MAY 11 1995

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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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RELEASE AUTHORIZATION

Document Number: WHC-SD-CP-OTR-152, REV 0

Document Title: CLOSED LOOP COOLING OPERATION WITH MICON

Release Date: 5/10/95

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara M. Broz

May 10, 1995

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OPERABILITY TEST PROCEDURE
WHC-SD-CP-OTR-152

Revision 0

January 18, 1995

Closed Loop Cooling Operation with MICON

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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.

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.

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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 # 840-13-55-004 Last Calibrated 2-16-94 Next Calibration 2-16-95
777-13-20-009 Last Calibrated 6/13/94 Next Calibration 6/13/95
 Calibrated temperature measuring device (range capability approximately 50 - 300 °F).

Device ID # 840-45-08-056 Last Calibrated 9/7/94 Next Calibration 9/7/95
 Calibrated VOM Multimeter (standard electricians type).

Calibrated Flow Meter
 Device ID # WC45683 Last Calibrated N/A Next Calibration N/A

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 II			
Component	Instrument	Description	Verify Calibrated
PW	PSL-1	Low Pressure Switch Process Water to FC1 & 2	done 1-20-95
FC1	TE/TT-SCW1A	Temperature Element/Transmitter SCW supply to Circ.Pump P1 from FC1.	done 9-26-94
	TE/TT-SCW1	Temperture Eelement/Transmitter SCW return to FC1.	done 9-26-94
	FE/FT/FY-SCW1 FE/FT-SCW1	Flow Element/Transmitter SCW supply to Circ. Pump P1 from FC1.	done 10-4-94

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TABLE II			
Component	Instrument	Description	Verify Calibrated
FC-2	TE/TT/SCW2 <i>need tag</i>	Temperature Element/Transmitter SCW supply to Circ. Pump P2 from FC2.	<i>done</i> 9-26-94
	TE/TT-SCW2A	Temperture Eelement/Transmitter SCW return to FC-2.	<i>done</i> 9-26-94
	FE/FT/FY-SCW2 <i>FE/FT-SCW2</i>	Flow Element/Transmitter SCW supply to Circ. Pump P1 from FC1.	<i>done</i> 10-4-94
SCW	PSL-TK1	Low Pressure Switch for SCW Expansion Tank TK1.	<i>Done</i> 4-95
PCW RM 35	PE/PT-PCW1 <i>PT-PCW-1</i>	Pressure Element/Transmitter - PRF PCW system	<i>Done</i> 10/1/94
PCW RM 35	TE/TT-PCW1	Temperature Element/Transmitter - PRF PCW system.	<i>DONE</i> 9-26-94
PCW-RM 35	FE/FT/FI-PCW1 <i>FE/FT/PCW-1</i>	Flow Element/Transmitter/Indicator - PRF - PCW System.	<i>DONE</i> 5/94
PCW RM 35	PSL TK-101	Low Pressure Switch - PRF PCW System.	<i>done</i> 10-18-94
PCW RM 35	FSL-PCW1	Flow Switch Low - PRF PCW Circulation Pump discharge flow.	
RM 35 PCW	TE/TT-PCW5	Temperature Element/Transmitter - PCW supply to Vacuum Pump VP#1.	<i>done</i> 9-94
RM 35 PCW	PE/PT-PCW5 <i>PT-PCW5</i>	Pressure Element/Transmitter - PCW supply to Vacuum Pump VP#1.	<i>done</i> 10-10-94
RM 35 PCW	FE/FT/FI-PCW5 <i>FE-FI-PCW5</i>	Flow Element/Transmitter/Indicator - PCW supply to Vacuum Pump VP#1.	<i>functional</i> 4-95
RM 35 PCW	TE/TT-PCW6 <i>need label</i>	Temperature Element/Transmitter - PCW supply to Vacuum Pump VP#2.	<i>done</i> 9-28-94
RM 35 PCW	PE/PT-PCW6 <i>need label</i>	Pressure Element/Transmitter - PCW supply to Vacuum Pump VP#2.	<i>done</i> 10-10-94
RM 35 PCW	FE/FT/FI-PCW6 <i>FE-FI-PCW6</i>	Flow Element/Transmitter/Indicator - PCW supply to Vacuum Pump VP#2.	<i>functional</i> 4-95

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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"~~ *REMOTE.* *SP-1*
3. At the MICON Terminal:
 - ~~a) Verify Alarm on MICON for failure of Fluid Cooler Fan FCF-1~~
 - ✓ a) Verify Alarm on MICON for failure of Spray Pump SP-1.

