ENGINEERING CHANGE NOTICE

Page 1 of 2

2. ECN Category
- Supplemental
- Direct Revision
- Change ECN
- Temporary
- Supersede
- Cancel/ Void

3. Originators Name, Organization, MSIN, and Telephone No.
G.E. NAVARRO, 15510, T4-20, 3-5239

4. Date
01/18/95

5. Project Title/No./Work Order No.
CLOSED LOOP COOLING/K6017

234-5Z/23F

7. App. Designator
Q

8. Document Numbers Changed by this ECN
(includes sheet no. and Rev.)
WHC-SD-CP-OTP-152, REV. 0

9. Related ECN No(s)
N/A

10. Related PO No.
N/A

11a. Modification Work
- Yes (do blk 11b)
- No (NA Bks 11b 11c, 11d)

11b. Work Package No.
N/A

11c. Modification Work Completed
N/A

11d. Restored to Original Condition
(Temp. or Standby ECN Only.)
N/A

Cog. Engineer Signature & Date

12. Description of Change
THE ATTACHED DOCUMENT IS REVISION 1 OF WHC-SD-CP-OTP-152.

13a. Justification
- Criteria Change
- Design Improvement
- Environmental
- As-Found
- Facilitate Const.
- Const. Error/Omission
- Design Error/Omission

13b. Justification Details
THE ORIGINAL OTP HAS BEEN REVISED TO REFLECT OPERATIONAL CHANGES. USQ COVERED IN WHC-CP-OTP-152, REV. 0 RELEASE.

14. Distribution
- GE NAVARRO T4-20 (1x)
- SB MERRICK T4-20 (1x)
- GA GLOVER T4-20 (1x)
- D GROTH T4-20 (1x)
- Central Files L8-04 (2x)
- O.S.T.I. L8-07 (2x)
- A. Anderson T4-V

Release Stamp
OFFICIAL RELEASE
BY WHC
DATE JUN 18 1995
55 sta 5

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED.
<table>
<thead>
<tr>
<th>15. Design Verification Required</th>
<th>16. Cost Impact</th>
<th>17. Schedule Impact (Days)</th>
<th>1. ECN (use number from pg. 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Yes</td>
<td></td>
<td></td>
<td>614337</td>
</tr>
<tr>
<td>□ No</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ENGINEERING**

<table>
<thead>
<tr>
<th>Additional</th>
<th>Savings</th>
<th>Cost Impact</th>
<th>Schedu Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>$</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**CONSTRUCTION**

<table>
<thead>
<tr>
<th>Additional</th>
<th>Savings</th>
<th>Improvement</th>
<th>Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on page 1) that will be affected by the change described in block 12. Enter the affected document number in block 19.

<table>
<thead>
<tr>
<th>Additional</th>
<th>Savings</th>
<th>Additional</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

19. Other Affected Documents: (Note: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

<table>
<thead>
<tr>
<th>Document Number / Revision</th>
<th>Document Number / Revision</th>
<th>Document Number / Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

20. Approvals

**OPERATIONS and ENGINEERING**

<table>
<thead>
<tr>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ARCHITECT-ENGINEER**

<table>
<thead>
<tr>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DEPARTMENT of ENERGY

Signature or a control number that tracks the approval signature.
DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.
DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.
## RELEASE AUTHORIZATION

<table>
<thead>
<tr>
<th>Document Number:</th>
<th>WHC-SD-CP-OTP-152, REV 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document Title:</td>
<td>CLOSED LOOP COOLING OPERATION WITH MICON</td>
</tr>
<tr>
<td>Release Date:</td>
<td>1/18/95</td>
</tr>
</tbody>
</table>

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

[Signature]

January 18, 1995

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

This report has been reproduced from the best available copy. Available in paper copy and microfiche. Printed in the United States of America. Available to the U.S. Department of Energy and its contractors from:

U.S. Department of Energy
Office of Scientific and Technical Information (OSTI)
P.O. Box 62
Oak Ridge, TN 37831
Telephone: (615) 576-8401

Available to the public from:

U.S. Department of Commerce
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Telephone: (703) 487-4650
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CLOSED LOOP COOLING OPERATION WITH MICON</td>
<td>WHC-SD-CP-OTP-152</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Key Words</th>
<th>6. Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLOSED LOOP COOLING, MICON</td>
<td>GE. NAVARRO</td>
</tr>
</tbody>
</table>

The document provides instructions for testing the closed loop cooling operation with the MICON computer system at PFP.

**Note:** The document is approved for public release.
<table>
<thead>
<tr>
<th>Revision</th>
<th>Description of Change - Replace, Add, and Delete Pages</th>
<th>Authorized for Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>EDT 606670, 08/10/94</td>
<td></td>
</tr>
<tr>
<td>1 RS</td>
<td>REVISED OPERATIONAL TEST PROCEDURE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ECN 614337</td>
<td></td>
</tr>
</tbody>
</table>

(1) Document Number
WHC-CP-SD-OTP-152
Page 1

A-7320-005 (08/91) WEF168
OPERABILITY TEST PROCEDURE
WHC-SD-CP-OTP-152

Revision 1

January 18, 1995

Closed Loop Cooling Operation with MICON
TABLE OF CONTENTS

1.0 TEST PLAN .................................................. 3
2.0 SAFETY .................................................... 3
3.0 TOOLS, EQUIPMENT, AND SUPPLIES ....................... 5
4.0 PRE-TEST INSPECTION AND SETUP ......................... 5
5.0 TEST PROCEDURE ........................................... 8
    5.1 PROCESS WATER ........................................ 8
    5.2 FLUID COOLERS; INTERLOCKS WITH MICON .............. 9
    5.3 CIRCULATION PUMPS P1 & P2 .......................... 14
    5.4 ROOM 35 VACUUM PUMP PRIMARY CLOSED COOLING LOOP (PCW) 27
    5.5 PRIMARY CLOSED COOLING LOOP (PCW) - GLOVE BOXES ..... 38
1.0 TEST PLAN

This Operability Test Procedure (OTP) provides instructions for testing the Closed Loop Cooling System interface with the MICON Terminal at the Plutonium Finishing Plant located at the 200 West Area of the Hanford Site.

