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May 3, 1988

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

10 CFR 50.54(f)

Gentlemen:

Subject: Docket No. 50-206
Generic Letter 88-03
Steam Binding of Auxiliary Feedwater Pumps
San Onofre Nuclear Generating Station
Unit 1

The subject generic letter provides the NRC staff's resolution of auxiliary feedwater pump steam binding, Generic Safety Issue 93. The staff's resolution requires that SCE maintain procedural controls to preclude steam binding by monitoring fluid conditions of the auxiliary feedwater system each shift. Additionally, procedures must be maintained for recognizing steam binding and restoring the auxiliary feedwater system to operable status, should steam binding occur. Accordingly the purpose of this letter is to confirm that these procedural controls are in place and will be maintained.

Provided for your information, as an enclosure to this letter, are copies of the appropriate procedures which cover monitoring of the auxiliary feedwater system for steam binding and mitigation should binding occur. Additionally, per your request the staff time to prepare this response including the requested confirmation is estimated to be 3 man-days.

If you have any questions regarding this information, please let me know.

Respectfully submitted,

M. O. Medford

Subscribed to and sworn before me
this 3rd day of May 1988.

C. Sally Sebo
Notary Public in and for the County
of Los Angeles, State of California

OFFICIAL SEAL
C. SALLY SEBO
Notary Public-California
LOS ANGELES COUNTY
My Comm. Exp. Apr. 20, 1990

cc: J. B. Martin, Regional Administrator, NRC Region V
F. R. Huey, NRC Senior Resident Inspector, San Onofre Units 1, 2 and 3

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Enclosure

Generic Letter 88-03

Steam Binding of the Auxiliary Feedwater System

(Generic Safety Issue 93)

Response

San Onofre Nuclear Generating Station

Unit 1

Generic Letter 88-03
San Onofre Nuclear Generating Station
Unit 1

Introduction

Generic Letter 88-03 requires that there be the procedural controls to prevent and mitigate steam binding of the Auxiliary Feedwater System. In particular, the generic letter requests that SCE confirm that the following procedural controls are in place and will be maintained:

1. Maintain procedures to monitor fluid conditions within the AFW system each shift during times when the system is required to be operable. This monitoring should ensure that fluid temperature at the AFW pump discharge is maintained at about ambient levels.

   Section A, Step 7.0 of SONGS Procedure SO123-0-9, Routine Operations and Inspections, requires that a plant equipment operator inspect the auxiliary feedwater system for steam binding once per shift, specifically:

   > 7.0 Auxiliary feedwater pumps. Check for oil leaks, check the valves for normal alignment, check the pump casings and discharge piping for greater than ambient temperatures which may indicate "backleakage" from the Main Feedwater System. This condition leads to steam binding or cavitation of the pumps. If backleakage is suspected, notify the Control Room Operator of the condition and take action to correct the condition per SO1-7-3, "Auxiliary Feedwater System".

   In addition to the above inspection, monitoring for backleakage is also performed per Operating Instructions SO1-12.3-26 and SO1-12.8-20 following the monthly and 18 month surveillance testing.

2. Maintain procedures for recognizing steam binding and for restoring the AFW system to operable status, should steam binding occur.

   If backleakage is detected, Section F of Operating Instruction SO1-7-3, restores the Auxiliary feedwater system to operational status. A copy of Section F of SO1-7-3 is provided for your information.

AUXILIARY FEEDWATER SYSTEM

F. MISCELLANEOUS AFW SYSTEM OPERATIONS

1.0 OBJECTIVES

1.1 To detail procedures to be followed if AFW Check Valve Backleakage is detected during Plant Operation. TCN 3-1

1.2 To describe the method of monitoring and adding oil to the Steam Driven AFW Pump turbine bearing. TCN 3-2

1.3 To restore the Steam Driven AFW Pump Steam Supply Line to Service in Modes 1 through 3. TCN 3-8

2.0 REFERENCES

2.1 Procedures

2.1.1 SO123-VI-0.9, Documents - Author's Guide to the Preparation of Site Orders, Procedures and Instructions TCN

2.2 Other

2.2.1 Significant Operating Experience Report 84-3 dated April 17, 1984; Subject: Auxiliary Feedwater Pumps Disabled by Backleakage

3.0 PREREQUISITES

3.1 Prior to use of a user-controlled (pink) copy of this Site Document to perform work, verify that it is current by checking a controlled copy and any TCNs or by use of the method described in SO123-VI-0.9.

