24
 JUN 11 1996

ENGINEERING DATA TRANSMITTAL

Page 1 of 1
 1. EDT 157826

2. To: (Receiving Organization) DISTRIBUTION		3. From: (Originating Organization) Project W-030, Tank Farm Projects		4. Related EDT No.: NA	
5. Proj./Prog./Dept./Div.: Project W-030		6. Cog. Engr.: LF Hill		7. Purchase Order No.: N/A	
8. Originator Remarks: Release of test report for site acceptance test of W-030 MICON system. Project W-030 provides the AY/AZ tank farms ventilation upgrade.				9. Equip./Component No.: N/A	
				10. System/Bldg./Facility: AY/AZ TANK FARMS	
11. Receiver Remarks:				12. Major Assm. Dwg. No.: N/A	
				13. Permit/Permit Application No.: N/A	
				14. Required Response Date: NA	

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Impact Level	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-W030-TRP-001	-	0	SITE ACCEPTANCE TEST RESULTS, W030 MICON SYSTEM	Q	2	2	

16. KEY											
Impact Level (F)		Reason for Transmittal (G)				Disposition (H) & (I)					
1, 2, 3, or 4 (see MRP 5.43)		1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)				1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged					
(G)	(H)	17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)								(G)	(H)
Reason	Disp.	(F) Name	(K) Signature	(L) Date	(M) MSIN	(F) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
2	2	Cog. Eng. LF Hill	<i>[Signature]</i>	6/3/96							
2	2	Cog. Mgr. KA Colosi	<i>[Signature]</i>	6/7/96							
2	2	QA HM Chafin	<i>[Signature]</i>	6/22/96	R3-15						
		Env.									
		Safety									

18. Signature of EDP Originator <i>[Signature]</i> Date 4-17-96		19. Authorized Representative for Receiving Organization <i>[Signature]</i> Date 6/7/96		20. Cognizant/Project Engineer's Manager <i>[Signature]</i> Date 6/9/96		21. DOE APPROVAL (if required) Ltr. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
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BD-7400-172-2 (07/91) GEF097

SITE ACCEPTANCE TEST, W-030 MICON SYSTEM

LF Hill

Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 157826 UC: 2030
Org Code: 8K240 Charge Code: NK201
B&R Code: EW3130010 Total Pages: *248 249 end 4/4/96*

Key Words: W-030, ACCEPTANCE, TEST, SAT, MICON, CONTROL, VENTILATION, UPGRADE, AWF, TANK FARM

Abstract: Monitoring and control of the W-030 ventilation upgrade is provided by a distributed control system (DCS) furnished by MICON Corporation. After shipment to the Hanford Site, the site acceptance test (SAT) for this system was conducted in a laboratory environment over a six-month period, involving four distinct phases and numerous hardware and software modifications required to correct test exceptions. The final result is a system which is not fully compliant with procurement specifications but is determined to meet minimum Project W-030 safety and functional requirements. A negotiated settlement was reached with the supplier to establish a "path forward" for system implementation. This report documents the "as-run" status of the SAT.

The SAT was completed in August of 1995. It was later followed by comprehensive acceptance testing of the W-030 control-logic configuration software; results are documented in WHC-SD-W030-ATR-011. Further testing is reported as part of process system startup operational testing, performed after the MICON installation.

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Kara / Broz *6/10/96*
Release Approval Date

Release Stamp

Approved for Public Release

Site Acceptance Test Results

W-030 MICON system

LF Hill

October 3, 1995

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W-030 MICON Site Acceptance Test Results

1.0 INTRODUCTION

The purpose of this report is to document the results of the Site Acceptance Testing (SAT) on the MICON control system for the W-030 project. Testing was conducted in four separate sessions over a period of 6 months. During this period, hardware and software revisions were made to correct test exceptions.

The test results are included in the attachments in "as-is" condition. The system still does not pass all the tests, but is being accepted based upon a negotiated settlement. Thus, the test data sheets still have a number of incomplete steps and open test exceptions. This accurately portrays the status of the test, which is the purpose of this document.

2.0 EXECUTIVE SUMMARY

The first SAT test session was a complete performance of the procedure; the others focused on re-test of prior deficiencies, with some re-test of areas clearly related to the changes made. Table 1 summarizes the test results, identifying the Test Exceptions (TEs) from each run and showing how they are related.

Most of the remaining deficiencies relate to the configurator program, and these constitute the major hurdle in proceeding with system implementation. The configurator is required to input (or maintain) the desired system functional logic, but is not (directly) used by the "run-time" system which operates in the real-time mode to control the ventilation trains. Poor configurator performance makes the configuration task very difficult and time-consuming, and raises concerns about quality. However, once configured, the run-time system is expected to work acceptably. Though MICON is working on correcting these configuration problems, the necessary revisions are quite extensive and cannot be completed in time to support W-030 Project startup. In consideration of this and to meet the project needs, WHC and MICON have agreed to a negotiated settlement, wherein MICON will provide additional support of the configuration effort by performing the actual entry of our configuration logic. Their intimate knowledge of the configurator problems will allow them to perform this entry task more expeditiously than could be done by WHC. Testing will be conducted to assure that the entered configuration meets our Logic Diagrams and will be separately reported. While this settlement does not fix the configurator or solve the long-term maintenance needs, it does meet the near-term project startup needs.

To facilitate reaching the negotiated settlement, the deficiencies were grouped into three categories: 1) clear safety-related requirements, 2) items which required resolution in order to proceed with implementation, but may have some latitude in type of resolution, and 3) items which were not critical to implementation. In the following exceptions summary table, all these open issues are noted as "Negot." or "Accept" to reflect their disposition in the negotiated settlement.

Except for documentation deficiencies, all of the category 1 safety-related or critical problems have been corrected as noted by "OK" in the exceptions summary table. Documentation, while classified as category 1, has been included in the negotiated settlement, essentially giving MICON additional time to perform the necessary revisions. The remaining items noted as "Negot." are category 2 items which will be resolved by completion of the configuration activity (which is the negotiated settlement scope). These items still do not fully meet the specification, but a "path-forward" has been taken which allows completion of the system. Finally, items noted as "Accept" are category 3 items not really necessary to proceed, so WHC is accepting them "as-is", as a part of the negotiated settlement.

Table 1

MICON SAT Exceptions Correlation

- NOTES: 1. TE numbers are prefixed by the SAT run number.
2. OK => test passed.
3. Accept => test not met, but is being accepted as-is.
4. Negot. => problem is being resolved by separate negotiations.
5. Open => Resolution still TBD.

#	DESCRIPTION	SAT #1 (2/6/95)	SAT #2 (3/14/95)	SAT #3 (6/26/95)	SAT #4 (8/1/95)
1	ALARM DAY STAMP	TE1.1	OK		
2	ALARM TIME STAMP	TE1.2	OK		
3	RCMF DI-31 INPUT	TE1.3	OK		
4	DOWNLOAD DELETES ALARMS	TE1.4	OK		
5	ACK CAUSES STATUS TOGGLE	TE1.5	OK		
6	GPLI HARDWARE	TE1.6	OK		
7	ALARM MISNOMER	TE1.7	OK		
8	SECURITY BREACH	TE1.8	OK		
9	PID RECALL '0'	TE1.9	TE2.4, 7, 8	TE3.6,7	Negot.
10	ANNUNCIATOR WINDOW COLOR	TE1.10	TE2.5	OK	
11	IOK - URGENT, CAUTION, ATTENTION ALARM SUMMARIES	TE1.11	TE2.6	OK	
12	IOK - VIDEO PRINT KEY	TE1.12	OK		
13	IOK - ANNUNCIATOR WINDOW	TE1.13	Not Fixed	OK	
14	FNC 17 RAMP, LOOP LIMITS	TE1.14	TE2.7,8	TE3.6,7	Negot.
15	FNC 21 PID RATIO/BIAS	TE1.15	TE2.7,8	TE3.6,7	Negot.
16	FNC 26 INSERT PID TERMS	TE1.16	TE2.7,8	TE3.6,7	Negot.