The Closed Loop Cooling System consists of several primary loops and a single secondary cooling loop.

The test objectives are to functionally prove the interlocks and instruments of the closed loop cooling system with the MICON and to show operability of the system from the MICON Terminal. Any out of tolerance readings during the test will be adjusted immediately or with a new calibration package at a later time per cognizant engineers direction.

The cognizant engineer shall have the authority to make field changes to this procedure with the concurrence of the oversight organization per approval designator.

2.0 SAFETY

Applicable Safety Documents - Provisions of Radiation Work Requirements and Permits Manual, WHC-CM-4-15, Vol. 2; WHC Radiological Control Manual, WHC-CM-1-6 and the Radiation Work Permit (RWP), as specified in the Job Control System (JCS) work package, apply to all work performed under this OTP.

A pre-job safety meeting shall be conducted and documented in Table 1 by Plant Engineering prior to work start. This OTP shall be read and discussed in detail by all personnel involved with its performance.
2.0 SAFETY (Cont.)

Portions of work will be performed in a Radiologically Controlled Area (RCA) and surface contamination area (SCA); therefore, on the basis of field monitoring and surveillance, HPT's will prescribe respiratory protection and protective clothing requirements. Radiation worker training for all personnel shall be current.

<table>
<thead>
<tr>
<th>PRESENTERS</th>
<th>ORGANIZATION</th>
<th>ATTENDEES</th>
<th>ORGANIZATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.0 TOOLS, EQUIPMENT, AND SUPPLIES

Calibrated current measuring device (range scale capability from zero to 50 A and from zero to 600 VAC).

Device ID # | Last Calibrated | Next Calibration
---|---|---

Calibrated temperature measuring device (range capability approximately 50 – 300 °F).

Device ID # | Last Calibrated | Next Calibration
---|---|---

Calibrated VOM Multimeter (standard electricians type).

Calibrated Flow Meter
Device ID # | Last Calibrated | Next Calibration
---|---|---

4.0 PRE-TEST INSPECTION AND SETUP

1. Equipment Identification

N/A – Performed previously in System OTP.

2. Instruments identified in Table II are in current calibration, except those identified with ** will be functionally checked during OTP performance.

<table>
<thead>
<tr>
<th>Component</th>
<th>Instrument</th>
<th>Description</th>
<th>Verify Calibrated</th>
</tr>
</thead>
<tbody>
<tr>
<td>PW</td>
<td>PSL-1</td>
<td>Low Pressure Switch Process Water to FC1 &amp; 2</td>
<td></td>
</tr>
<tr>
<td>FC1</td>
<td>TE/TT-SCW1A</td>
<td>Temperature Element/Transmitter SCW supply to Circ. Pump P1 from FC1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TE/TT-SCW1</td>
<td>Temperature Element/Transmitter SCW return to FC1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FE/FT/FY-SCW1</td>
<td>Flow Element/Transmitter SCW supply to Circ. Pump P1 from FC1.</td>
<td></td>
</tr>
<tr>
<td>Component</td>
<td>Instrument</td>
<td>Description</td>
<td>Verify Calibrated</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>FC-2</td>
<td>TE/TT/SCW2</td>
<td>Temperature Element/Transmitter SCW supply to Circ. Pump P2 from FC2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TE/TT-SCW2A</td>
<td>Temperature Element/Transmitter SCW return to FC-2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FE/FT/FY-SCW2</td>
<td>Flow Element/Transmitter SCW supply to Circ. Pump P1 from FC1.</td>
<td></td>
</tr>
<tr>
<td>SCW</td>
<td>PSL-TK1</td>
<td>Low Pressure Switch for SCW Expansion Tank TK1.</td>
<td></td>
</tr>
<tr>
<td>PCW RM 35</td>
<td>PE/PT-PCW1</td>
<td>Pressure Element/Transmitter - PRF PCW system</td>
<td></td>
</tr>
<tr>
<td>PCW RM 35</td>
<td>TE/TT-PCW1</td>
<td>Temperature Element/Transmitter - PRF PCW system</td>
<td></td>
</tr>
<tr>
<td>PCW RM 35</td>
<td>PSL TK-101</td>
<td>Low Pressure Switch - PRF PCW System.</td>
<td></td>
</tr>
<tr>
<td>PCW RM 35</td>
<td>FSL-PCW1</td>
<td>Flow Switch Low - PRF PCW Circulation Pump discharge flow.</td>
<td></td>
</tr>
<tr>
<td>RM 35 PCW</td>
<td>TE/TT-PCW5</td>
<td>Temperature Element/Transmitter - PCW supply to Vacuum Pump VP#1.</td>
<td></td>
</tr>
<tr>
<td>RM 35 PCW</td>
<td>PE/PT-PCW5</td>
<td>Pressure Element/Transmitter - PCW supply to Vacuum Pump VP#1.</td>
<td></td>
</tr>
<tr>
<td>RM 35 PCW</td>
<td>FE/FT/FI-PCW5</td>
<td>Flow Element/Transmitter/Indicator - PCW supply to Vacuum Pump VP#1.</td>
<td></td>
</tr>
<tr>
<td>RM 35 PCW</td>
<td>TE/TT-PCW6</td>
<td>Temperature Element/Transmitter - PCW supply to Vacuum Pump VP#2.</td>
<td></td>
</tr>
<tr>
<td>RM 35 PCW</td>
<td>PE/PT-PCW6</td>
<td>Pressure Element/Transmitter - PCW supply to Vacuum Pump VP#2.</td>
<td></td>
</tr>
<tr>
<td>RM 35 PCW</td>
<td>FE/FT/FI-PCW6</td>
<td>Flow Element/Transmitter/Indicator - PCW supply to Vacuum Pump VP#2.</td>
<td></td>
</tr>
</tbody>
</table>
Quality Control Verification Point:

Instruments in Table II are in current calibration.

--------------------/--------------------/---------------
Signature Stamp Date
(Optional)
5.0 TEST PROCEDURE

5.1 PROCESS WATER PSL-1 LOW PRESSURE SWITCH.

___ 1. Close Pressure Switch PSL-1 Root Valve V-CLC-22
___ 2. Remove ¼ inch Plug from pressure switch manifold drain.
___ 3. Slowly open pressure switch drain valve V-CLC-31 to lower pressure in the leg.
___ 4. The pressure in the manifold will immediately drop. Verify PSL1 Low Pressure Alarm on MICON.
___ 6. Open Pressure switch root valve V-CLC-22
___ 7. Verify that Alarm and light indication clear on Micon.
___ 8. Reinstall ¼" plug on manifold.

