# WATERBOX TUBE FAILURE

## 1.0 ENTRY CONDITIONS

IF in Mode 1 through 4,

AND cation conductivity at CDP discharge (CE-2, CE-3) is verified to be > 10 μmho/cc,

THEN use this procedure.

## 2.0 IMMEDIATE ACTIONS

| NOTE |
|---|
| There are no immediate actions for this procedure. |

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## 3.0 FOLLOW-UP ACTIONS

| ACTIONS | DETAILS |
|---|---|
| 3.1 ___ Notify Chemistry. | • Notify Chemistry to perform the following:<br>___ Determine affected CWP.<br>___ Notify the control room if Condensate Demin outlet (CE-5) cation conductivity > 1 µmho/cc. |
| 3.2 ___ Notify personnel of plant conditions. | • ___ STA<br>• ___ Plant Operators<br>• ___ SSOD (evaluate plant conditions for entry into the Emergency Plan) |
| 3.3 ___ Isolate condensate rejection flow to CDT-1 | • Notify SPO to fail closed CDV-88 "Condensate Reject to CDT-1" (95 ft TB behind Atmospheric Drain Tank). |

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| ACTIONS | DETAILS |
|---|---|
| 3.4 ___ Verify Condensate Demins are not bypassed. | • Notify SPO to verify the following are closed at the "Condensate Demineralizer Control Panel":<br>___ CXV-5 "Demin Bypass Valve"<br>___ CXV-12 "Demin Bypass Valve" |
| ___ IF Condensate Demins are bypassed, THEN notify SPO to attempt to close all Condensate Demin bypass valves. | 1 ___ Adjust CX-15-DPI-B1 knob to "15" (95 TB CXCP-1 Panel).<br>2 ___ Adjust CX-16-DPI-B2 knob to "15" (95 TB CXCP-1 Panel).<br>3 ___ Depress "SYSTEM HI D/P ALARM CXV-12F BYPASS VALVE B2" "RESET" push button (95 TB CXCP-1 Panel).<br>4 ___ Depress "SYSTEM HI D/P ALARM CXV-5F BYPASS VALVE B1" "RESET" push button (95 TB CXCP-1 Panel).<br>5 ___ Adjust CX-15-DPI-B1 knob to "0" (95 TB CXCP-1 Panel).<br>6 ___ Adjust CX-15-DPI-B2 knob to "0" (95 TB CXCP-1 Panel). |
| 3.5 ___ Notify SPO to ensure proper Condensate Demins are in service. | 1 ___ Obtain most efficient Condensate Demin alignment from chemistry.<br>2 ___ Ensure proper number of condensate demins are in service for power level. |

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| ACTIONS | DETAILS |
|---|---|
| 3.6 ___ IF at any time, Condensate Demin outlet (CE-5) cation conductivity is > 1 μmho/cc, THEN stop the affected CWP and **GO TO** Step 3.12 in this procedure. | 1 Stop the affected CWP:<br>___ CWP-1A<br>___ CWP-1B<br>___ CWP-1C<br>___ CWP-1D<br>2 ___ **GO TO** Step 3.12 in this procedure. |
| 3.7 ___ IF a power reduction is required, THEN start a rapid power reduction at > 5%/min.<br><br>See Table 1 | • **CONCURRENTLY PERFORM** AP-510, Rapid Power Reduction, beginning with Step 3.1 |
| 3.8 ___ IF the tube leak is in a hotwell with only one inservice waterbox, AND turbine is operating, THEN reduce Rx power to less than the anticipatory setpoint and trip the turbine. | • ___ WHEN Rx power is < 45%, THEN trip the turbine and **CONCURRENTLY PERFORM** AP-660, Turbine Trip, beginning with Step 2.1 |

| Applicable carry-over steps: |
| --- |
| 3.6 IF Condensate Demin outlet cation conductivity is > 1 μmho/cc... |

| ACTIONS | DETAILS |
|---|---|
| 3.9 ___ IF at any time, the affected CWP can be stopped, THEN stop the affected CWP. | 1 ___ Ensure Rx power and Turbine are operating within CWP operation guidelines.<br><br>See Table 1 |