4.0 PRECAUTIONS

TCN 3-1

4.1 In Modes 1-3 both Steam Generator Auxiliary Feedwater Pumps and associated flow paths shall be OPERABLE as follows:

4.1.1 One Auxiliary Feedwater Pump capable of being powered from an emergency electrical source, and

4.1.2 One Auxiliary Feedwater Pump capable of being powered from an OPERABLE steam supply system. (Tech. Spec. 3.4.3.A)

4.1.3 With one Auxiliary Feedwater Pump inoperable, restore both Auxiliary Feedwater Pumps (one capable of being powered from an emergency electrical power source and one capable of being powered by an OPERABLE steam supply system) to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
(Tech. Spec. 3.4.3.B)

AUXILIARY FEEDWATER SYSTEM

F. MISCELLANEOUS AFW SYSTEM OPERATIONS

5.0 CHECKLISTS

5.1 None

TCN 3-1

6.0 INSTRUCTIONS

NOTE: Check valve backleakage is evidenced by increasing pipe temperatures. Temperatures should be checked on top of the pipes due to stratification that can occur under low flow conditions. (Reference 2.2.1)

TCN

6.1 Determine the Extent of the Backleakage

TCN 3-2

6.1.1 If check valve backleakage is detected, then check pipe temperatures with a contact pyrometer.

.1 Check temperature near each AFW header connection to main feed piping.

.2 Check temperature near each redundant header connection to main feed piping.

TCN 3-1

CAUTION Temperatures at an AFW Pump of 200°F or above are indication of probable steam binding of that pump. A steam bound pump is considered inoperable.

.3 Check temperature at each AFW pump.

6.1.2 If backleakage is identified to the Motor Driven AFW Pump, then perform step 6.2.

6.1.3 If backleakage is identified to the Steam Driven AFW Pump, then perform step 6.3.

6.2 Flush the Motor Driven AFW Pump and Backleaking Header

6.2.1 Place "A" AFW System Mode switch in "Manual."

6.2.2 Document manual valve manipulations on SO(1) 431, Component Control Form.

AUXILIARY FEEDWATER SYSTEM

F. MISCELLANEOUS AFW SYSTEM OPERATIONS

6.0 INSTRUCTIONS (Continued)

6.2.3 Vent the Motor Driven AFW Pump using:

.1 AFW-429, Motor Driven AFW PP Vent.

.2 Instrument Drain between AFW-442, PT-2011 Root, and PT-2011.

6.2.4 When the Motor Driven AFW Pump is filled with ambient temperature water, then CLOSE vent and drain opened in step 6.2.3.

6.2.5 Perform step 6.2.6 or step 6.2.7 as applicable.

6.2.6 Flush backleaking redundant header to Motor Driven AFW Pump. TCN 3-1

.1 CLOSE the Train "A" AFW Flow Control Isolation Valves:

.1.1 AFW-316, FCV-2300 Isolation Valve.

.1.2 AFW-314, FCV-2301 and FCV-3301 Isolation Valve.

.1.3 AFW-313, FCV-3300 Isolation Valve.

.2 START the Motor Driven AFW Pump.

.3 OPEN MOV-1202, AFW Pump G10S Discharge.

.4 Observing precautions concerning current plant status, THROTTLE OPEN the AFW Flow Control Isolation Valve(s) to the redundant header line(s) with backleakage.

.5 When the pipe temperature(s) is(are) back to ambient, then STOP the Motor Driven AFW Pump.

.6 CLOSE MOV-1202.

.7 LOCK OPEN the Train "A" AFW Flow Control Isolation Valves:

.7.1 AFW-316, FCV-2300 Isolation Valve.

.7.2 AFW-314, FCV-2301 and FCV-3301 Isolation Valve.

.7.3 AFW-313, FCV-3300 Isolation Valve.

.8 Go to step 6.4.

AUXILIARY FEEDWATER SYSTEM

F. MISCELLANEOUS AFW SYSTEM OPERATIONS

6.0 INSTRUCTIONS (Continued)

6.2.7 Flush backleaking AFW header to Motor Driven AFW Pump.

.1 START the Motor Driven AFW Pump.

.2 Observing Precautions concerning current plant status, THROTTLE OPEN MOV-1204.