Quality Control Verification

PSL1 Alarm annunciataed as required.

------------------------/------------------------/---------------
Signature   Stamp (Optional)   Date
5.2 FLUID COOLERS; INTERLOCKS WITH MICON

1. Verify that Fluid Coolers FC-1 & FC-2 are operating normal and no alarms or system trouble indicating lights are activated on the MICON.

2. At the Control Panels for the Fluid Coolers FC-1 & FC2 located on the west side of Building 236-Z on the south end of the pad) verify the following:
   a. Fluid cooler FC1 is running normal.
   b. Fluid Cooler FC2 is running normal.
   c. Fluid Cooler FC1 Spray Pump control is set on "R" Remote.
   d. Fluid Cooler Fan FCF1 control is set on "R" Remote.
   e. Fluid Cooler FC2 Spray Pump control is set on "R" Remote.
   f. Fluid Cooler Fan FCF2 control is set on "R" Remote.

5.2.1 Fluid Cooler FC-1

1. Verify that both Fluid Coolers are in normal operation.

2. At the Fluid Cooler FC-1 Motor Control Panel located at the south end of the Fluid Cooler FC-1 pad turn the Disconnect Switch to "OFF".

3. At the MICON Terminal:
   a) Verify Alarm on MICON for failure of Fluid Cooler Fan FCF-1
   b) Verify Alarm on MICON for failure of Spray Pump SP-1.
4. Return Disconnect to "ON" at the Fluid Cooler FC-1 Motor Control Panel. Restart Fluid Cooler Fan FCF1 and Spray Pump SP1 from MICON.

5. At the MICON Terminal:

   a) Verify Alarm on MICON for failure of Fluid Cooler Fan FCF1 clears.

   b) Verify Alarm on MICON for failure of Spray Pump SP1 clears.

Quality Control Verification Point:

Alarms annunciated and cleared as required.

-------------/--------------/---------------
Signature     Stamp  Date
((Optional)
5.2.2 Fluid Cooler FC-2

1. Verify that both Fluid Coolers are in normal operation.

2. At the Fluid Cooler FC-2 Motor Control Panel located at the south end of the Fluid Cooler FC-2 pad turn the Disconnect Switch to "OFF".

3. At the MICON Terminal:
   a) Verify Alarm on MICON for failure of Fluid Cooler Fan FCF2
   b) Verify Alarm on MICON for failure of Spray Pump SP2.

4. Return Disconnect to "ON" at the Fluid Cooler FC-2 Motor Control Panel. Restart Fan FCF2 and Spray Pump SP2 from MICON.

5. At the MICON Terminal:
   a) Verify Alarm on MICON for failure of Fluid Cooler Fan FCF2 clears.
   c) Verify Alarm on MICON for failure of Spray Pump SP2 clears.

Quality Control Verification Point:
Alarms annunciated and cleared as required.
5.2.3. Verify that both Fluid Coolers FC-1 & FC-2 are in normal operation and Fan and Spray Pump Controls are in Remote.

   a) Stop Fluid Cooler Fan FCF1 from MICON Terminal.
   b) Stop Fluid Cooler Spray Pump SP1 from MICON Terminal.
   c) Verify that FCF1 & SP1 is physically stopped.
   d) Verify FCF1 & SP1 stopped indication on MICON Terminal.
   e) Restart FCF1 from MICON Terminal.
   f) Restart SP1 from Micon Terminal.
   g) Verify that FCF1 has started physically.
   h) Verify that SP1 has started physically.
   i) Verify FCF1 "ON" indication on MICON Terminal.
   j) Verify SP1 "ON" indication on MICON Terminal.

Quality Control Verification Point:

Alarms annunciated and cleared as required.

----------------------------------------/------------------------/--
Signature                  Stamp           Date
( Optional)
l) Stop Fluid Cooler Fan FCF2 from MICON Terminal.
m) Stop Fluid Cooler Spray Pump SP2 from MICON Terminal.
n) Verify that FCF2 & SP2 is stopped physically.
o) Verify FCF2 & SP2 stopped indication on MICON Terminal.
p) Restart FCF2 from MICON Terminal.
q) Restart SP2 from Micon Terminal.
r) Verify that FCF2 has started physically.
s) Verify that SP2 has started physically.
t) Verify FCF2 "ON" indication on MICON Terminal.
u) Verify SP2 "ON" indication on MICON Terminal.
v) Verify that system is operating "Normal".

Quality Control Verification Point:
Alarms annunciated and cleared as required.
5.3 CIRCULATION PUMPS P1 & P2 INTERLOCKS WITH MICON

1. At the Circulation Pumps P1 & P2 Motor Control Panels, Configure the system to place Circulation Pump P1 & P2 in operation by placing the Pump Switchs P1 and P2 to "AUTO".

2. At the Motor Control Panels verify Hand Switches for valves HV-SCW1 & HV-SCW2 are in the "REMOTE" Position.

3. Verify that both Circulation Pumps P1 & P2 are in operation and both Motor Operated Valves HV-SCW1 & HV-SCW2 are open.

5.3.1 CIRCULATION PUMP P1

1. Verify Circulating Pump P2 is running normally.

2. Place the Circulation Pump P1 Disconnect Switch in the "OFF" position.

3. At the MICON Terminal:
   a) Verify Circulation Pump P1 Failure alarm.

4. Return the Circulation Pump P1 Disconnect Switch to the "ON" position and restart pump P1 from MICON.
5. At the MICON Terminal:
   a) Verify Circulation Pump P1 Failure alarm clears.
   b) Verify Light Indication Circulation Pump "P1 ON".