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OPERABILITY TEST PROCEDURE IMPACT LEVEL Q	CLOSED LOOP COOLING OPERATION WITH MICON	WHC-SD-CP-OTR-152 REV. 0 PAGE 10 OF 48
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✓ 4. Return ^{switch} ~~Disconnect~~ to ^{REMOTE} "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.

✓ 6. Restore SP-1 to normal operating mode. *AN 3/3/95*

Quality Control Verification Point:

Alarms annunciated and cleared as required.

/ 3-3-95

Signature Stamp Date
(Optional)

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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"~~ *REMOTE* *SP-1*
- ✓ 3. At the MICON Terminal:
 - ~~a) Verify Alarm on MICON for failure of Fluid Cooler Fan FCF2~~
 - ✓ *a/b)* Verify Alarm on MICON for failure of Spray Pump SP2.
- ✓ 4. Return ~~Disconnect~~ *switch* *REMOTE* 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.
- ✓ 6. *Restore SP-2 to normal operating mode.*

Quality Control Verification Point:

Alarms annunciated and cleared as required.

Stamp (Optional)
Date *3-7-85*

3/7/85

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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.

/ _____ / 3-3-95
 Signature Stamp Date
 (Optional)

OPERABILITY TEST PROCEDURE IMPACT LEVEL Q	CLOSED LOOP COOLING OPERATION WITH MICON	WHC-SD-CP-OTR-152 REV. Q PAGE 13 OF 48
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- ✓ 1) 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.

Signature

Stamp
(Optional)

3-3-95

Date

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5.3 CIRCULATION PUMPS P1 & P2 INTERLOCKS WITH MICON

- 1 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.

AUTO
AUTO

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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.

/
/ 3-3-95
 Signature Stamp Date
 (Optional)

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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".

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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 annunciated and cleared as required.

/

Signature / Stamp (Optional) / Date

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5.3.3. SCW Return Loop1 TE/TT SCW1 (TIR-SCW1) - Temperature Indicating Recorder Test.

- Disconnect RTD at element*
- ✓ 1. ~~Remove Temperature Element TE/TT-SCW1 from the Thermal Well.~~
- ✓ 2. *Connect RTD calibrator output terminals to RTD terminals*
~~Immerse the Temperature Element TE-SCW1 into Calibrator. Note temperature at the calibrator.~~
- ~~3. Verify temperature at the MICON Terminal.~~
- ✓ 3A. Gradually lower temperature at the calibrator to $50^{\circ} \pm 1^{\circ}\text{F}$.
Record Actual Temperature 50 °F.
- ✓ 4B. Observe and verify temperature indication/drop on the MICON Temperature Indicating record.
Temperature at MICON: 50.7 °F
- ✓ 5B. Gradually raise temperature at the calibrator to $86^{\circ}\text{F} \pm 1^{\circ}\text{F}$
Record actual temperature 86 °F.
Temperature at MICON 86.2 °F.
- ✓ 6A. Compare temperature history on the MICON Terminal and the recorded temperature at the calibrator, they must record within 3%.
- ✓ 7B. *Disconnect RTD calibrator from terminals and connect OHM meter*
~~Reinstall Temperature Element into the thermal well.~~ 60 °F
to the RTD and read & record the temperature.
- ✓ 8B. ~~Verify proper installation of the Temperature element.~~
Remove OHM meter, reconnect the RTD to its terminals and verify from MICON that the RTD is operating.

Quality Control Verification Point:

Verified temperature alarm, indication and records as required.