#	DESCRIPTION	SAT #1 (2/6/95)	SAT #2 (3/14/95)	SAT #3 (6/26/95)	SAT #4 (8/1/95)
17	FNC 27 LOAD PID VALUES	TE1.17	TE2.7,8	TE3.6,7	Negot.
18	DATA NOT SAVED TO SCROLL FILE	TE1.18	TE2.7,8	TE3.6,7	Negot.
19	FNC 9 DATA NOT SAVED TO SCROLL FILE	TE1.19	TE2.7,8	TE3.6,7	Negot.
20	LONG EXPRESSIONS NOT ALL SAVED TO SCROLL FILE	TE1.20	TE2.7,8	TE3.6,7	Negot.
21	FNC 86 CASCADE NOT INHIBITED	TE1.20	TE2.7,8	TE3.6,7	Negot.
22	FNC 90 ALARM MANAGEMENT (INH)	TE1.21	TE2.7,8	TE3.6,7	Negot.
23	FNC 101 DOES NOT WORK	TE1.23	TE2.7,8	TE3.6,7	Negot.
24	FNC 104 IS REVERSE LOGIC	TE1.24	TE2.7,8	TE3.6,7	Negot.
25	FNC 106 INVERT	TE1.25	TE2.7,8	TE3.6,7	Negot.
26	FNC 112 DELAY PULSE	TE1.26	TE2.7,8	TE3.6,7	Negot.
27	ARCHIVE FAILED	TE1.27	OK		
28	GRAPHICS DON'T SUPPORT DI	TE1.28	OK		
29	DISPLAY CALL-UP TIME	TE1.29	TE2.10	TE3.8	Accept
30	PHONY ALARMS (sec fieldbus)	TE1.30	TE2.2, 3	TE3.3,4	OK
31	Alarm Inhibit		TE2.11	TE3.1,2	OK
32	Group Displays of 32/48 items		TE2.12	Accept	
33	Operations Manual		TE2.13	TE3.7	Negot.
34	Configuration Manual		TE2..14	TE3.7	Negot.
35	Configuration Forms		TE2.15	Accept	
36	Invisible Un-Ack'd Alarms		TE2.16	OK	
37	Download Stops Historian		TE2.17	Accept	
38	Use of MUD's on Graphics			TE3.5	OK
39	Archiver Doesn't Delete files				TE4.1

3.0 DISCUSSION OF ATTACHMENTS

The documentation associated with the tests is given in the attachments to this report. These are the "as-run" results. The test procedure had appendixes for recording of the data. To minimize redundancy, the procedure body (w/o appendixes) is included once as attachment 1. Each of the other attachments document one run of the SAT. Each attachment opens with a summary of the test results and exceptions, and then follows with the data sheets which were filled out for that run. The test exceptions were originally included in the procedure as appendix D, but have been pulled to the front to make the package easier to assimilate. Only SAT #1 performed the complete procedure. For SAT #2, many data sheets were simply filled out as "N/A", because no need to repeat that section was apparent. For SAT's #3 and #4, unused data sheets were simply omitted. SAT #4 was limited to a retest of the open Test Exceptions which were identified as being corrected.

The original procedure and data sheets used various numbering schemes. For this document the SD numbering in the upper RH corner of each page takes precedence. Each attachment is individually page numbered.

Attachment 1: Procedure w/o Data Sheets

Attachment 2: SAT #1: A/S View Run Version 3.0.41 Results

- Test Exceptions and Summary Results
- Completed Data Sheets

Attachment 3: SAT #2: A/SView Run Version 3.0.44 Results

- Test Exceptions and Summary Results
- Completed Data Sheets

Attachment 4: SAT #3: A/SView Run Version 3.0.47 Results

- Test Exceptions and Summary Results
- Completed Data Sheets

Attachment 5: SAT #4: A/SView Run Version 3.0.48 Results

- Test Exceptions and Summary Results

4.0 TEST RESOLUTION

This test procedure is being closed out, with a number of open test exceptions which are the subject of the negotiated settlement. The exceptions involve deficiencies in the configuration utility and the documentation which hamper WHC proceeding with the configuration activity. WHC plans to overcome these deficiencies by increasing MICON involvement in the configuration activity. The negotiated settlement allows proceeding with configuration, and gives MICON additional time to complete the documentation.

The negotiated settlement includes testing of the entered system configuration. Whereas the un-configured system is basically a tool-kit, this "configuration" test is the real confirmation that the final system performs in accordance with the design logics and can properly control the ventilation system. Thus, the configuration test will be the test whereby the control system is actually accepted.

Attachment 1

SAT Procedure

**SITE ACCEPTANCE
TEST PROCEDURE
FOR
MICON-VIEW A/S SYSTEM**

**W-030 TANK FARM VENTILATION UPGRADE
WESTINGHOUSE HANFORD CO.**

WHC P.O. WKH-SVV-516865, Mod No. 9
MICON S.O. 30517

Rev. 3
November, 1994

MICON
Houston, Texas

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- Define the intent, scope and nature of inspection and testing to be carried out, and the documentation to be prepared, during the Site Acceptance Test (SAT).
- The scope of this document is to:

SECTION I SCOPE OF THIS DOCUMENT

SECTION II SYSTEM DESIGN PARAMETERS

2.1 GENERAL

The system is designed and constructed in accordance with the Buyer's Purchase Order WKH-SXV-516465, Mod. No. 9 and specifications WHC-S-4013 and ECN 153033.

This document, together with drawings and other documents referenced therein, will form the basis for the tests. The principal design parameters for the system, which will not be fully covered in SAT, are described in Sections 2.2 and 2.3 below.

2.2 ENVIRONMENTAL CONDITIONS

The system will be installed in an air conditioned control building, which will normally be maintained at the following nominal conditions:

- Temperature at 24DC
- Humidity at 30% RH

The system is designed to withstand the following conditions which comply with requirements as per Spec. WHC-S-4013, Section 3.1.8:

	<u>Controllers</u>	<u>Workstations</u>
• Temperature	0 - 50DC	10 - 40DC
• Humidity	5 - 98% RH	20 - 80% RH

NOTE: Capability of the system to withstand maximum and minimum humidity or temperature limits will not be checked as part of SAT activities.

2.3 POWER SUPPLIES

The system is designed to operate on 120 Volt, 60 Hz., single, phase power supply with the following limits which comply with requirements as per Spec. WHC-S-4013, Section 3.1.6:

	<u>Controllers</u>	<u>Workstations</u>
• Voltage	90 - 132 VAC	87.5 - 132 VAC
• Frequency	47 - 63 Hz	47 - 63 Hz
• Harmonic Distortion	5% Max.	5% Max.

NOTE: Capability of the system to operate within specified frequency and harmonic distortion will not be checked as part of the SAT activities.

SECTION III SYSTEM OVERVIEW

3.1 GENERAL

The principal sub-assemblies of the system are described in the following paragraphs.

3.2 SYSTEM CONFIGURATION

Drawing No. 30517-D3 represents the Block Diagram of the MICON A/S System for Westinghouse Hanford, Co., Richland, Washington.

The MICON A/S System consists of the following equipment:

1. 3 ea. Operator Console Stations (SPARCstations)
2. 1 ea. Engineering MICON-View Workstation (SPARCstation)
3. 4 ea. Local Control Units (LCU)
4. 1 lot Data Communication Facilities

Each of the above items are described in sections 3.2.1 through 3.2.4.

NOTE: The equipment description complies with item 3.1.1 of specification WHC-S-4013.

3.2.1 OPERATOR CONSOLE STATIONS

The Operator/Management MICON-View& Console Station consists of a Horseshoe Operator Console, 3 High Performance SPARCstation, 19" High-Resolution Monitors, Operator Keyboard, Alpha-Numeric Keyboard, Trackball, General Purpose LAN Interface (GPLI), UPS, and Printers. The Operator Console supports two printers -one (1) dot-matrix printer for alarm/event printing and general purpose logging and one (1) color ink jet printer for screen printing. The Operator Console also houses an 8-4-1 transceiver which connects SPARCstations in the Operator Console to that of SPARCstation in the Engineering Console. GPLI provides the communication interface between the SPARCstations and the token-passing carrier-band LAN. The dimensions of the Operator Console is 185" (w) x 54.25" (d) x 29" (h).