6. From the MICON Terminal perform the following:
   a) Stop Circulation Pump P1.
   b) Close MOV HV-SCW1
   c) Verify Circulation Pump P1 is stopped
   d) Verify that MOV HV-SCW1 is closed.
   e) Circulation Pump P1 "OFF" indication on MICON Terminal.
   f) MOV HV-SCW1 "Closed" indication on MICON Terminal.
   g) Open MOV HV-SCW1
   h) Verify that MOV HV-SCW1 is open
   i) Start Circulation Pump P1.
   j) Verify Circulation Pump P1 starts and runs.
   k) Circulation Pump "ON" indication on MICON Terminal.
   l) MOV SCW1 "OPEN" indication on MICON Terminal.

Quality Control Verification Point:
Alarms annunciated and cleared as required.

------------------------------------------
Signature                        Stamp (Optional)  Date
5.3.2 CIRCULATION PUMP P2

1. Ensure that Circulating Pump P1 is running normally.

2. Place the Circulation Pump P2 Disconnect Switch in the "OFF" position.

3. At the MICON Terminal:
   a) Verify Alarm Circulation Pump P2 Failure.

4. Return the Circulation Pump P2 Disconnect Switch to the "ON" position and restart P2.

5. At the MICON Terminal:
   a) Verify Alarm Circulation Pump P2 Failure clears.
   b) Verify Light Indication Circulation Pump "P2 ON".
6. From the MICON Terminal perform the following:
   
   a) Stop Circulation Pump P2.
   b) Close MOV HV-SCW2
   c) Verify Circulation Pump P2 is stopped
   d) Verify that MOV HV-SCW2 is closed.
   e) Verify Circulation Pump P2 "OFF" indication on MICON Terminal.
   f) Verify MOV HV-SCW2 "Closed" indication on MICON Terminal.
   g) Open MOV HV-SCW2 From MICON.
   h) Verify that MOV HV-SCW2 is open.
   i) Start Circulation Pump P2 from MICON.
   j) Verify Circulation Pump P2 starts and runs.
   k) Circulation Pump "ON" indication on MICON Terminal.
   l) MOV SCW2 "OPEN" indication on MICON Terminal.

7. Return system to "Normal" configuration per ZO-060-505.

Quality Control Verification Point:

Alarms annunciacted and cleared as required.
5.3.3. SCW Return Loop1 TE/TT SCW1 (TIR-SCW1) – Temperature Indicating Recorder Test.

   1. Remove Temperature Element TE/TT-SCW1 from the Thermal Well.
   2. Immerse the Temperature Element TE-SCW1 into Calibrator. Note temperature at the calibrator.
   3. Verify temperature at the MICON Terminal.
   4. Gradually lower temperature at the calibrator to 50° ± 1°F.
      Record Actual Temperature ________°F.
   5. Observe and verify temperature indication/drop on the MICON Temperature Indicating record.
      Temperature at MICON: ________°F
   6. Gradually raise temperature at the calibrator to 86°F ±1°F
      Record actual temperature ________°F.
      Temperature at MICON ________°F.
   7. Compare temperature history on the MICON Terminal and the recorded temperature at the calibrator, they must record within 3%.
   8. Reinstall Temperature Element into the thermal well.
   9. Verify proper installation of the Temperature element.

Quality Control Verification Point:

Verified temperature alarm, indication and records as required.
5.3.4. SCW Supply Loop1 TE/TT (TIR/TAH/TAL) SCW1A - Temperature Indicating Recorder Test.

   1. Remove Temperature Element TE-SCW1A from the Thermal Well.
   2. Immerse the Temperature Element TE-SCW1A into calibrator. Note temperature at the calibrator.
   3. Verify temperature at the MICON Terminal.
   4. Gradually raise temperature at the Calibrator.
   5. Observe and verify temperature indication/rise on the MICON Temperature Indicating record.
   6. Gradually lower the temperature at the Calibrator to 38°F ±1°F.
   7. The low temperature setpoint is 40°F ±1°F. When the temperature at the Calibrator 40°F ±1°F the Low Temperature alarms should annunciate. Verify Low Temperature Alarm on the MICON Terminal and at the recorder. 
      Record actual temperature __________°F.
      Temperature at MICON __________°F.
   8. Gradually raise the temperature at the calibrator, when the temperature gets above 40°F the low Temperature alarm should clear. Observe that the Alarm clears at the MICON Terminal.
   9. Keep slowly raising the temperature at the calibrator. When the temperature reaches 76°F ±1°F the high Temperature alarm will annunciate. Verify High Temperature alarm on the MICON Terminal.
   10. Verify and compare temperature history on the MICON Terminal and the recorded temperature at the Calibrator.
   11. Reinstall Temperature Element into the thermal well.
   12. Verify proper installation of the Temperature element.

Quality Control Verification Point:
Verified temperature alarm, indication and records as required.

_____________________________________   ___________________________   _______________________
Signature                        Stamp                          Date
(Optional)
5.3.5 FE/FT/FY-SCW1 (FIR-SCW1) Flow Indicating Recorder

1. Ensure that Fluid Cooler FC1 and Circulation Pump P1 is in operation and running normal.

2. Note and mark the position of hand valve V-CLC-1 (So that valve may be returned to its original position after the test).

3. Slowly close hand valve V-CLC-1 to throttle flow in approximately 5 gpm steps closely observing the flow indication on the MICON.

4. Verify flow on the MICON Terminal. The flows must be within 3%.

5. Return valve V-CLC-1 to its original position.

6. Return system to original configuration.

Quality Control Verification Point:
Verified flow indication at MICON as required.

Signature / Stamp / Date
(Optional)
5.3.6 FAL-SCW1 Low Flow Switch/Low Flow Alarm.

1. Ensure Circulating Pump P2 is running normally and is set in the HAND position.

2. Ensure that Circulation Pump P1 is in operation and running normally and in the AUTO (REMOTE) position.

3. Note the flow as read at the MICON for FIR-SCW1 and FIR-SCW2. Engineer is to adjust the low flow set points to 5 gpm below present reading.

4. Slowly close hand valve V-CLC-3 and V-CLC-6 to throttle flow to approximately the new set points.

5. When the low flow set point is reached the "Low Flow Alarm" should annunciate on the MICON Terminal. Verify Circulation Pump P1 Low Flow alarm.

6. P1 will turn off in MICON control. Verify P1 has shut down.

7. Slowly open hand valve V-CLC-3 and V-CLC-6 to increase flow to above low flow set points. Verify that P1 Failure alarm clears on MICON Terminal.