Signature

Stamp
(Optional)

Date

3-3-95

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5.3.4. SCW Supply Loop1 TE/TT (TIR/TAH/TAL) SCW1A - Temperature Indicating Recorder Test.

- Disconnect RTD at element. TE-SW1A.*
- ✓ 1. ~~Remove Temperature Element TE SCW1A from the Thermal Well.~~
Connect RTD calibrator output terminals to RTD terminals.
 2. ~~Immerse the Temperature Element TE SCW1A into calibrator. Note temperature at the calibrator.~~
 3. ~~Verify temperature at the MICON Terminal.~~
 - ✓ 8.3 Gradually raise temperature at the Calibrator.
 - ✓ 8.4 Observe and verify temperature indication/rise on the MICON Temperature Indicating record.
 - ✓ 8.5 Gradually lower the temperature at the Calibrator to 38°F ±1°F.
 - ✓ 8.6 The low temperature setpoint is 40°F ±1°. When the temperature at the Calibrator 40° ±1°F the Low Temperature alarms should annunciate. Verify Low Temperature Alarm on the MICON Terminal and at the recorder.
Record actual temperature 38 °F.
Temperature at MICON 38 °F.
 - ✓ 8.7 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.
 - ✓ 8.8 Keep slowly raising the temperature at the calibrator. When the temperature reaches 76° ±1°F the high Temperature alarm will annunciate. Verify High Temperature alarm on the MICON Terminal.
 - ✓ 10.9 Verify and compare temperature history on the MICON Terminal and the recorded temperature at the Calibrator.
 - ✓ 11.0 *Disconnect RTD calibrator from terminals and cover RTD, put RTD back into normal configuration.*
~~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]

Signature

Stamp
(Optional)

Date

3-3-95

YH
3/3/95

- ✓ 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~~ ^{above} present reading.
- ~~4. Slowly close hand valve V-CLC-3 and V-CLC-6 to throttle flow to approximately the new set points.~~
- ✓ 5.4 When the low flow set point is ^{changed} reached the "Low Flow Alarm" should annunciate on the MICON Terminal. Verify Circulation Pump P1 Low Flow alarm.
- ✓ 5.5 P1 will turn off in MICON control. Verify P1 has shut down.
- ✓ 7.1 ~~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.~~ ^{Return alarm set points to normal.}
- ✓ 8. ~~Return valve V-CLC-3 and V-CLC-6 to their original positions.~~
- ✓ 8.8 Return system to original configuration.

Verified flow indication, alarm and pump trip at MICON as required.

Signature _____ Stamp (Optional) _____ Date 3-3-95

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5.3.7. SCW Return Loop 2 TE/TT (TIR) SCW2 - Temperature Indicating Recorder Test.

- Disconnect RTD at element TE/TT SCW2.*
- ✓ 1. ~~Remove Temperature Element TE/TT-SCW2 from the Thermal Well.~~
 - ✓ 2. *Connect RTD calibrator output terminals to RTD terminals.*
~~Immerse the Temperature Element TE SCW2 into calibrator. Note temperature at the calibrator~~
 - ~~3. Verify temperature at the MICON Terminal.~~
 - ✓ 4.3 Gradually lower temperature at the calibrator to 50°F ± 1°F.
50.1°F AT MICON
 - ✓ 5.4 Observe and verify alarm on the MICON Temperature Indicating record.
 - ✓ 6.5 Gradually raise temperature at the calibrator to 86°F ± 1°F.
86.0°F AT MICON
 - ✓ 7.6 Compare temperature history on MICON Terminal and the recorded temperature at the Calibrator, should be within 3%.
 - ✓ 8.7 *Disconnect RTD calibrator from terminals and connect ohm meter to the RTD and read & record the temperature.*
~~Reinstall Temperature Element into the thermal well.~~ *60.3 °F*
 - ✓ 8.8 ~~Verify proper installation of the Temperature element.~~
Remove OHM meter and reconnect RTD terminals.

Quality Control Verification Point:

Verified temperature alarm, indication and records as required.