Reference Drawings are:

30517-D5	Layout, Operator Console
30517-D6	Assy, Operator Console
30517-D7	Wiring, Operator Console
30517-A8	Nameplates, Operator Console
30517-1	BOM, Assy, Operator Console

3.2.2 ENGINEERING MICON-VIEW STATION

The engineering station includes all the types of equipment that the Operator Console has. Notable differences are that the Engineering Station has a 16" monitor (vs. 19"), mouse (vs. trackball) and only one printer - alarm/logging.

Reference Drawings are:

30517-D9 Assy, Engineering Console
30517-D10 Wiring, Engineering Console
30517-A11 Nameplates Engineering Console
30517-3 BOM, Assy, Engineering Console

3.2.3 LOCAL CONTROL UNITS (LCU)

There are four Local Control Units (1-4) in the W-030 project. Each LCU can accommodate three UR-32 sub-racks, primary and secondary power supplies, AC power distribution and LAN cables. The UR-32 sub-rack accommodates the UR-32 Controller, RCM-32 I/O Module and the Termination Panel.

LCU No. 1 consists of the following equipment:

1. 1 Cabinet, 31.5"(w) x 19.76"(d) x 78.74"(h)
2. 2 UR-32 Sub-Racks
3. 2 U-32R Controllers (Primary and Secondary)
4. 2 RCM-32-A, Analog Input Modules & Termination Panels
5. 3 RCM-32-D, Discrete I/O Modules & Termination Panels
6. 3 RCM-32-Dr, Discrete I/O Modules & Termination Panels
7. 2 U-32 Power Supply (Primary & Secondary)
8. 1 LOI-32, Local Operator Interface

Reference Drawings are:

30517-D14 Assy, LCU No. 1
30517-D15 Wiring, UR-32, Sub-Rack 1, 2, LCU No. 1
30517-A16 Nameplates, LCU No. 1
30517-7 BOM, Assy, LCU No. 1

LCU No. 2 consists of the following equipment:

1. 1 Cabinet, 31.5"(w) x 19.76"(d) x 78.74"(h)
2. 2 UR-32 Sub-Racks
3. 2 U-32R Controllers (Primary and Secondary)
4. 2 RCM-32-A, Analog Input Modules & Termination Panels
5. 3 RCM-32-D, Discrete I/O Modules & Termination Panels

6. 3 RCM-32-Dr, Discrete I/O Modules & Termination Panels
7. 2 U-32 Power Supply (Primary & Secondary)
8. 1 LOI-32, Local Operator Interface

Reference Drawings are:

30517-D19	Assy, LCU No. 2
30517-D20	Wiring, UR-32, Sub-Rack 1, 2, LCU No. 2
30517-A21	Nameplates, LCU No. 2
30517-9	BOM, Assy, LCU No. 2

LCU No. 3 consists of the following equipment:

1. 1 Cabinet, 31.5"(w) x 19.76"(d) x 78.74"(h)
2. 2 UR-32 Sub-Racks
3. 2 U-32R Controllers (Primary and Secondary)
4. 4 RCM-32-A, Analog Input Modules & Termination Panels
5. 3 RCM-32-D, Discrete I/O Modules & Termination Panels
6. 2 RCM-32-Dr, Discrete I/O Modules & Termination Panels
7. 2 U-32 Power Supply (Primary & Secondary)
8. 1 LOI-32, Local Operator Interface
9. 1 RCM-32-F, RTD Input Modules & Termination Panels

Reference Drawings are:

30517-D24	Assy, LCU No. 3
30517-D25	Wiring, UR-32, Sub-Rack 1, 2, LCU No. 3
30517-A26	Nameplates, LCU No. 3
30517-11	BOM, Assy, LCU No. 3

LCU No. 4 consists of the following equipment:

1. 1 Cabinet, 31.5" (w) x 19.76" (d) x 78.74 (h)
2. 2 UR-32 Sub-Racks
3. 2 U-32R Controllers (Primary & Secondary)
4. 1 RCM-32-A, Analog Input Modules & Term Panels
5. 1 RCM-32-D, Discrete I/O Modules & Term Panels
6. 1 RCM-32-Dr, Discrete I/O Modules & Term Panels
7. 2 U-32 Power Supplies (Primary & Secondary)
8. 1 LOI-32, Local Operator Interface
9. 1 RCM-32-F RTD Input Module & Termination Panel

Reference Drawings are:

30517-D27	Assy, UR-32, Sub-Rack 1, 2, LCU No. 4
30517-A29	Nameplates, LCU No. 4
30517-13	BOM, Assy, LCU No. 4

3.2.4 DATA COMMUNICATION FACILITIES

Within the MICON Automation System, the principal data highway is a token-passing carrier-band LAN. This architecture provides the deterministic high-speed service for the real-time communication requirements. The token-passing process communications include redundant media and electronics, enabling data transfer to continue in case one communication link fails.

Low-speed local networks are also included at the controller level to accommodate SCADA and Subsystem communications. The low-speed data channels are not connected in this application.

In addition to the token-passing data highway network, MICON-View workstation networking capability is provided through the workstation supervisory Ethernet LAN. All computer resources are made accessible throughout the workstation network, providing a fault-tolerance and redundancy scheme, and offering inter-operability among MICON-View workstations and other systems.

The U-32 Remote Controller and Remote I/O Control Modules are connected through a redundant Digital Field Bus Communication cable. Each cable is a twisted pair shielded cable. The Field-Bus accommodates up to 31 single or redundant MICON RCM-32 modules.

Bulkhead connectors are provided inside the consoles and cabinets for entry and exit of the token-passing carrier-band LAN communication cables. These cables are referred to as RG11 Trunk cables and are provided between two chassis. Drop cables are provided between the U-32 controllers and taps.

SECTION IV SAT ACTIVITY

4.1 SCOPE AND INTENT

The intent of SAT is that MICON will demonstrate to the Buyer that the system is designed, constructed and performs in accordance with Buyer's Purchase Order, which includes procurement specification WHC-S-4013 and ECN 153033. The scope of testing to meet this intent will be as defined under Section's 4.2 and 4.3.

MICON will provide all test databases, which will be brought to Hanford Site and loaded on W-030 system. Testing will not require databases or files to be created by WHC personnel.

4.2 SYSTEM FUNCTIONAL TEST

4.2.1 GENERAL

The System Functional Test will be comprised of discrete tests as described hereunder. These tests are to fully prove all functional and performance aspects of the system in accordance with specification and to identify any deficiencies.

The steps mentioned in this document are not required to be sequential. Any section can be tested as required. An exception to this test will be documented and approved in accordance with a Test Exception sheet located in Appendix D. Tests may be omitted with the Buyer's prior consent. Any omission shall be recorded on the test documentation.

4.2.2 INPUT/OUTPUT FUNCTION TEST

This test is to prove the function of selected analog/discrete inputs and outputs, including spares together with the associated MICON control configuration, display configuration, alarm settings, and printer operation.

The test will be performed on the first available analog and discrete input and output of the first RCM-32 of the first sub-rack of LCU No. 1 and increment to the next sequential point on the next RCM-32 in the system. All RCMs in the system will be tested. The first input and output will be wired in series with (jumping) successive points on the RCM being tested to achieve 100% I/O testing. Inputs will be simulated by means of a calibrated voltage/current device and outputs observed in MICON A/S OPEN system..

Testing will be recorded by initials and date on data sheets which define acceptance criteria and by remarks if required, on the above mentioned drawings and the log sheets which will form part of Appendix A.1.1 through A.1.8 of this document.

One hundred (100%) of the Analog and Discrete I/O's will be tested.

