

October 31, 1995



U.S. Nuclear Regulatory Commission
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ULNRC-3279

Gentlemen:

**DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
FACILITY OPERATING LICENSE NPF-30
LICENSEE EVENT REPORT 95-006-00
PLANT SHUTDOWN DUE TO EXCESSIVE REACTOR
COOLANT SYSTEM LEAKAGE AND FEEDWATER ISOLATION
SIGNAL DUE TO HIGH STEAM GENERATOR LEVEL**

The enclosed Licensee Event Report is submitted pursuant to 10CFR50.73(a)(2)(i)(A) due to a condition requiring a plant shutdown by Callaway Plant Technical Specifications. This LER is additionally submitted pursuant to 10CFR50.73(a)(2)(iv) for a condition that resulted in an automatic actuation of an Engineered Safety Feature.

A handwritten signature in cursive script that reads "R. D. Affolter".

R. D. Affolter
Manager, Callaway Plant

RDA/HDB/JDN/cmw

Enclosure

cc: Distribution attached

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Callaway Plant Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 4 8 3 1 OF 0 4	PAGE (3) 1 OF 0 4
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TITLE (4) **Plant Shutdown Due to Excessive Reactor Coolant System leakage and Feedwater Isolation Signal due to High Steam Generator Level**

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)														
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV. NO.	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)												
1	0	2	9	5	0	0	6	0	1	0	2	7	9	5			0	5	0	0	0		

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (Check one or more of the following) (11)																				
POWER LEVEL (10) 0 9 8	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(v)	<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)(x)	<input type="checkbox"/> 73.71(b)	<input type="checkbox"/> 73.71(c)	<input type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER	
NAME H. D. Bono, Supervising Engineer, Site Licensing		AREA CODE 3 1 4	NUMBER 6 7 6 - 4 4 2 8

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO				

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

On 10/02/95 at 0430 CST, with the plant in Mode 1 at 98% Reactor Power, Licensed Operators (LOs) received indications of increased Reactor Coolant System (RCS) leakage. Computerized RCS leak monitoring indicated a total leak rate of 2.15 gpm. Technical Specification (TS) 3.4.6.2 Action b. was entered due to RCS Unidentified Leakage greater than 1.0 gpm.

At 0600 hrs OSP-BB-00009, RCS Leak Rate was completed and quantified Unidentified Leakage at 2.11 gpm. Reactor Building entry at 0717 hrs identified the leak was inside the bioshield, but could not identify its exact source due to high area dose rates.

Reactor shutdown commenced at 0800. The turbine was manually tripped at 1126 hrs. At 1138 hrs a Feedwater Isolation Signal (FWIS) and subsequent Auxiliary Feedwater Actuation Signal (AFAS) occurred due to 'D' Steam Generator high-high level as a result of reduced feedwater (FW) temperature and a faulty pneumatic booster relay keeping the FW supply regulating valve from completely closing. Heatup of the additional cold FW caused the level setpoint to be exceeded.

At 1230 hrs the leak source was verified as a pinhole leak on the 2 inch RCS Loop 'D' Crossover Leg to Chemical Volume Control System Excess Letdown pipe. The leak was reclassified as Pressure Boundary Leakage. TS 3.4.6.2 Action a was entered as Action b was exited.

LOs restored from the FWIS/AFAS and continued shutdown at 1300 hrs. Mode 3 was achieved at 1418 hrs. Mode 5 was achieved on 10/02/95 at 0627 hrs.

The leak was due to a low cycle fatigue crack, as a result of pipe interference during heatup and cooldown cycling. It was repaired in accordance with ASME Code Case N-504. The interference was removed.

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

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		9 5	- 0 0 6	- 0 0			

TEXT (If more space is required, use additional NRC Form 360A's)(17)

BASIS FOR REPORTABILITY:

Per Technical Specification (TS) 3.4.6.2, Reactor Coolant System (RCS) Unidentified Leakage exceeding the one gpm limit requires Plant Shutdown. In addition to the RCS leakage, during the shutdown an Engineered Safety Feature¹ (ESF) Feedwater Isolation Signal (FWIS) and an Auxiliary Feedwater Actuation Signal (AFAS) occurred due to water level in the 'D' Steam Generator² (SG) increasing to the high-high level actuation setpoint. This report is submitted pursuant to 10CFR50.73(a)(2)(i)(A) to report the completion of any nuclear plant shutdown required by the plant's TS. This report is also submitted pursuant to 10CFR50.73(a)(2)(iv) to report an event which resulted in the automatic actuation of ESF.