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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.~~
Disconnect RTD at element TE-SCW2A.
- ✓ 2. ~~Immerse the Temperature Element TE SCW2A into calibrator. Note temperature at the Calibrator test material block.~~
Connect RTD calibrator output terminals to RTD terminals.
- ~~3. Verify temperature at the MICON Terminal.~~
- ✓ 4.3 Gradually raise temperature at the Calibrator.
- ✓ 5.4 Observe and verify temperature indication/rise on the MICON Temperature Indicating record.
- ✓ 6.5 Gradually lower the temperature at the Calibrator to 38°F.
- ✓ 7.6 The low temperature setpoint is 40°F ±1°F. When the temperature at the Calibrator reaches 40° ±1°F the Low Temperature alarms should annunciate. Verify Low Temperature Alarm on the MICON Terminal and at the recorder. *38°F 37.6°F MICON*
- ✓ 8.7 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.
- ✓ 8.8 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.
- ✓ 10.9 Verify and compare temperature history on the MICON Terminal and the recorded temperature at the Calibrator.
- ✓ 11. ~~Reinstall Temperature Element into the thermal well.~~
Disconnect RTD calibrator from terminals.
- ✓ 12. ~~Verify proper installation of the Temperature element.~~
Reconnect RTD terminals.

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

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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.~~
- ✓ 5.4 When the low flow set points are ^{changed} reached the "Low Flow Alarm" should annunciate on the MICON Terminal. Verify Circulation Pump P2 Low Flow alarm.
- ✓ 6.5 P2 will turn off in MICON control. Verify P2 has shut down.
- ✓ 7.6 ^{Return alarm set points to normal.} ~~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.~~
- ✓ 9.7 Return system to original configuration.

Quality Control Verification Point:

Verified flow indication, alarm and pump trip at MICON as required.

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 (Optional)

5.3.11 PSL-TK1 (PAL-TK-1) Expansion Tank TK-1 Low Pressure Alarm Test.

Short across PSL-TK1 alarm contacts.

- ~~1. Close Pressure Switch PSL-TK1 Root Valve V-CLC-206~~
- ~~2. Remove 1/2 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.~~
- ~~8. Open Pressure switch root valve V-CLC-206.~~
- ~~9.2. Verify Alarm clears on Micon.~~
- ~~10. Reinstall plug on PI-TK1/PSL-TK1 manifold drain~~
- ~~11.3. Return system to normal operation.~~
4. VERIFY ALARM SOUNDS.

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

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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.

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

- Disconnect RTD at element TE/TT-PCW5.*
- ✓ 1. ~~Remove Temperature Element TE/TT-PCW5 from the Thermal Well.~~
 - ✓ 2. *Connect RTD calibrator output terminals to RTD terminals.*
~~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. *Reconnect RTD elements to original configuration.*
~~Reinstall Temperature Element into the thermal well.~~
 - ~~11. Verify proper installation of the Temperature element.~~
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Quality Control Verification Point:
Verified alarm and indication at MICON as required.

[Signature]

Signature

Stamp
(Optional)

Date

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

- ___ 1. Close Root Valve V-23A-108 for PE/PT-PCW5.
- ___ 2. Remove $\frac{1}{2}$ inch plug on PT-PCW5 manifold and install a drain valve for the manifold.
- ___ 3. Ensure the newly installed manifold drain valve is closed.
- ___ 4. Open root valve V-23A-108 and repressurize the manifold then close V-23A-108.
- ___ 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.
- ___ 8. Open Pressure switch root valve V-23A-108.
- ___ 9. Verify Alarm and light indication clear on Micon.
- ___ 10. Return system to normal operation.

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PE/PT-PCW5 WAS
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Quality Control Verification Point:
Verified alarm and indication at MICON as required.