8. Return valve V-CLC-3 and V-CLC-6 to their original positions.

9. Return system to original configuration.

Quality Control Verification Point:
Verified flow indication, alarm and pump trip at MICON as required.
5.3.7. SCW Return Loop 2 TE/TT (TIR) SCW2 - Temperature Indicating Recorder Test.

1. Remove Temperature Element TE/TT-SCW2 from the Thermal Well.
2. Immerse the Temperature Element TE-SCW2 into calibrator. Note temperature at the calibrator.
3. Verify temperature at the MICON Terminal.
4. Gradually lower temperature at the calibrator to 50°F ±1°F.
5. Observe and verify alarm on the MICON Temperature Indicating record.
6. Gradually raise temperature at the calibrator to 86°F ± 1°F.
7. Compare temperature history on MICON Terminal and the recorded temperature at the Calibrator, should be within 3%.
8. Reinstall Temperature Element into the thermal well.
9. Verify proper installation of the Temperature element.

Quality Control Verification Point:
Verified temperature alarm, indication and records as required.
5.3.8. SCW Supply Loop 2 TE/TT (TAH/TIR/TAL) SCW2A - Temperature Indicating Recorder Test.

1. Remove Temperature Element TE-SCW2A from the Thermal Well.
2. Immerse the Temperature Element TE-SCW2A into calibrator. Note temperature at the Calibrator. Test material block.
3. Verify temperature at the MICON Terminal.
4. Gradually raise temperature at the Calibrator.
5. Observe and verify temperature indication/rise on the MICON Temperature Indicating record.
6. Gradually lower the temperature at the Calibrator to 38°F.
7. The low temperature setpoint is 40°F ±1°F. When the temperature at the Calibrator reaches 40°F ±1°F the Low Temperature alarms should annunciate. Verify Low Temperature Alarm on the MICON Terminal and at the recorder.
8. Gradually raise the temperature at the calibrator, when the temperature gets above 40°F the low Temperature alarm should clear. Observe that the Alarm clears at the MICON Terminal.
9. Keep slowly raising the temperature at the calibrator. When the temperature reaches 76°F ±1°F the high Temperature alarm will annunciate. Verify High Temperature alarm on the MICON Terminal.
10. Verify and compare temperature history on the MICON Terminal and the recorded temperature at the Calibrator.
11. Reinstall Temperature Element into the thermal well.
12. Verify proper installation of the Temperature element.

Quality Control Verification Point:
Verified temperature alarm, indication and records as required.
5.3.9 FE/FT/FY (FIR) – SCW2 Flow Indicating Recorder

1. Ensure that Fluid Cooler FC2 and Circulation Pump P2 is in operation and running normal.

2. Note and mark the position of hand valve C-CLC-4 (So that valve may be returned to its original position after the test).

3. Slowly close hand valve V-CLC-4 to throttle flow in approximately 5 gpm steps closely observing the flow indication on the MICON.

4. Verify flow history on the MICON Terminal, the flow must be within 3%.

5. Return valve V-CLC-4 to its original position.

6. Return system to original configuration.

Quality Control Verification Point:
Verified flow indication, alarm and pump trip at MICON as required.
5.3.10 FAL-SCW2 Low Flow Switch/Low Flow Alarm.

1. Ensure Circulating Pump P1 is running normally and set to the HAND position.

2. Ensure that Circulation Pump P2 is in operation and running normally in the AUTO (REMOTE) position.

3. Note and flow as read at the MICON for FIR-SCW1 and FIR-SCW2. Engineer is to set the low flow interlock set points at 5 gpm below the present reading.

4. Slowly close hand valve V-CLC-6 and V-CLC-3 to throttle flow to approximately the low flow set points as read at the MICON.

5. When the low flow set points are reached the "Low Flow Alarm" should annunciate on the MICON Terminal. Verify Circulation Pump P2 Low Flow alarm.

6. P2 will turn off in MICON control. Verify P2 has shut down.

7. Slowly open hand valve V-CLC-6 and V-CLC-3 to increase flow to above set points. Verify that P1 Failure alarm clears on MICON Terminal.

8. Return valve V-CLC-6 and V-CLC-3 to their original positions.

9. Return system to original configuration.

Quality Control Verification Point:
Verified flow indication, alarm and pump trip at MICON as required.

-----------------------------/-----------------------------/-------------
Signature          Stamp          Date
(Optional)
5.3.11 PSL-TK1 (PAL-TK-1) Expansion Tank TK-1 Low Pressure Alarm Test.

1. Close Pressure Switch PSL-TK1 Root Valve V-CLC-206

2. Remove ¼ inch plug on PI-TK1/PSL-TK1 manifold and install a drain valve for the manifold.

3. Ensure the newly installed manifold drain valve is closed.

4. Open PI-TK1/PSL-TK1 root valve V-CLC-206 and repressurize the manifold then close V-CLC-206.

5. Very slowly crack open the new manifold drain valve to very gradually bleed manifold and depressurize the manifold.

6. When the pressure decreases to 65 ± 1 psig as indicated on PI-TK1 the alarm on MICON Terminal will annunciate. Verify Pressure Low annunciation.

7. Close pressure switch PSL-TK1 manifold drain valve.


10. Reinstall plug on PI-TK1/PSL-TK1 manifold drain

11. Return system to normal operation.

Quality Control Verification Point:
Verified alarm at MICON as required.

________________________/________________________/-------------
Signature Stamp Date
(Optional)
5.4. ROOM 35 VACUUM PUMP PRIMARY CLOSED COOLING LOOP (PCW)

5.4.1 PCW Circulation Pump P-106

1. Verify that Vacuum Pump #2 is in normal operation with Circulating pump P-108.

2. Ensure that the Circulating Pump P106 hand switch HS-106 is in the Auto position.

3. At the MICON Terminal:
   a) Start pump P-106
   b) Verify Light indication P106 "ON".

4. At the Motor Control Center for Circulating Pump P-106 located in room 34, turn off the power for Pump P-106 by placing the disconnect switch to "OFF" position.