NOTE: Successful completion of Section 4.2.2 demonstrates compliance to WHC-S-4013, 3.2.2.1 through 3.2.2.3.
4.2.2.1 mA Inputs

- a) Verify that the Remote I/O Control Modules are installed in the appropriate RCM-32 Sub-Rack Chassis location.
- b) ~~Connect the signal source identified on drawing no. 90D1011006, titled Wiring Connections, Customer U-32R control module to the first input to be tested per the I/O Jumper Configuration (Appendix B.1).~~ *JUMPER OUTPUTS TO INPUTS PER FIGURE 4.2.2.4 (PAGE 11).* *MT 1-12-95*
- NOTE: For 4-20 mA input, make sure the jumpers are set correctly. Refer to Appendix B.1.
- c) Request the test analog display for the channel being tested.
- d) Vary the input signal between minimum and maximum value of the span. Verify the corresponding value on graphic display (see Figure 5.2.2.1) of the systems CRT. As a reference, verify the output at 5%, 50% and 95% of the input signal span.
- e) ~~Adjust the signal source for 5%, 50% and 95% of the input span as indicated on X85 Calibrator. Verify that the display tracks the input signal. Record on the Data Sheet, the measured error. Refer to Appendix B.2.~~ *OUTPUTS* *MT 1-12-95*
- f) Decrease the signal source to zero (0) mA input and verify display value of -25. Record on the Data Sheet the measured value next to Appendix B.2.
- g) Record on the Data Sheet, the Signal Value, Displayed Value and the calculated % error for 5%, 50% and 95%. Verify that the error is less than the required value of A0.25% FS. Refer to Appendix B.2.
- h) Configure the PV alarm points to the values listed on the Data Sheet.
- i) Vary the input signal and verify that the alarms occur and are displayed on the annunciator/summary CRT displays in an alarm format. Verify alarm is logged on the alarm printer.
- j) Acknowledge the alarm and verify that the CRT display changes to indicate that the alarm has been acknowledged.
- k) Verify an alarm acknowledge message is printed on the alarm printer.
- l) Verify the color coding is met (Spe. 3.2.9.1 & App. 3 of spec). IE: Urgent uses red only, Caution uses yellow only, Attention uses white only.
- m) For the first RCM-A module only, repeat steps H-K for each alarm priority level.

Figure 4.2.2.1

4.2.2.2 Volt Inputs

- a) Verify that the RCM's are installed in the appropriate UR-32 Sub-Rack Chassis locations listed in Appendix A.1.1 through A.1.8.
- b) Repeat steps b through m of Section 4.2.2.1 (mA Inputs) for the voltage inputs to be tested. Record the result in Appendix B.3.

NOTE: For volt inputs, verify that the jumpers are set correctly. Refer to Appendix B.1.

4.2.2.3 Resistance Temperature Detector (RTD) Inputs

- a) Verify that the RTD input Modules, RCM-32-F, have been installed at the proper location. Refer to Drawing 30517-D3, Block Diagram.
- b) Select an arbitrary resistance value from the Standard Platinum RTD Table. Note down the corresponding temperature.
- c) Connect a decade box to any RTD channel. Select the appropriate resistance, based upon the above values.
- d) Read the corresponding temperature in MICON A/S OPEN system. Verify that this temperature value is the same as that of the one noted in (b) above. Record the result in Appendix B.4.

4.2.2.4 Control Input/Output Function Test

Testing of the MICON Analog Inputs for control will be executed simultaneously with the associated MICON Analog Outputs, such that the complete loop is checked. For the initial stages of tests, Integral and Derivative controls will be switched out and Gain set at unity. All outputs will be tied back to all analog inputs.

The amount of inputs that are connected to one output shall be determined by the type of RCM-32's used. All data shall be recorded in Appendix B.5.

- a) Configure 100% of the I/O modules according to the type selected. Refer to Appendix B.1.
- b) Vary the analog output signal ~~from the Intelligent Operator Keyboard (IOK)~~ * *MT 1/17/95*
Observe the bar chart on the graphic display for the analog input.
- c) Verify the operation of manual control and display facilities at the CRT/Keyboard for each selected output at 5%, 50% and 95%.
- d) Verify the operation of auto/manual transfer and Local, Remote and Cascade modes through the appropriate selection and display facilities at the CRT/Keyboard * *MT 1/17/95*
- e) Configure Integral and Derivative settings on one control loop and verify the correct response.
- f) Configure the Gain settings on one control loop and verify the correct response by manipulating setpoint demands above and below the stable process variable.
- g) Disconnect Test Inputs and Outputs on completion of the test.

**, IOK TESTED LATER*

CONTROLLER TEST CONFIGURATION ANALOG TEST FEEDBACK

Figure 4.2.2.4 - Control I/O Function Test

NOTE: Use this configuration in conjunction with Appendix A.1.1 - A.1.8 & B.1.

4.2.2.5 Discrete Input/Output Test

The Discrete Input and Output Test will be carried out using the RCM-32-D and RCM-32-Dr. RCM-32-D is configured in this project as the Input Module (24 VDC) and the RCM-32-Dr as the Output Module (120 VAC). Record the result in Appendix B.6.

- a) Connect 100% of the 'Dr' Module points to 'D' Module on a one-to-one basis. Connection points for the Dr and D Modules are respectively (OUT, I/O) and (COM, +).
- b) Configure the above 100% points for 'Dr' and 'D' Modules in MICON A/S OPEN OPEN. 'Dr' points are configured as ~~virtual discret~~ *discrete outputs*. MT
1/17/9
- c) Initially, the respective Discrete I/O's are in the OFF state. Verify the DI/O status in the Group Display. Verify the 'D' and 'Dr' Module LED's are OFF.
- d) ^{Discrete Output} Select one ~~Virtual Discrete~~. A window opens, select the ON button and then select the ENTER button in the window. MT
1/17/9
- e) The status in the Group Display turns to ON and the respective LED's in the 'Dr' and 'D' Modules turn ON.
- f) Repeat steps (d) and (e) for the remaining points.

4.2.3 U-32R REDUNDANCY TEST

The test will comprise of the following steps for all backup U-32R controller. Record the results in Appendix B.7.

- a) ~~Disconnect the power lead of the primary U-32R.~~ *UNPLUG THE ACTIVE U32.*
- b) Verify that the control is transferred to the backup U-32R without interruption to the system operation or loss of data. Verify system alarm and diagnostic message.
- c) Verify the analog output value. No deviation should be noted upon transfer to the backup controller.
- d) Verify that the system status is correctly displayed on the console CRT.
- e) ~~Reset power by pressing "Activate this Computer" pushbutton of the primary controller.~~ *RESET U32R AND ACTIVATE U32R.* Verify that the analog output value remains the same as when the backup controller was active.
- f) ~~Repeat Step A, but initiate a transfer by unplugging the Active U-32R.~~

NOTE: Transfer should occur and alarm diagnostic messages displayed on the console CRT. Verify system alarm and diagnostic message.

- F.8) Disconnect the power lead of the backup U-32R Controller and introduce a sample fault, ~~per Step 4~~ on the primary U-32R. *(unplug tap)*
- G.8) Verify that the transfer to the backup U-32R does not occur and that the outputs of the primary U-32R freeze.
- H.8) Verify the system status indicated on the console CRT's gives an alarm message. Also verify that there is no deviation from the linear test pattern.
- I.8) Verify a sample Primary Backup U-32R configuration by using the local Lap-Top pc controls that the configuration facilities are operative and correct. Refer to Configuration of the U-32R Controller using a personal computer manual. *LOI*
- J) *RESTORE HARDWARE CONFIGURATION.*
 - k) Verify that changes made using these facilities are reflected by the changed U-32R and console CRT displays.
 - l) ~~Restore the original configuration by using the console disk drive and verify.~~
 - L.8) Simulate a break in the Data Highway Communication between the U-32R and Console Station No. 1 by removing token passing LAN cable between J-3 of the Operator Console Station and J-1 of the LCU No. 1. Refer to Drawing No. 30517-

D3, Block Diagram.

- M.A) Verify that the U-32R operation is not effected and the system status on subject console CRT is correctly indicated.

NOTE: Successful completion of 4.2.3 demonstrates compliance to WHC-S-4013, Section 3.2.4.1.

