. An evaluation of data covering the time period from 1/16/99 to 1/22/02 was performed. The "A" MDAFW pump was Inoperable on five occasions identified in Section I. Item D, due to the unsatisfactory test data. The evaluation revealed that the "A" MDAFW pump had been Inoperable on these five occasions with a total Inoperability time of 370 days, 9 hours, 43 minutes.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT.

PAL01A feeds steam generators B and C. Both of these steam generators (S/G) have atmospheric steam dump valves (ASD); ABPV0002 on S/G "B" and ABPV0003 on S/G "C". These ASDs have set pressures of 1125 psig, as compared to the lowest S/G safety valve set pressures of 1185 psig. PAL01A will provide sufficient auxiliary feedwater flow, even with slight pump degradation and/or excessive mini-flow, if the ASDs are credited.

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

PAL01A was determined to be Inoperable on five occasions due to unsatisfactory test data. At least one ASD (either ABPV0002 or ABPV0003) was Operable during these occasions. Therefore, PAL01A was always functional during the last three (3) years, resulting in no increase in core damage risk.

III. CAUSE OF THE EVENT

The cause is the initial error in the Bechtel Calculation M-AL-39 Rev.2, which led to a reduction in available pump operating margin.

IV. CORRECTIVE ACTIONS

Multiple corrective actions are being pursued. The error in Bechtel calculation M-AL-39 has been corrected under Callaway calculation AL-16, Revision 3 and an action plan has been developed to review all applicable Bechtel calculations. Pump testing procedures have been revised, recirculation flow manual isolation valves are now locked in a throttled position, and potential pump performance enhancements are being reviewed for future modification.

V. PREVIOUS SIMILAR EVENTS

A review of Callaway Action Request System (CARS) and past LERs revealed four CARs dealing with problems associated with Bechtel AFW system calculations. These were CARs 199700421, 199803497, 200107295, and 200200281.

VI. ADDITIONAL INFORMATION

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

System: BA

Component: P