5. At the MICON Terminal verify the following:
   a) Alarm Circulating Pump P-106 "Failure"
   b) Light Indication "P106 OFF"
   c) PAL-PCW5 - Low Pressure Alarm
   d) FAL-PCW5 Low Flow Alarm

6. At the Motor Control Center for Circulation Pump P106 return disconnect to "AUTO".

7. Restart Circulating Pump P106 from the MICON Terminal by pressing the "Start" button.
8. Verify Circulating Pump P106 starts and runs normal.

9. At the MICON Terminal verify the following:
   a) Circulating Pump P106 "ON"
   b) Alarm for failure circulating pump P106 clears.
   c) Light Indication P106 "ON".
   d) PAL-PCW5 low pressure alarm clears.
   e) FAL-PCW5 low flow alarm clears.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

----------------------------------------/----------------------------------------
Signature   Stamp     Date
          (Optional)
5.4.2. PCW TE/TT (TIR)-PCW5 Temperature Indicating Recorder/Temperature Alarm Test.

1. Remove Temperature Element TE/TT-PCW5 from the Thermal Well.

2. Immerse the Temperature Element TE-PCW5 into calibrator. Note temperature at the calibrator.

3. Verify temperature at the MICON Terminal.

4. Gradually raise temperature at the calibrator.

5. Observe and verify temperature indication/rise on the MICON Temperature Indicating record.

6. Gradually raise the temperature at the calibrator to above 90°F.

7. When the temperature at the calibrator is greater than 90°F the High Temperature alarms should annunciate.

8. Verify alarm on the MICON Terminal and the recorded temperature at the calibrator they must be within 3%.

9. Gradually lower the temperature at the calibrator, when the temperature gets below 90°F the High Temperature alarm should clear. Observe that the Alarm clears at the MICON Terminal.

10. Reinstall Temperature Element into the thermal well.

11. Verify proper installation of the Temperature element.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

________________________/________________________/__________
Signature Stamp Date
(Optional)
5.4.3. FE/FT/FI (FIR/FAL)-PCW5 Flow Indicating Recorder/Flow Alarm Test

**WARNING:** THE FOLLOWING SECTION WILL INVOLVE A PRF VACUUM OUTAGE.

1. Ensure that Vacuum Pump VP#1 and Circulation Pump P106 is in operation and running normal.

2. Slowly close hand valve V-23A-110 to throttle flow in steps closely observing the flow indication on Flow Indicator (FE/FT/FI-PCW5) till the flow is 9.6 ±1 gpm. The Low Flow Rate alarm setpoint is 9.6 ±1 gpm.

3. When the flow rate is 9.6 ±1 gpm the "Low Flow Alarm" should annunciate on the MICON Terminal. Verify Low Flow alarm.

4. When the flow rate is less than 9.6 gpm Vacuum Pump VP # 1 and circulating pump P-106 will trip. Failure Alarm will annunciate on MICON Terminal. Verify Alarm.

5. Slowly open hand valve V-23A-110 to increase flow to above 9.6 gpm.

6. Restart pump P-106 and Vacuum pump #1. Verify that pump P-106 and VP1 Failure alarms clear on MICON Terminal.

7. Return system to original configuration.

**Quality Control Verification Point:**
Verified alarm and indication at MICON as required.

------------------------/------------------------/-------------
Signature Stamp Date
(Optional)
5.4.4 PE/PT (PIR/PAL)-PCW5 PCW Loop Low Pressure Alarm Test.

2. Remove ½ inch plug on PT-PCW5 manifold and install a drain valve for the manifold.
3. Ensure the newly installed manifold drain valve is closed.
5. Very slowly crack open the new manifold drain valve to very gradually bleed manifold and depressurize the manifold.
6. When the pressure decreases to 2 ±1 psig the alarm on MICON Terminal will annunciate. Verify Pressure Low annunciation and light indication on the MICON Terminal.
7. Close pressure switch manifold drain vale.
10. Return system to normal operation.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

Signature/Stamp/Date
(Optional)
5.4.5 PCW Circulation Pump P-108

1. Verify that Vacuum Pump #1 is operating with P-106.

2. Ensure that the Circulating Pump P108 hand switch HS-108 is in the Auto position.

3. At the MICON Terminal.
   a) Turn on Circulating Pump P-106.
   b) Verify Light indication P108 "ON".

4. At the Motor Control Center for Circulating Pump P-108 located in room 34, turn off the power for Pump P-108 by placing the disconnect switch to "OFF" position.

5. At the MICON Terminal:
   a) Alarm for failure of Circulating Pump P-108
   b) Verify Light Indication "P108 OFF"
   c) Verify PAL-PCW6 – Low Pressure Alarm
   d) Verify FAL-PCW6 Low Flow Alarm

6. At the Motor Control Center for Circulation Pump P108 return disconnect to "ON".

7. Restart Circulating Pump P108 from the MICON Terminal by pressing the "Start" button.

9. At the MICON Terminal verify the following:

   a) Circulating Pump P108 "ON"
   b) Alarm for failure circulating pump P108 clears.
   c) Light Indication Circulating Pump P108 "ON".
   d) PAL-PCW6 low pressure alarm clears.
   e) FAL-PCW6 low flow alarms clears.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

----------------------------------/----------------------------------
Signature                      Stamp                      Date
(Optional)
5.4.6 PCW TE/TT-PCW6 (TIR/TAH PCW6)- Temperature Indicating Recorder/Temperature Alarm Test.

1. Remove Temperature Element TE/TT-PCW6 from the Thermal Well.

2. Immerse the Temperature Element TE/TT-PCW6 into calibrator. Note temperature at the calibrator.

3. Verify temperature at the MICON Terminal.

4. Gradually raise temperature at the calibrator.

5. Observe and verify temperature indication/rise on the MICON Temperature Indicating record.

6. Gradually raise the temperature at the calibrator to above 80° ±1°F and observe the temperature rise and indication on the MICON Terminal recorder.
   a) Actual Temperature °F
   b) MICON Temperature °F

7. When the temperature at the Test Material block is greater than 90° ±1°F the High Temperature alarms should annunciate. Verify High Temperature Alarm on the MICON Terminal.
   a) Actual Temperature °F
   b) MICON Temperature °F

8. Gradually lower the temperature at the Test Material block, when the temperature gets below 90°F the High Temperature alarm should clear. Observe that the Alarm clears at the MICON Terminal.