CONDITION AT TIME OF EVENT:

Mode 1 - Power Operation

Reactor Power - 98%

RCS temperature (Tave) - 587°F

RCS pressure - 2234 psig

DESCRIPTION OF EVENT:

On 10/02/95, at 0430 CST Licensed Operators (LOs) observed volume control tank³ level decreasing at a faster than normal rate. The LO checked other indications and found the 'B' containment sump pump was cycling frequently, the particulate and gas channels of GTRE0031 and GTRE0032, Containment Atmosphere Radiation Monitors⁴, were indicating increasing particulate and noble gas activity, and computerized RCS leak monitoring indicating a total leak rate of 2.15 gpm. TS 3.4.6.2 Action b was entered due to RCS Unidentified Leakage in excess of one gpm. LOs responded to the event in accordance with OTO-BB-00003, RCS Excessive Leakage. At 0500 hrs manual performance of OSP-BB-00009, RCS Leak Rate was initiated. Performance was completed at 0600 hrs and quantified RCS unidentified leakage to be 2.11 gpm.

A containment entry was made at 0717 hrs to identify the source of the leakage. A leak was noted inside the bioshield on the 'D' RCS loop. The exact source of the leak could not be determined due to area dose rates. At 0800 hrs the plant commenced shutdown at 30% per hour. The main turbine⁵ was manually tripped at 40 MWe and mode 2 was entered at 1130 hrs in accordance with OTG-ZZ-00005, Plant Shutdown 20% Power to Hot Standby.

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TEXT (If more space is required, use additional NRC Form 366A's)(17)

At 1138 hrs a FWIS and subsequent AFAS were received due to high-high level in 'D' SG. At the time of the manual turbine trip, LOs were experiencing difficulty maintaining SG level within the control band. Several factors contributed to the difficulty. The 'B' feedwater heater drain pump⁶ tripped on low heater drain tank⁸ level at 1106 hrs due to AFLV0071B, Heater Drain Pump 'B' Discharge Level Valve, failing open resulting in reduced feedwater temperature. AEFCV0540, 'D' Main Feedwater Regulating Valve, did not close completely and continued to supply the SG. Due to the amount of feedwater added through the main feedwater regulating valve, and concurrent heatup of cold water caused the 'D' SG level to exceed the FWIS setpoint. LOs responded to the FWIS and AFAS in accordance with OTO-SA-00001, Engineered Safety Feature Verification and Restoration.

At approximately 1230 hrs the source of the RCS unidentified leakage was verified to be a flaw in the heat affected zone adjacent to a weld on pipe BB-74-BCA-2⁷, RCS Loop D Crossover Leg to CVCS Excess Letdown. The leakage was reclassified as Pressure Boundary Leakage and TS 3.4.6.2 Action a was entered as Action b was exited.

Recovery from the FWIS/AFAS event was complete and shutdown continued at 1300 hrs. Mode 3 was achieved at 1418 hrs and Mode 5 was achieved on 10/03/95 at 0627 hours.

ROOT CAUSE:

The crack on the Excess Letdown piping is attributed to an interference between a flange and a surface mounted plate downstream of the crack location. The interference created a low cycle, high stress fatigue load at the flaw location.

The root cause of the SG overflow and subsequent FWIS and AFAS was leakage past the seat of valve AEFCV0540. The leakage was due to failure of the valve to completely close with a hard close signal present as a result of booster relay failing to operate properly on AEFCV0540.

CORRECTIVE ACTIONS:

1. A weld overlay in accordance with ASME Code Case N-504 was applied to repair the failure. The overlay is designed as a Code pressure boundary. The overlay is designed for all normal, transient and seismic loading conditions. The interference with the plate was eliminated. The repaired pipe section will be replaced in Refuel 8 for subsequent metallurgical analysis.
2. Other crossover legs were visually inspected for interference. A potential interference was identified on loop 'B'. The potential interference was eliminated.

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				YEAR	SEQUENTIAL NUMBER	REV NO															
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TEXT (If more space is required, use additional NRC Form 365A's)(17)

3. Nondestructive Examination was performed on adjacent weld locations on pipe BB-74-BCA-2". Additionally, the 3 similar crossover leg piping configurations were examined. No indications were identified.
4. Snubbers and variable supports on line BB-74-BCA-2" were verified to be Operable. During plant restart, vibration, strain measurements, and pressure resonance were measured and verified to be normal.
5. The booster relay for valve AEFCV0540 was replaced.
6. Heater Drain Tank Level Control Valve AFLV0071B, was repaired. The failure was due to binding between the valve plug and cage.

SAFETY SIGNIFICANCE:

The RCS leakage from the two inch line was within normal makeup charging capacity. RCS leakage was contained within the reactor building. No radioactive material was released to the outside environment. Had the line failed completely, the resulting break would have been within the design basis and less than the limiting four inch break analyzed in chapter 15 of the FSAR for a Condition III small break loss of coolant accident.

The ESF systems and components involved in the FWIS and AFAS responded as designed following overfilling of the SG.

This event posed no threat to the health and safety of the public.

PREVIOUS OCCURRENCES:

No previous similar occurrences.

FOOTNOTES:

1. System - JE
2. System - JB, Component SG
3. System - CB, Component TK
4. System - IL, Component MON
5. System - TB, Component TRB
6. System - SJ, Component P
7. System - AB, Component PSF
8. System - SJ, Component TK