4.2.4 FIELD-BUS COMMUNICATION

The following equation can be used to verify Field-Bus communications.

$$\text{Pressure Compensation Equation Expression} = \frac{P+B}{Pc+B}$$

P = Pressure of Gas in psig (variable)
Pc = Meter Calibration Pressure in psig
B = Fixed Constant (14.7)

- a) Insert a sample configurations in any two RCM's. The RCM No. ³4 shall contain data for one of the process inputs. The RCM No. 2 shall contain the equation for pressure compensation as defined above. *1/18/95*
- b) Solve the equation and observe the result on the CRT's.
- c) Change the variable (P) in configuration for RCM No. 2. Solve the equation and record the result.
- d) Remove the RCM No. ³2 containing data from sub-rack. Solve the equation. Verify that the pressure ~~goes to zero~~ *remains the same.* *MT 1/18/95*
- e) Remove GPLI32 and note "active" indication of backup GPLI. Note proper alarm indication of Primary GPLI failure. Replace primary GPLI and restore to "active" state.
- f) Remove GPLI Primary power supply and note no change in GPLI status.

On completion of this test, MICON will prepare a record, which the Buyer will review and sign for concurrence. This will form Appendix B.8 of this document.

NOTE: Successful completion of 4.2.4 demonstrates compliance to WHC-S-4013, section 3.2.5.1.

4.2.5 U-32R CONTROLLER POWER SUPPLY TEST

- a) Disconnect from 120V, 60Hz receptacle (refer to Drawing No. 30517-D15, sheet 6) the primary power supply in the LCU No. 1. Verify that the secondary power supply has taken control.
- b) Reconnect 120v, 60Hz receptacle for primary power supply and verify that the power-on light is illuminated.
- c) Disconnect the secondary power supply from the cabinet receptacle. Verify that the primary power supply has taken control. ~~The display on the CRT will indicate secondary power supply failure, assuming all power supplies are wired according to Appendix A.1.~~ N/A
MT
1-19-95
- d) Repeat Step b and c for the rest of the LCU's. Record the results on the Data Sheet refer to Appendix B.9.

NOTE: Successful completion of 4.2.5 demonstrates compliance to WHC-S-4013, Section 3.2.2.1.

4.2.6 CONSOLE TEST

This test is to prove all aspects of the Operator, and Engineering Consoles Operation, which were not verified during previous tests. All testing will be verified page by page. Record the results in Appendix B.10.

- a) Verify MICON configuration facilities are operating, both for configuration to disk and on-line.
- b) Download loop and Input Configuration and Auxiliary Data.
- c) Upload Loop and Input Configuration and Auxiliary Data.
- d) ~~Set the Main (UPS) power supply switch to OFF from the console, refer to Drawing No. 30517-D7. Verify the effect on the remaining system operation.~~ UNPLUG
MT
1-19-95
- e) Wait for 20 minutes, then set the Main (UPS) power supply switch to ON from the console and verify the effect on the system operation.
- f) Restore the display configuration from disk and verify against the original file. Verify dynamic Trend Display, ~~and print the result. (not needed, done in "h")~~ MT
1-19-95
- g) Disconnect the GPLI-1 Primary Input from TB1, refer to Drawing 30517-D7. Disconnect PR1 LAN from GPLI-1 sub-assemblies of the console to simulate fault.
- h) Verify the system status and diagnostic messages are correct and there is no

disruption on the system operation as monitored by the Trend Display. Print out Trend Display results.

- i) Verify archiving of Historical, Trending and Configuration Data ~~and print out the results.~~ *MT 1-19-95*
- j) Verify that the archive file could be reloaded.
- k) Verify the Security definition of the system with regard to MICON user group level. (i.e.: Groups and/or users cannot access features outside the System Administration definition).

NOTE: 1) Successful completion of 4.2.6 demonstrates compliance to WHC-S-4013, sections 3.2.6.3.
2) Successful completion of 4.2.6 steps g & h demonstrates compliance to WHC-S-4013, section 3.2.5.1.

4.2.7 SystemTest

Download the configuration file to specific controller.

StepNo.

- a) Enter Test Configuration (store application configuration in back-up RAM, if necessary). *NOTE: PID DOES NOT USE RECALL (RECALL = 0). use file "recall2".* *MT 1/20/95*
- b) Connect the ANALOG and DIGITAL I/O as per Section 4.2.2.
- c) Remove the main power supply (PS-1) to the MICON, wait for 10 seconds and then restore power to the MICON. (This will "initialize" the alarm annunciation and place all loops in the Manual mode).
- d) Verify that the Alarms and the Setpoint are initialized. Verify that Process and Output displays are zero. Select each loop in turn to check that all loop data is zero for each of the loops. *NOTE: Use "Function Value" to assist.* *MT 1/20/95*
- e) Verify that all Analog Inputs display values of zero. Verify that all loop Process Alarms are zero.
- f) If during Steps c to e MICON does not give the correct indications, recheck the configuration associated with the incorrect display (i.e., If an input reads something other than zero, check the input characterization and aux. scaling).

Note that an invalid analog input value could be reflected in the process variable display if the input was used in a loop configuration.

- g) Display all digital inputs to verify that all values are "1".
- h) If during Step g, an input (or a pair of inputs) displays an incorrect value, first check the digital output associated with the digital input. Verify that the output is activated

("ON"). If the output is not "ON", check the Analog Input Configuration. The Analog Input number will be the same number as that of the digital output in question.

- i) All alarm conditions should now have been verified and acknowledged. Monitor Loop ~~1~~ and adjust a setpoint of 10.000 for Loop 1. After the setpoint is entered, verify the bargraph shows a maximum low deviation. Also, verify "L1" deviation alarm present. Verify the Alarm Value is negative and at the same magnitude as that of the setpoint. ACK the alarm. *Use file "devalm2".*

MT
1-20-95

- j) Repeat Step i for all loops. Enter a setpoint equal to the loop number times 10 for each loop. (i.e., loop 1 = 10.000, loop 2 = 20.000, etc.).

MT
1-20-95

- k) Place all loops in AUTO mode. Verify that the MICON will now begin to develop outputs for each loop. The output for each loop will be the same magnitude as the setpoint. It will also equal the process variable and the analog inputs connected to the valve output through the test connection.

MT
1-20-95

After approximately 2 minutes all loops should show Process Value equal to setpoint. ACK all alarms. With each loop in control balance, the Alarm display should be blank (no alarms).

MT
1-20-95

- l) Display the Analog Inputs (AI) and verify their values. (AI-1 and 9 = 10.000, AI-2 and 10 = 20.000 ...). If there is a discrepancy in reading, check the associated configuration.

- m) If all inputs check out and there are no alarm conditions, Analog operation has been verified. The inputs are configured to alarm at a 1% deviation from the setpoint.

MT
1-20-95

- n) Place Loop ~~1~~ in Manual. Monitor the display of Digital Outputs (DO) #1 at the Group Display. The display should be "1-OF". Adjust the VALUE output A 1% from setpoint. This will result in an input alarm from AI#1 and AI#9 and from DI#1 and DI#9. ACK these alarms. The state of DO-1 should now be "ON". Both DI-1 and DI-9 should be canceled when the loop is in balance control again. If alarms exist even though the loop is at setpoint, re-check configuration of discrepant input.

- o) Repeat Step n for each loop. Once complete, Digital operation is verified.

MT
1-20-95

- p) Record the result in Appendix B.11.

4.2.8 LOCAL OPERATOR INTERFACE (LOI)

1. Verify that the LOI is connected to the LOI port on the U-32R Termination Panel.
2. Disconnect the Primary and Secondary Token Passing LAN from the front of the U-

32R in LCU No. 1.

3. Turn on CB-3 (circuit breaker), for PS-3. PS-3 is the power supply for the LOI.
4. Verify that the operations of different functions by pressing the respective keys on the LOI-32. Refer to the LOI-32 Operator Manual for function details.
5. Verify 16 character tags can be displayed.
6. Verify "password" protection.
7. Verify "password" protection prohibits alarms from being acknowledged.

Items 1-7 are to be noted as to their performance on Appendix E (page 70)

4.2.9 LCU REDUNDANCY TEST

For the purpose of this test, LCU-1 is defined as the primary cabinet and LCU-2 as the backup cabinet. Normally, the primary cabinet is the active cabinet and the backup cabinet is the standby cabinet. These roles may be reversed. Also, for the purpose of this test, LCU-1 and LCU-2 are considered to be identical. This test will use one redundant U-32R Controller, one non-redundant RCM-32:Dr Controller, one relay named ACTIVE (ACT), and one temporary test light named TEST in each LCU cabinet.