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5.4.5 PCW Circulation Pump P-108

- 1/ 1. Verify that Vacuum Pump #1 is operating with P-106.
- 1/ 2. Ensure that the Circulating Pump P108 hand switch HS-108 is in the Auto position.
- 1/ 3. At the MICON Terminal.
 - a) Turn on Circulating Pump P-¹⁰⁸~~106~~. *108 on 3/14/95*
 - 1/ b) Verify Light indication P108 "ON".
- 1/ 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.
- 1/ 5. At the MICON Terminal:
 - 1/ a) Alarm for failure of Circulating Pump P-108
 - 1/ b) Verify Light Indication "P108 OFF"
 - 1/ c) Verify PAL-PCW6 - Low Pressure Alarm
 - 1/ d) Verify FAL- PCW6 Low Flow Alarm
6. At the Motor Control Center for Circulation Pump P108 return disconnect to "ON".
- 1/ 7. Restart Circulating Pump P108 from the MICON Terminal by pressing the "Start" button.
- 1/ 8. Verify Circulating Pump P108 starts and runs normal.

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9. At the MICON Terminal verify the following:

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

Quality Control Verification Point:

Verified alarm and indication at MICON as required.

Signature

Stamp
(Optional)

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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.~~
Disconnect RTD at element
2. ~~Immerse the Temperature Element TE/TT-PCW6 into calibrator. Note temperature at the calibrator.~~
Connect RTD calibrator output terminals to RTD terminals.
3. ~~Verify temperature at the MICON Terminal.~~
- 4.3 Gradually raise temperature at the calibrator.
- 5.4 Observe and verify temperature indication/rise on the MICON Temperature Indicating record.
- 6.5 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 80 °F
 - b) MICON Temperature 80 °F
- 7.6 When the temperature at the ~~Test Material block~~ ^{calibrator} is greater than 90° ±1°F the High Temperature alarms should annunciate. Verify High Temperature Alarm on the MICON Terminal.
 - a) Actual Temperature 90 °F
 - b) MICON Temperature 90 °F
- 8.7 Gradually lower the temperature at the ~~Test Material block~~ ^{calibrator}, when the temperature gets below 90°F the High Temperature alarm should clear. Observe that the Alarm clears at the MICON Terminal.
- 9.8 Verify and compare temperature history on the MICON Terminal and the recorded temperature at the Test Material block.
- 10.9 ~~Reinstall Temperature Element into the thermal well.~~
Disconnect RTD calibrator from terminals
- 11.10 ~~Verify proper installation of the Temperature element.~~
Reconnect RTD terminals.

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

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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 1. Ensure that Vacuum Pump VP#2 and Circulation Pump 108 is in operation and running normal.
- h 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. *h. 9.57 Low 9.4 3-17-95*
- 1 3. When the flow rate is about 9.6 ± 1 gpm the "Low Flow Alarm" will annunciate on the MICON. Verify Low Flow alarm.
- 1 6. When the flow rate is less than 9.6 ± 1 gpm Vacuum Pump VP # 2 and circulating pump P-108 will trip. Failure Alarm will annunciate on MICON. Verify Alarm. *VP #2 Trip 3-17-95*
- 1 7. Slowly open hand valve V-23A-118 to increase flow to above 9.6 gpm.
- 1 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.

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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
- ☒ 3. Close PCW return Hand Valve V-CLC-119 located in corridor 33.
- ~~4. Close PCW bypass valve V-CLC-127 and V-CLC-128~~
- ~~5. Remove Orifice OFM CLC-1 and replace with 1" spacer (if required) to ensure adequate flow to circulation pumps P-101 & P-102.~~
- ☒ 6.4 Open PCW bypass valves V-CLC-127 & V-CLC-128.
- ☒ 7.5 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.~~

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- ✓ ~~ex)~~ No systems Failure alarms or Failure Indications.
- ✓ 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-101.
- ~~11. Reinstall orifice OFM-CLC-1.~~
- ✓ 12. Return system to normal configuration.

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

Signature

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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 or 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.

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5.5.3 PCW TE/TT-PCW1 (TIR PCW1) - Temperature Indicating Recorder/Temperature Alarm Test.