2 Stop the affected CWP:

| |
|---|
| ___ CWP-1A |
| ___ CWP-1B |
| ___ CWP-1C |
| ___ CWP-1D |

3 Notify SPO to close waterbox vacuum isolation valve for the affected CWP:

___ ARV-47 "A Waterbox Vacuum Outlet Iso" (119 ft TB north of A Waterbox)

___ ARV-46 "B Waterbox Vacuum Outlet Iso" (119 ft TB north of B Waterbox)

___ ARV-45 "C Waterbox Vacuum Outlet Iso" (119 ft TB north of C Waterbox)

___ ARV-44 "D Waterbox Vacuum Outlet Iso" (119 ft TB north of D Waterbox)

4 ___ Notify Chemistry of CWP shutdown.

| Applicable carry-over steps: |
| --- |
| 3.6 IF Condensate Demin outlet cation conductivity is > 1 μmho/cc... |
| 3.9 IF the affected CWP can be stopped, THEN stop the affected CWP. |

ACTIONS | DETAILS

**NOTE**

**Opening waterbox vacuum breakers can potentially create a vacuum leak when the affected CWP is stopped.**

3.10 ___ IF at any time, the affected CWP is stopped, THEN open affected Waterbox Vacuum Breaker Valves.

| | |
|---|---|
| ___ CWP-1A | ___ ARV-57 |
| | ___ ARV-56 |
| ___ CWP-1B | ___ ARV-55 |
| | ___ ARV-54 |
| ___ CWP-1C | ___ ARV-53 |
| | ___ ARV-52 |
| ___ CWP-1D | ___ ARV-51 |
| | ___ ARV-50 |

3.11 ___ WHEN all of the following conditions exist for the affected CWP:

___ CWP is stopped

___ Waterbox vacuum isolation valve is closed

___ Waterbox Vacuum Breaker valves are open

THEN GO TO OP-204, Power Operations, Section 4.3, 100% To 20% Power Decrease.

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ACTIONS | DETAILS

**STATUS**

**Condensate Demin outlet (CE-5) cation conductivity is > 1 μmho/cc.**

3.12 ___ IF the Rx is NOT tripped, THEN manually trip the Rx, and **CONCURRENTLY PERFORM** OP-02, Vital System Status Verification, beginning with Step 2.1

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3.13 ___ Initiate EFIC.

1 ___ Depress "EFW INITIATE" push buttons on EFIC channels A and B.

2 Ensure at least one EFP running:

___ EFP-1

___ EFP-2

3 ___ Ensure level in available OTSGs is at or trending toward required level.

[Rule 3, EFW Control]

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ACTIONS

DETAILS

3.14 ___ Initiate MFLI for both OTSGs.

1 Depress "MAIN FEED ISOLATION" pushbuttons on EFIC Channels A and B for both OTSGs.

2 Select MBV to "MAN" and select FW isolation valves to "CLOSE" for both OTSGs:

| FW Valve | A OTSG | B OTSG |
|---|---|---|
| LLBV | ___ FWV-31 | ___ FWV-32 |
| MBV toggle | ___ "MAN" | ___ "MAN" |
| MBV | ___ FWV-30 | ___ FWV-29 |
| SUBV | ___ FWV-36 | ___ FWV-33 |
| Cross-Tie | ___ FWV-28 | ___ FWV-28 |
| Suction | ___ FWV-14 | ___ FWV-15 |

___ 3 Ensure both MFWPs tripped:

| A OTSG | B OTSG |
|---|---|
| ___ FWP-2A | ___ FWP-2B |

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| ACTIONS | DETAILS |
|---|---|
| 3.15 ___ Stop both MFWBPs. | 1 Start both MFWBP aux oil pumps:<br>___ FWP-6A<br>___ FWP-6B<br>2 Stop both MFWBPs:<br>___ FWP-1A<br>___ FWP-1B |
| 3.16 ___ Isolate waterbox vacuum for the affected CWP. | 1 Notify SPO to close waterbox vacuum isolation valve for the affected CWP:<br>___ ARV-47 "A Waterbox Vacuum Outlet Iso" (119 ft TB north of A Waterbox)<br>___ ARV-46 "B Waterbox Vacuum Outlet Iso" (119 ft TB north of B Waterbox)<br>___ ARV-45 "C Waterbox Vacuum Outlet Iso" (119 ft TB north of C Waterbox)<br>___ ARV-44 "D Waterbox Vacuum Outlet Iso" (119 ft TB north of D Waterbox)<br>2 ___ Notify Chemistry of CWP shutdown. |