The RCM will be using three discrete outputs and two discrete inputs for this test. Refer to Figure 1. Discrete output DO29 is used to control the test light, DO31 is the override relay, and DO32 is the keep alive relay. DI31 is monitoring the status of the active relay and DI30 monitors the status of the active relay in the redundant LCU cabinet.

There are four wires between the LCU1 and LCU2 cabinets. These wires are labeled A, B, C, and D in Figure 1.

The normal operating conditions for this test are as follows:

1. LCU-1 is the active cabinet, ie., the active relay is energized
2. LCU-2 is the standby cabinet, ie., the active relay is deenergized
3. DO29 in LCU-1 is energized
4. DO31 in LCU-1 is deenergized
5. DO32 in LCU-1 is energized
6. DO29 in LCU-2 is deenergized
7. DO31 in LCU-2 is deenergized
8. DO32 in LCU-2 is energized

NOTES
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The RCM/U32R should be configured as follows:

1. DO32 should be configured as a keep alive relay, ie., DO32 relay should deenergize if it is not told to energize at least once every two loop scan times.

*NOTES
Continued*
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2. The keep alive relay (DO32) should be deenergized for at least 30 seconds, if virtual discrete DV02 is false (logic zero).

DV02 = DI30 # DI31 # ACTIVE # rDV01

ACTIVE (RCM is active) = (DO32 & NOTDI31) from last loop scan or an activate command from A/S VIEW

where # = logic OR

& = logic AND

NOTDI31 = DI31 is false (0 volts)

rDV01 = virtual discrete (DV01) from the redundant LCU cabinet, rDV01 is true if not received

3. Send virtual discretes DV01 and DV04 to the redundant LCU cabinet.

DV01 = DI30 # DI31 # NOTACTIVE

DV04 = NOTDI30 & DI31

where NOTACTIVE = RCM is not active

NOTDI31 = DI31 is false (0 volts)

4. The DO31 relay should energize and latch if DV03 is true (logic one). DO31 should also be controllable from the A/S VIEW console and will override DV03.

DV03 = NOTDI30 & DI31 & ACTIVE & rDV04

where NOTDI30 = DI30 is false (0 volts)

rDV04 = virtual discrete (DV04) from the redundant LCU cabinet, rDV04 is true if not received

5. DO29 should be configured to energize when the RCM is active.
6. The RCM in LCU-2 should have a 100ms startup delay.
7. Send an alarm to the A/S VIEW console when a Controller becomes active or if

(ACTIVE & NOTDI30)

(ACTIVE & DO31)

(NOTACTIVE & DI30)

(NOTACTIVE & NOTDI31)

is true.

The redundancy procedure will test for the following conditions:

1. Verify that the primary LCU cabinet will become active when simultaneously applying power to both LCU-1 and LCU-2. (LCU-2 is primary)
2. Remove the RCM Controller from the active LCU and verify that standby LCU becomes active.
3. Replace the RCM Controller in the LCU and verify on CRT that it is ready.
4. Activate the standby LCU cabinet from the A/S VIEW console.
5. Test for the following fault conditions on the wires between the two LCU cabinets, refer to Figure 1:
 - a. Wire A open
 - b. Wire B open
 - c. Wires A and B open
 - d. Wire A shorted to earth ground
 - e. Wire B shorted to earth ground
 - f. Wires A and B shorted to earth ground

MT
1/25/95

The following is the redundancy procedure for the above:

1. Simultaneously apply power to both LCU-1 and LCU-2 cabinets. Check that the TEST light in the LCU-~~1~~₂ is on and the TEST light in the LCU-~~2~~₁ cabinet is off.
2. Remove the RCM Controller from LCU-~~1~~₂. Check that the TEST light in the LCU ~~1~~₂ cabinet is off and the TEST light in the LCU ~~2~~₁ cabinet is on.
3. Replace the RCM Controller in the LCU-~~2~~₁ and check that the TEST light in the LCU-~~1~~₂ is off and the TEST light in the LCU-~~2~~₁ cabinet is on.

MT
1/25/95

4. Energize D031 from the A/S VIEW console to activate LCU-1 cabinet. Check that the TEST light in the LCU-1 is on and the TEST light in the LCU-2 cabinet is off.
5. Open wire B and check that LCU-1 cabinet send a backup failed alarm to the A/S VIEW console. Replace wire B.
6. Open wire A and check that the TEST light in the LCU-1 is off and the TEST light in the LCU-2 cabinet is on. Replace wire A.
7. ~~Activate the LCU-1 cabinet. Open A and B wires simultaneously and check that the TEST light in the LCU-1 is on and the TEST light in the LCU-2 cabinet is off.~~ *MT 1/25/95*
8. ~~De-activate LCU-1 cabinet and activate LCU-2 cabinet. Check that the TEST light in the LCU-1 is off and the TEST light in the LCU-2 cabinet is on. Replace A and B wires.~~ *MT 1/25/95*
9. Activate the LCU-1 cabinet. Short wire A to earth ground and check that the TEST light in the LCU-1 is on and the TEST light in the LCU-2 cabinet is off. Remove short from wire A.
10. Short wire B to earth ground and check that the TEST light in the LCU-1 is off and the TEST light in the LCU-2 cabinet is on. Remove short from wire B.
11. ~~Activate the LCU-1 cabinet. Short wires A and B to earth ground simultaneously and check that the TEST light in the LCU-1 is on and the TEST light in the LCU-2 cabinet is off. Remove short from wires A and B.~~ *MT 1/25/95*
12. Remove power from LCU-1 and check that the TEST light in the LCU-1 cabinet is off and the TEST light in the LCU-2 cabinet is on. Restore power.
13. Replace LCU-1 with LCU-2, LCU-2 with LCU-1, wire A with B, and wire B with A and repeat steps 2 thru 12.

Record the result in Appendix B.12.

4.2.10 MICON PROGRAMMABLE FUNCTION TEST

This phase of testing is intended to demonstrate any or all of the programmable functions integral to the MICON U32 and RCM32 Controller. MICON Manual U-32 and RCM-32 Controller/RTU Function Description may be used as a guideline for defining the operational purpose of each function in addition to the assistance of MICON personnel in attendance of the SAT. The objective and result of any or all Functional Blocks should be recorded on Test Form of Appendix B.13. Fifteen (15) sheets of eight (8) sequents are provided to cover the multiple functions, Numbers 1-117. Copies of this form may be added to provide more detailed information or to include sub-function tests.

4.3 TEST COMPLETION

- a) All testing detailed under Section 4.2 of this procedure has been completed.
- b) Any additional tests found to be required during the course of testing to fully check the system has been completed.
- c) Any anomalies or defects in the system operation has been corrected and retested, as required.

Attachment 2

SAT #1 Results

Attachment 2 Table of Contents

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APPENDIX D

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-2

TEST EXCEPTIONS LIST

ITEM	DESCRIPTION	RESOLUTION
1	ALARM DAY STAMP (p.41-a,c,d,f) (p.42-a,c,f)	new eeprom 3/17/95
2	ALARM TIME STAMP (p.41-g,h) (p.42-b,d,g,h,i)	new eeprom 3/17/95
3	RCMF DI-31 INPUT (p.35,37)	REPLACE EEPROM W/RCF-5119
4	DOWNLOAD DELETES ALARMS (p.30)	new A/S VIEW 3/17/95
5	ACK CAUSES STATUS TOGGLE (p.34)	new A/S VIEW 3/17/95
6	GPI HARDWARE (p.46-b,c,d)	REPLACED GPI
7	ALARM MISNOMER (p.47-a,b)	new A/S VIEW 3/17/95
8	SECURITY BREACH (p.49,p.71)	new A/S VIEW 3/17/95
9	PASS MODE RECALL (p.50,d,e)(p.54)	
10	ANN. WINDOW COLOR (p.50)	
11	IOK/URG ALARM (p.72-a,b,c,d)	
12	IOK/VIDEO PRINT (p.72-a,b,c,d)	3/20/95
13	IOK/ANN WINDOW (p.50,72-b,d)	
14	FAC 75 MSV DOESN'T WORK (p.60)	NA, MT 1/27/95

NOTES
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PR
PR
PR
PR
PR
PR
PR
PR
NF
NF
NF
PR
NF

CNFS

minor

-NA-

MICON QUALITY ASSURANCE MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

-NA-

MICON PROJECT MGR.