9. Verify and compare temperature history on the MICON Terminal and the recorded temperature at the Test Material block.

10. Reinstall Temperature Element into the thermal well.

11. Verify proper installation of the Temperature element.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

------------------------------/------------------------/------------------------
Signature                      Stamp                        Date
(Optional)
5.4.7 FE/FT/FI-PCW6 (FIR/FAL-PCW6) Flow Indicating Recorder/Flow Alarm Test

**WARNING:** THE FOLLOWING SECTION WILL INVOLVE A PRF VACUUM OUTAGE.

1. Ensure that Vacuum Pump VP#2 and Circulation Pump 108 is in operation and running normal.

2. Slowly close hand valve V-23A-118 to throttle flow in steps closely observing the flow indication on FE/FT/FI-PCW6 till the flow is 9.6 ±1 gpm. The Low Flow Rate alarm setpoint is 9.6 ±1 gpm.

3. When the flow rate is about 9.6 ±1 gpm the "Low Flow Alarm" will annunciate on the MICON. Verify Low Flow alarm.

6. When the flow rate is less than 9.6 ±1gpm Vacuum Pump VP # 2 and circulating pump P-108 will trip. Failure Alarm will annunciate on MICON. Verify Alarm.

7. Slowly open hand valve V-23A-118 to increase flow to above 9.6 gpm.

8. Restart circulating pump P-108 and Vacuum pump #1. Verify that VP1 and P-108 Failure alarms clear on MICON.

9. Return system to original configuration.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

---
Signature          Stamp          Date
(Optional)
5.4.8 PE/PT (PIR/PAL)-PCW6 PCW Loop Low Pressure Alarm Test.

2. Remove plug on PE/PT-PCW6 manifold and install a drain valve for the manifold.
3. Ensure the newly installed manifold drain valve is closed.
5. Very slowly crack open the new manifold drain valve to very gradually bleed manifold and depressurize the manifold.
6. When the pressure decreases to 2 ±1 psig the alarm on MICON Terminal will annunciate. Verify low pressure alarm and light indication on the MICON Terminal.
7. Close pressure switch manifold drain valve.
10. Return system to previous configuration.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

-----------------------------/----------------------------------/
Signature                      Stamp                      Date
(Optional)
5.4.9 LE TK-105/LSL TK-105 (LAL TK-105) LEVEL ELEMENT/ALARM TEST

1. Remove mounting bolts from Tank TK-105 Level Element mounting flange.

**NOTE**
This test will be performed without disconnecting any electrical leads from the Level Instrument.

2. After the bolts are removed, gently raise the level element high enough to clear the bottom electrode from the water.

3. Verify Low Level Alarm on MICON Terminal.


5. Reinstall Level Element LE TK-105 on Tank TK-105 cover and reinstall all bolts that were removed.

Quality Control Verification Point:
Verified alarm and indication at MICON as indicated.

________________________/________________________/________
Signature               Stamp                Date
(Optional)
5.5.0 PRIMARY CLOSED COOLING LOOP (PCW) - GLOVE BOXES

1. Ensure that the SCW system is in normal operation.
2. Close PCW supply Hand Valve V-CLC-124 located in corridor 33.
5. Remove Orrifice OFM-CLC-1 and replace with 1" spacer (if required) to ensure adequate flow to circulation pumps P-101 & P-102.
7. Ensure that PCW system Circulation Pumps P101 & P102 are both operable.
8. Ensure that Expansion Tank TK-101 is pressurized. Pressure Indicating gage PI-TK-101 should read between 10 to 80 psig.

5.5.1 PCW Circulation Pump P-101

1. At the Motor Control Center for Circulation Pump P-101, located in room 34, turn on the power for Pump P-101 by placing the power switch (labeled "PRIMARY CLOSED LOOP CIRCULATION PUMP P-101 ROOM 35) to the ON position.
2. At the Control Panel for Circulating Pump P101 place hand switch in the "Auto" position.
3. From the MICON Terminal start circulating pump P-101.
4. At the MICON Terminal verify the following:
   a) Indication, Circulating Pump P-101 "ON".
   b) PIR-PCW1 is recording the system pressure.
   c) TIR-PCW1 is recording system temperature.
   d) FIR-PCW1 is recording system flow.
   e) CIR-PCW1 is recording system conductivity.
5. At the Motor Control Center for Circulating Pump P-101 located in room 34, turn off the power for Pump P-101 by placing the disconnect switch to "OFF" position.

6. At the MICON Terminal verify the following:
   a) Circulating Pump P-101 Failure Alarm "XA-P101" on.
   b) Circulating Pump P101 Failure "OFF" Indication on.
   c) PAL-PCW1 - Low Pressure Alarm.
   d) FAL-PCW1 Low Flow Alarm.

7. At the MICON TERMINAL press the circulating pump P-101 stop button.

8. At the Motor Control Centre return disconnect switch for P-101 to "ON" position.

9. Start Circulating Pump P-101 from MICON and verify following:
   a) Circulating Pump P-101 Failure Alarm "XA-P101" clears.
   b) Circulating Pump P101 Failure "OFF" Indication clears.
   c) PAL-PCW1 - Low Pressure Alarm clears.
   d) FAL-PCW1 Low Flow Alarm clears.

10. Stop circulation pump P-102.


12. Return system to normal configuration.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.
5.5.2 PCW Circulation Pump P-102

1. At the Motor Control Center for Circulation Pump P-102, located in room 34, turn on the power for Pump P-102 by placing the power switch (labeled "PRIMARY CLOSED LOOP CIRCULATION PUMP P-102 ROOM 35) to the ON position.

2. At the Control Panel for Circulating Pump P-102 place hand switch is in the "Auto" position.

3. From the MICON Terminal start circulating pump P-102.

4. At the MICON Terminal verify the following:
   a) Circulating Pump P-102 "ON" indication.
   b) No system failure alarms of failure indications.

5. At the Motor Control Center for Circulating Pump P-102 located in room 34, turn off the power for Pump P-102 by placing the disconnect switch to "OFF" position.