.3 When the pipe temperature is back to ambient, then STOP the Motor Driven AFW Pump.

.4 CLOSE MOV-1204.

.5 Go to step 6.4.

6.3 Flush the Steam Driven AFW Pump and Backleaking Header

TCN 3-1

6.3.1 Place "B" AFW System Mode switch in "Manual."

6.3.2 Document manual valve manipulations on SO(1) 431, Component Control Form.

6.3.3 Vent the Steam Driven AFW Pump using:

.1 AFW-348, Steam Driven AFW PP Vent.

.2 AFW-345, AFW PP Discharge Line Drain.

.3 AFW-347, Steam Driven AFW PP Drain.

6.3.4 When the Steam Driven AFW Pump is filled with ambient temperature water, then CLOSE vent and drains opened in step 6.3.3.

6.3.5 Perform step 6.3.6 or step 6.3.7 as applicable.

6.3.6 Flush backleaking redundant header to Steam Driven AFW Pump.

.1 CLOSE the Train "B" AFW Flow Control Isolation Valves:

.1.1 AFW-305, FCV-2300 Isolation Valve.

.1.2 AFW-306, FCV-2301 and FCV-3301 Isolation Valve.

AUXILIARY FEEDWATER SYSTEM

F. MISCELLANEOUS AFW SYSTEM OPERATIONS

6.0 INSTRUCTIONS (Continued)

6.3.6.1.3 AFW-308, FCV-3300 Isolation Valve.

.2 START the Steam Driven AFW Pump by depressing the "Turbine Start" pushbutton.

.3 Observing precautions concerning current plant status, THROTTLE OPEN the AFW Flow Control Isolation Valve(s) to the redundant header line(s) with backleakage.

.4 When the pipe temperature(s) is(are) back to ambient, then STOP the Steam Driven AFW Pump.

.5 LOCK OPEN the Train "B" AFW Flow Control Isolation Valves. TCN 3-1

.5.1 AFW-305, FCV-2300 Isolation Valve.

.5.2 AFW-306, FCV-2301 and FCV-3301 Isolation Valve.

.5.3 AFW-308, FCV-3300 Isolation Valve.

.6 Go to step 6.4.

6.3.7 Flush backleaking AFW header to Steam Driven AFW Pump.

.1 START the Steam Driven AFW Pump by depressing the "Turbine Start" pushbutton.

.2 CLOSE CV-3213, AFW Pump G10 Discharge.

.3 Observing precautions concerning current plant status, THROTTLE OPEN AFW-346, AFW to 1st Point Heater Inlet.

.4 When the pipe temperature(s) is(are) back to ambient, then STOP the Steam Driven AFW Pump.

.5 CLOSE and LOCK AFW-346.

.6 Go to step 6.4.

6.4 Restoration from Backleakage

6.4.1 Perform independent verification of valve position for manual valves manipulated per this instruction. TCN 3-2

6.4.2 Ensure both AFW System Mode switches in "AUTO," in Modes 1 through 3.

AUXILIARY FEEDWATER SYSTEM

F. MISCELLANEOUS AFW SYSTEM OPERATIONS

6.0 INSTRUCTIONS (Continued)

6.4.3 Perform Operability test on AFW Pumps per SO1-12.8-20, Auxiliary Feedwater System Operability Test. TCN 3-2

6.4.4 Monitor temperatures with a contact pyrometer every one-half hour until it is certain no backleakage exists.

.1 Monitor temperature at each redundant header connection to main feed piping.

.2 Monitor temperature at each AFW header connection to main feed piping. TCN 3-1

CAUTION Temperatures at an AFW Pump of 200°F or above are indication of probable steam binding of that pump. A steam bound pump is considered inoperable.

.3 Monitor temperature at each AFW pump.

6.5 Adding Oil to the Steam Driven AFW Pump Turbine Bearing

NOTE: The turbine bearing sight glass has been marked with "min" and "max" level ranges. TCN 3-2

6.5.1 When the oil level in the turbine bearing sight glass is approximately 1/4 of the acceptable range, then the bearing should be filled until the oil is at the "max" level mark as follows:

.1 Monitor the sight glass to ensure sight glass operation,

.2 Measure the amount of oil added within ± 10 ml,

.3 Add the oil through the bearing cap plug,

.4 Document the oil addition on Attachment 2.