-NA-

WESTINGHOUSE HANFORD CO.

NOTES:

① PR = Passed Retest

NF = Not Fixed (in 3.0.44)

APPENDIX D

WHC-SD-W030-TRP-001, Rev. C
Attachment 2, p. A2-3

TEST EXCEPTIONS LIST

ITEM	DESCRIPTION	RESOLUTION
14	Fnc 17 Ramp/Loop Limits (p.54)	
15	Fnc 21 PID RAT/BIAS (p.54)	
16	Fnc 26 Insert PID Terms (p.55)	
17	Fnc 27 Load PID Value (p.55)	
18	PARAMETERS NOT SAVED (p.54, 57, 59, 61, 62, 63)	
19	Fnc 9 Data Not Saved (p.53)	
20	LONG EXPRESSIONS NOT ALL SAVED (p.59/Export Loops), 62	
21	Fnc 86 CASC Not Inhibited (p.61)	
22	Fnc 90 Alarm Mgt (Inhibit) (p.61)	
23	Fnc 101 Does Not Work (p.62)	
24	Fnc 104 Is Reverse Logic (p.62)	
25	Fnc 106 Invert (p.62)	
26	Fnc 112 Delay Pulse (p.63)	
27	ARCHIVE FAILED (p.44)	3/20/95

NF

PR

-NA-

MICON QUALITY ASSURANCE MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

-NA-

MICON PROJECT MGR.

-NA-

WESTINGHOUSE HANFORD CO.

APPENDIX D

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-4

TEST EXCEPTIONS LIST

ITEM	DESCRIPTION	RESOLUTION
28	GRAPHICS PACKAGE DI (p.70)	Run 3.0.44 / Builder 5209, 3/21/95
29	DISPLAY CALL-UP TIME (p.78)	
30	PHONY ALARMS (no ref)	

PR
NF*
NF

-NA-
MICON QUALITY ASSURANCE MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL

-NA-
MICON PROJECT MGR.

-NA-
WESTINGHOUSE HANFORD CO.

* Not fixed in Run 3.0.44, except for graphics which are called up in < 2 seconds.

W-030 MICON S.A.T. EXCEPTIONS SUMMARY

2-6-95

NOTES:

1. STATUS: F = fixed, PR = passed retest.
2. All reference to Appendix B of purchase spec are via item 3.2.6.7.

NO.	DESCRIPTION	SAFETY	SPEC. REF.	STATUS
1	ALARM DAY STAMP	*	3.2.10	PR 3/17/95
2	ALARM TIME STAMP	*	3.2.10	PR 3/17/95
3	RCMF DI-31 INPUT	.		F, PR
4	DOWNLOAD DELETES ALARMS	*	3.2.6.6, 3.2.9	PR 3/17/95
5	ACK CAUSES STATUS TOGGLE	*	APP B, p. 34, item D	PR 3/17/95
6	GPLI HARDWARE			F, PR
7	ALARM MISNOMER	*	APP B, p. 32, items A.2, B	PR 3/17/95
8	SECURITY BREACH	*	3.2.6.3	PR 3/17/95
9	PID RECALL 'O'			OPEN 3/20/95
10	ANNUNCIATOR WINDOW COLOR	*	APP B, p. 34, item F	OPEN 3/20/95
11	IOK - URGENT, CAUTION, ATTENTION ALARM SUMMARIES	*		OPEN 3/20/95
12	IOK - VIDEO PRINT KEY			PR 3/20/95
13	IOK - ANNUNCIATOR WINDOW			- NA -
14	FNC 17 RAMP, LOOP LIMITS			OPEN 3/20/95
15	FNC 21 PID RATIO/BIAS			
16	FNC 26 INSERT PID TERMS			
17	FNC 27 LOAD PID VALUES			
18	DATA NOT SAVED TO SCROLL FILE			
19	FNC 9 DATA NOT SAVED TO SCROLL FILE			
20	LONG EXPRESSIONS NOT ALL SAVED TO SCROLL FILE			

W-030 MICON S.A.T. EXCEPTIONS SUMMARY

NO.	DESCRIPTION	SAFETY	SPEC. REF.	STATUS
21	FNC 86 CASCADE NOT INHIBITED			OPEN 3/20/95
22	FNC 90 ALARM MANAGEMENT (INH)	*	3.2.9.7	
23	FNC 101 DOES NOT WORK			
24	FNC 104 IS REVERSE LOGIC			
25	FNC 106 INVERT			
26	FNC 112 DELAY PULSE			↓
27	ARCHIVE FAILED			PR 3/20/95
28	GRAPHICS DON'T SUPPORT DI	*	3.2.6.6	PR 3/21/95
29	DISPLAY CALL-UP TIME	*	3.2.5.2	OPEN 3/21/95
30	PHONY ALARMS (sec fieldbus)	*	APP B, p. 32, items B, A.2	OPEN 3/20/95

W-030 MICON S.A.T. EXCEPTIONS

2-2-95

Run Version 3.0.41
sys_cnfg version 1.2.3
Display Builder version 4B29
U32 eeprom versions: UR 4B03, UB 4B03
RCMA eeprom version RCA 4B03
RCMD eeprom version RCD 4B03
RCMF eeprom version RCF 5119
GPLI eeprom versions: GB 4A19, GBX 4A19
LOI eeprom version 4915

- *1. TEST REFERENCE 4.2.2.1, APPENDIX B.2, PAGE 41-a, c, d, f;
TEST REFERENCE 4.2.2.2, APPENDIX B.3, PAGE 42-a, c, f;
Today's date is 1-10-95, but alarms generated for AI0201 and LP0201 showed 1-9-95 on the CRT and printer. Generated alarm on LP0301 and the day reported on CRT and printer was 1-10-95, the correct day. The time reported in all cases was correct. Generated alarm on LP1101 and the day reported on CRT was 1-9-95, but on printer was 1-10-95.

Also noticed that the DAY reported on each SPARC and each printer do not always match - one SPARC may show the 9th and another the 10th. Talked to Jeter, who said that a SPARC compares the time reported by the RCMs to its own internal time and if the RCM's time is older than the SPARC's, then the previous day is assigned to the day stamp. This can be caused by the RCM's time being only milliseconds older than the SPARC's time. This is a random thing and is dependent on the internal clocks in the RCMs and SPARCs. Jeter said he can put a time buffer, say 10 to 15 minutes, in the SPARC to resolve this.

On U32-1 the day stamp is incorrect but the time stamp is correct.

TEST REFERENCE 4.2.2, APPENDIX A.1.6.2, PAGE 35:
Day stamp for alarms from RCMDr-27 is incorrect as described above.

- *2. TEST REFERENCE 4.2.2.1, APPENDIX B.2, PAGE 41-g, h; AND
TEST REFERENCE 4.2.2.2, APPENDIX B.3, PAGE 42-b, d, e, g, h, i:
SPARC time does not match RCM times reported on alarms, especially in the last half of the hour (ie: 08:30 to 09:00). Times match fairly well in first of hour (ie: 09:05 to 09:30). Also, the time difference in last half of hour becomes greater as the SPARC and RCM clock times diverge. For example, the time difference at SPARC time of 8:37 was 4 minutes (RCM time of 8:33), at SPARC time of 8:51 was 9 minutes (RCM time of 8:42), and at SPARC time of 9:01 was 12 minutes (RCM time of 8:49). The RCM clock is always slower than SPARC clock by up to 15 minutes until the clocks synchronize on the hour. At about 5 minutes after the hour (after system

W-030 MICON S.A.T. EXCEPTIONS

was brought up or RCM was powered up, which may be at any time during the hour) the SPARC and RCM times synchronize. For example, at SPARC time of 9:27 the time difference was only 1 minute (RCM time of 9:26).

On RCM-11, which is a new card, the time stamp is correct and the RCM and SPARC times match. The above anomaly may be due to older hardware.