6. At the MICON Terminal verify the following:
   a) Circulating Pump P102 "Failure Alarm" on.
   b) Circulation Pump P-102 "OFF" indication.

7. At the MICON press the circulating pump P-102 "STOP" button.

8. At the Motor Control Centre return disconnect switch for P-102 to "ON" position.

9. At the MICON start circulating pump P-102 and verify following:
   a) Circulating Pump P-102 failure alarm clears.
   b) Circulating pump P-102 "OFF" indication clears.

10. Return PCW system to normal configuration.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.
5.5.3 PCW TE/TT-PCW1 (TIR PCW1) - Temperature Indicating Recorder/Temperature Alarm Test.

1. Remove Temperature Element TE/TT-PCW1 from the Thermal Well.
2. Immerse the Temperature Element TE-PCW1 into calibrator. Note temperature at the calibrator.
3. Verify temperature at the MICON Terminal.
4. Gradually raise temperature at the Calibrator.
5. Observe and verify alarm on the MICON Temperature Indicating record.
6. Gradually raise the temperature at the Calibrator to above 75°F and observe the temperature rise and indication on the MICON Terminal recorder.

NOTE
75°F is used as the high temperature for PCW supply to the glove boxes as given in Table A-1 of Westinghouse Internal Memo 155550-93-GPM-051. The intent of this test is to ensure that the temperature transmitter will trigger High Temperature alarm on MICON Terminal at the given setpoint.
7. When the temperature at the calibrator is greater than 75°F the High Temperature alarms should annunciate. Verify High Temperature Alarm on the MICON Terminal.
   a) Actual Temperature °F
   b) MICON Temperature °F

8. Gradually lower the temperature at the Calibrator. When the temperature gets below 75°F the High Temperature alarm should clear. Observe that the Alarm clears at the MICON Terminal.

9. Verify and compare temperature history on the MICON Terminal and the recorded temperature at the calibrator.

10. Reinstall Temperature Element into the thermal well.

11. Verify proper installation of the Temperature element.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

------------------------/------------------------/------------------------
Signature  Stamp  Date
(Optional)
5.5.4. FE/FT/FI-PCW1 (FIR/FAL-PCW1) Flow Indicating Recorder/Flow Alarm Test

1. Start Circulation Pump P-101 from MICON Terminal.

2. Verify flow rate at FIR-PCW1.

3. Slowly close hand valve V-CLC-135 to throttle flow in steps closely observing the flow indication on FE/FT/FI-PCW1. The Low Flow Rate alarm setpoint is 32 GPM.

4. At the MICON Terminal, verify the following:
   a) Circulation Pump P-101 trip on low flow FSL-PCW1 actuation.
   b) Circulation Pump P-101 failure alarm XA-P101
   c) Low Flow alarm FAL-PCW1.
   d) Flow Indicating Recorder FIR-PCW1 indicates gpm rate.
   e) Record low flow rate at trip _____ gpm.

5. Slowly open hand valve V-CLC-135 to full open.

6. Restart Circulating pump P101 and verify that P101 Failure alarm clears on MICON Terminal.

7. From MICON shut down P-101.

8. Start circulating pump P-102


10. Slowly close hand valve V-CLC-134 to throttle flow in steps closely observing the flow indication on FE/FT/FI-PCW1. The Low Flow Rate alarm setpoint is 32 ±1 gpm.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

__________________________________________  ________________  ________________
Signature            Stamp                Date
(Optional)
11. At the MICON Terminal, verify the following:
   
   a) Circulation Pump P-102 trip on low flow FSL-PCW1 actuation.
   b) Circulation Pump P-102 failure alarm XA-P101
   c) Low Flow alarm FAL-PCW1.
   d) Flow Indicating Recorder FIR-PCW1 indicates gpm rate.
   e) Record low flow rate at trip _____ gpm.


13. Return system to original configuration.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

__________________________/__________________________/__________________________
Signature                  Stamp                  Date
(Optional)
5.5.5 PE/PT-PCW1 (PIR/PAL- PCW1) PCW Loop Low Pressure Alarm Test.

2. Remove ¾ inch plug on PE/PT-PCW1 manifold and install a drain valve for the manifold.
3. Ensure the newly installed manifold drain valve is closed.
4. Open root valve V-CLC-140 and repressurize the manifold then close V-CLC-140.
5. Very slowly crack open the new manifold drain valve to very gradually bleed manifold and depressurize the manifold.
6. When the pressure decreases to 50 ±1 psig the alarm on MICON Terminal will annunciate. Verify Pressure Low annunciation on the MICON Terminal.
7. Close pressure switch manifold drain valve.
8. Open Pressure switch root valve V-CLC-140.
10. Return system to normal operation.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

Signature ____________________________
Stamp ____________________________
Date ____________________________
(Optional)
5.5.6 EXPANSION TANK TK-101 Pressure Switch PSL-TK-101 alarm

1. Isolate expansion tank TK-101 manifold by closing the following valves.
   a) V-CLC-121 - Verify Closed
   b) V-CLC-119 - Verify closed
   c) V-CLC-128 - Verify closed
   d) V-CLC-133 - Verify closed
   e) V-CLC-134 - Verify closed

2. Remove 1/2" pipe cap downstream of valve V-CLV-118.

3. Slowly open valve V-CLC-118 to depressurize manifold.

4. When the pressure in the manifold drops below 50 ±1 psig Low Pressure Alarm PAL-TK101 will annunciate on the MICON.

5. Verify alarm on MICON.

6. Close V-CLC-118 and reinstall pipe 1/2" cap.

7. a) Open V-CLC-121 - Verify Open
   b) Valve V-CLC-119 - Verify Closed.
   c) Open V-CLC-128 - Verify Open
   d) Open V-CLC-133 - Verify Open
   e) Open V-CLC-134 - Verify Open.

   a) Verify PAL-TK101 clears on MICON.

9. Return to normal configuration.

Quality Control Verification Point:
Verified alarm and indication at MICON as required.

________________________/________________________/
Signature Stamp Date
Closed Loop Cooling Operation with MICON OTP Exceptions List.

<table>
<thead>
<tr>
<th>STEP</th>
<th>EXCEPTION</th>
<th>RESOLUTION</th>
<th>INITIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>