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| ACTIONS | DETAILS |
|---|---|
| 3.17 ___ Open the affected Waterbox Vacuum Breaker Valves. | ___ CWP-1A: ___ ARV-57, ___ ARV-56<br>___ CWP-1B: ___ ARV-55, ___ ARV-54<br>___ CWP-1C: ___ ARV-53, ___ ARV-52<br>___ CWP-1D: ___ ARV-51, ___ ARV-50 |

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3.18 ___ IF at any time, EFT-2 level is ≤ 8.5 ft, THEN notify SPO to cross-tie CDT-1 and EFT-2

- ___ Unlock and open CDV-103 "CDT-1 to EFP Suction" (119 ft Berm by CDT-1).
- ___ Ensure CDV-290 "CDT-1 to EFP Suction" is open (119 ft Berm in covered valve box by FST-1A).

| Applicable carry-over steps: |
| --- |
| 3.18 IF EFT-2 level is ≤ 8.5 ft, THEN cross-tie CDT-1 and EFT-2... |

| ACTIONS | DETAILS |
|---|---|
| 3.19 ___ IF at any time, makeup to CDT-1 is required, THEN notify SPO to makeup to CDT-1 | 1 ___ Ensure CDV-102 "CDT-1 Lower Iso" closed (119 ft Berm by CDT-1).<br>2 ___ Ensure CDV-236 "CDT-1 Upper Iso" open (119 ft Berm by CDT-1).<br>3 Isolate Condenser vacuum from DW loads downstream of DWV-346:<br>___ Close CDV-149 "DW Makeup to Hotwell Control Bypass" (95 ft TB by C inlet waterbox).<br>___ Close CDV-147 "DW Makeup to Hotwell Control Inlet Iso" (95 ft TB by C inlet waterbox).<br>4 ___ Select DWV-346 "TB DW Header Iso" control switch to "CLOSE" (95 ft TB Demin Water Panel).<br>5 ___ Open DWV-377 "DWV-346 Bypass" (95 ft TB southwest stairwell) until pressure equalizes around DWV-346<br>6 ___ Select DWV-346 "TB DW Header Iso" control switch to "OPEN" and verify DWV-346 opens (95 ft TB Demin Water Panel).<br>7 ___ Open CDV-147 "DW Makeup to Hotwell Control Inlet Iso" (95 ft TB by C inlet waterbox).<br>8 ___ Close DWV-377 "DWV-346 Bypass" (95 ft TB southwest stairwell).<br>9 ___ Select DWV-346 "TB DW Header Iso" control switch to "AUTO" (95 ft TB Demin Water Panel).<br>10 ___ Throttle open CDV-112 "DW Makeup to CDT-1" (95 ft TB by MFWBPs). |

| Applicable carry-over steps: |
| --- |
| 3.18 IF EFT-2 level is ≤ 8.5 ft, THEN cross-tie CDT-1 and EFT-2... |
| 3.19 IF makeup to CDT-1 is required, THEN makeup to CDT-1... |

## 3.0 FOLLOW-UP ACTIONS (CONT'D)

| ACTIONS | DETAILS |
|---|---|
| 3.20 ___ Stop any hotwell fills. | • Notify SPO to perform the following:<br>___ Fail closed CDV-87 "CDT-1 Makeup to Hotwell" (95 ft TB by C inlet waterbox)<br>___ Fail closed CDV-113 "DW Makeup to Hotwell Control" (95 ft TB by C inlet waterbox)<br>___ Close CDV-149 "Makeup to Hotwell Control Bypass" (95 ft TB by C inlet waterbox) |
| 3.21 ___ Notify Chemistry to make preparations for continuous condensate release. | |
| 3.22 ___ **EXIT** this procedure. | |

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Table 1:
CWP Operation
Guidelines

| CWP Combination | Power Level |
|---|---|
| From 4 to 3 CWPs | <85% |
| From 3 to 2 CWPs (one in each hotwell) | <60% |
| From 3 to 2 CWPs (both in same hotwell) | <45% |