- Disconnect RTD at element TE/TT-PCW1.*
- ✓ 1. ~~Remove Temperature Element TE/TT-PCW1 from the Thermal Well.~~
Connect RTD calibrator output terminals to RTD terminals.
- ✓ 2. ~~Immerse the Temperature Element TE-PCW1 into calibrator. Note temperature at the calibrator.~~
3. ~~Verify temperature at the MICON Terminal.~~
- ✓ 4.3 Gradually raise temperature at the Calibrator.
- ✓ 5.4 Observe and verify alarm on the MICON Temperature Indicating record.
- ✓ 5.5 Gradually raise the temperature at the Calibrator to above 75°F and observe the temperature rise and indication on the MICON Terminal recorder.
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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.

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- ✓ 7.6 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 75 °F
- b) MICON Temperature 75 °F
- ✓ 8.7 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.
- ✓ 8.8 Verify and compare temperature history on the MICON Terminal and the recorded temperature at the calibrator.
- ✓ 10. *Disconnect RTD calibrator from terminals.*
~~Reinstall Temperature Element into the thermal well.~~
- ✓ 11. *configuration*
Verify proper ~~installation~~ of the Temperature element. *wires.*

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

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Date

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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. *In MICON reset alarm to lower than 8 gpm.*
4. ~~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. ~~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. 5. Restart Circulating pump P101 and verify that P101 Failure alarm clears on MICON Terminal.~~
- ✓ ~~7. 6. From MICON shut down P-101.~~
- ✓ ~~8. 7. Start circulating pump P-102~~
- ✓ ~~9. 8. Verify flow rate at FIR-PCW1.~~
- ~~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

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- ✓ 11.8
9. 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.~~
 - _____ 12. ~~Slowly open hand valve V-CLC-135 to full open.~~
 - ✓ 13.8
10. Return system to original configuration.

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3/27/95

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

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5.5.5 PE/PT-PCW1 (PIR/PAL- PCW1) PCW Loop Low Pressure Alarm Test.

- _____ 1. Close Root Valve V-CLC-140 for PT-PCW5.
- _____ 2. Remove $\frac{1}{2}$ 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 $\pm$ 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.
- _____ 9. Verify Alarm clears on Micon.
- _____ 10. Return system to normal operation.

NOT NEEDED
 CO405-1 PROVED
 PE/PT-PCW1.
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Quality Control Verification Point:
 Verified alarm and indication at MICON as required.

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Signature	Stamp (Optional)	Date

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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 $\pm$ 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.
- _____ 8. Repressurize TK-101 to above 55 psig.
 - a) Verify PAL-TK101 clears on MICON.
- _____ 9. Return to normal configuration.

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3/6/95
3/23/95
CO431-3

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

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Signature Stamp Date

OPERABILITY TEST PROCEDURE IMPACT LEVEL Q	CLOSED LOOP COOLING OPERATION WITH MICON	WHC-SD-CP-OTR-152 REV. Q PAGE 47 OF 48
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Closed Loop Cooling Operation with MICON OTP Exceptions List.

STEP	EXCEPTION	RESOLUTION	INITIALS

OPERABILITY TEST PROCEDURE IMPACT LEVEL Q	CLOSED LOOP COOLING OPERATION WITH MICON	WHC-SD-CP-OTR-152 REV. 1A 0 m PAGE 48 OF 48
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6.0 ACCEPTANCE RECORD

- 6.1 Any equipment non-conformance or anomalies are listed on the exceptions list.
- 6.2 Upon test completion and acceptance, the cognizant engineer will prepare an Operational Test Report (OTR) and transmit it to Central Files via an Engineering Data Transmittal (EDT).
- 6.3 The distributed control system (MICON) is accepted for service required by the Closed Loop Cooling system in 236-Z and 234-5Z. This acceptance is based on the attached OTP and resolution of any exceptions discovered during the OTP as documented on the list of exceptions.

Cognizant Engineer *[Signature]* Date 3/22/95

Cognizant Engineer *[Signature]* Date 4/5/95
Manager

Quality Engineer *A. P. Parulian* Date 3/29/95 ^{APP}

PFP Plant Operations *[Signature]* Date 4-10-95