TEST REFERENCE 4.2.2, APPENDIX A.1.2.1, PAGE 26;
TEST REFERENCE 4.2.2, APPENDIX A.1.2.2, PAGE 27;
TEST REFERENCE 4.2.2, APPENDIX A.1.4.1, PAGE 30;
TEST REFERENCE 4.2.2, APPENDIX A.1.4.2, PAGE 31;
TEST REFERENCE 4.2.2, APPENDIX A.1.6.1, PAGE 34;
TEST REFERENCE 4.2.2, APPENDIX A.1.6.2, PAGE 35;
TEST REFERENCE 4.2.2, APPENDIX A.1.7.2, PAGE 37; AND
TEST REFERENCE 4.2.2, APPENDIX A.1.8.1, PAGE 38:

SPARC time does not match RCM time on these D, Dr, and F cards as well.

SUMMARY OF EXCEPTIONS 1 & 2

<u>RCM</u>	<u>CARD TYPE</u>	<u>DATE STAMP</u>	<u>TIME STAMP</u>
U-32-1	U32	OFF	OK
RCM-2	A	OFF	OK
RCM-3	A	OK	OFF (hardware)
RCM-4	D	OK	OFF (hardware)
RCM-5	D	OK	OFF (hardware)
RCM-6	D	OK	OFF (hardware)
RCM-7	Dr	OK	OFF (hardware)
RCM-8	Dr	OK	OFF (hardware)
RCM-9	Dr	OK	OK
U-32-10	U32	OFF	OK
RCM-11	A	OFF	OK
RCM-12	A	OFF	OFF (hardware)
RCM-13	D	OK	OFF (hardware)
RCM-14	D	OK	OFF (hardware)
RCM-15	D	OK	OFF (hardware)
RCM-16	Dr	OK	OFF (hardware)
RCM-17	Dr	OK	OFF (hardware)
RCM-18	Dr	OK	OFF (hardware)
U-32-19	U32	OFF	OK
RCM-20	A	OK	OFF (hardware)
RCM-21	A	OFF	OK
RCM-22	A	OK	OFF (hardware)
RCM-23	A	OK	OFF (hardware)
RCM-24	D	OK	OFF (hardware)
RCM-25	D	OK	OFF (hardware)
RCM-26	D	OK	OFF (hardware)
RCM-27	Dr	OFF	OK

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<u>RCM</u>	<u>CARD TYPE</u>	<u>DATE STAMP</u>	<u>TIME STAMP</u>
RCM-28	Dr	OK	OFF (hardware)
RCM-29	F	OK	OFF (hardware)
U-32-30	U32	OFF	OK
RCM-31	A	OK	OFF (hardware)
RCM-32	F	OK	OFF (hardware)
RCM-33	D	OK	OFF (hardware)
RCM-34	Dr	OK	OK

Note: 'A' card RCMA-3 and 'D' card RCMD-4 were sent back to Houston for testing.

- *3. TEST REFERENCE 4.2.2, APPENDIX A.1.6.2, PAGE 35; AND
TEST REFERENCE 4.2.2, APPENDIX A.1.7.2, PAGE 37:
First DI channel (#31) on the RCM-32-F RTD cards does not read an input.
When an input is provided, the display does not change.
- *4. TEST REFERENCE 4.2.2, APPENDIX A.1.4.1, PAGE 30:
All controllers, not just the ones on page 30, are effected as described.
When a controller file is compiled in a controller, all alarms in the numerically previous controller clear even if the inputs are in an alarm state. For example; if tags in controllers 12, 13, and 14 are in the alarm state and controller number 15's file is compiled, all alarms in controller 14 clear in the SPARC stations and in the LOI. This happens even though controller 14's tags are in the alarm state. Alarms in controllers 12 and 13, or any other controller in the system for that matter, are unaffected.
- *5. TEST REFERENCE 4.2.2, APPENDIX A.1.6.1, PAGE 34:
All discrete controllers (D and Dr cards), not just the ones on page 34, are effected as described. When alarms are acknowledged the statuses of the tags that are alarming change from the correct status to the non-alarm status for 1 to 2 seconds. This was observed in quarter-screen and half-screen windows.
- 6. TEST REFERENCE 4.2.3, APPENDIX B.7, PAGE 46:
We were in process of testing U-32 redundancy, step 4.2.3.d. We had just removed the primary U-32 in LCU-2. The proper system alarms activated, but the OCS reserve GPLI failed followed by one SECONDARY CONTROLLER OFFLINE alarm for each U-32. The secondary controllers were actually still running, just that the OCS CRTs could not see them. The EWS did not have the secondary controller offline alarms and could see the controllers. The problem looks like hardware in the OCS reserve GPLI or

W-030 MICON S.A.T. EXCEPTIONS

secondary tap on reserve GPLI. This did not occur when we tested the U32s in LCU-1.

- *7. TEST REFERENCE 4.2.4, APPENDIX B.8, PAGE 47-a; AND
TEST REFERENCE 4.2.4, APPENDIX B.8, PAGE 47-b:
When primary GPLI on EWS is removed, the proper GPLI failure alarms are generated and the secondary GPLI becomes active (as it should) and switches from monitoring the secondary highway to monitoring the primary highway. However, the latter causes generation of "Secondary Controller Offline" alarm messages for each backup U32 even though these U32 are still running (ie: not offline) and communications with the backup U32 are not lost. Verification that communications to the backup U32 were not lost was done by pulling out the primary U32 (while primary GPLI was removed), forcing the backup U32 to become active, and still being able to track the PV at the EWS and modify setpoints/outputs from the EWS. So, the "Secondary Controller Offline" alarms are a misnomer. While the communications and controls are still intact, the misnomer is confusing and can lead to misdiagnosis.
- *8. TEST REFERENCE 4.2.6, APPENDIX B.10, PAGE 49; AND
APPENDIX F, PAGE 71:
PAGE 49: Group Display, Trend and History displays, and Graphic Display operations such as setpoint changes, loop mode changes, and other operator actions are not protected when no user is logged in at a workstation.
PAGE 71: User Define and System Administration works properly for login access. Problem is with non-login access as described above.
- *9. TEST REFERENCE 4.2.7, APPENDIX B.11, PAGE 50; AND
TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 54:
Configuration file setup for PID RECALL of 0, and function 55 AO RECALL of 0. First set the loop for auto mode, with setpoint > 20, and allowed PV to stabilize. Upon power loss of RCM, group display shows "OFFLINE" as it should and parameters freeze. Upon power up (it was difficult to see the fnc-55 output go to zero every time because the Group Display update time was not fast enough to observe the output change each time), we observed the fnc-55 output go to zero then immediately get set to the previous output value. We also observed the fnc-20 PID output and fnc-11 AI PV remain constant (the PID output and PV never initialize to zero). So it appears the fnc-20 PID RECALL of '0' does not work, causing the fnc-55 output to be set to the PID output. PID RECALL of '1' does what it is supposed to where all parameters are recalled.
- *10. TEST REFERENCE 4.2.7, APPENDIX B.11, PAGE 50:
Alarm colors are fine in all displays except the annunciator window.

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Actually, colors in the annunciator window are fine with exception of the inverse video. In the annunciator window the foreground/background color format to indicate acknowledged alarms does not match the foreground/background color usage in the group displays. When an alarm is active and acknowledged, the background in the annunciator window should be the alarm color and the foreground lettering should be other (as in group display).

- *11. APPENDIX G, IOK KEYBOARD FUNCTIONS, 'URG ALARM', PAGE 72-a,b,c,d:
'Urgent Alarms', whether accessed from IOK or trackball, strips the caution and attention alarms out of the 'Recent Alarms' list but does not properly compress the resulting data. This results in partially full pages, and succeeding pages that contain the exact same data.

'Cautions Alarms' and 'Attention Alarms' (only accessible with trackball) does the same thing.
- 12. APPENDIX G, IOK KEYBOARD FUNCTIONS, 'VIDEO PRINT', PAGE 75-a,b,c,d:
'Video Print' key does not work.
- 13. TEST REFERENCE 4.2.7, APPENDIX B.11, PAGE 50; AND
APPENDIX G, IOK KEYBOARD FUNCTIONS, 'ANNUNCIATOR', PAGE 72-b,d:
Quitting a window using the trackball, especially Groups and Annunciator window, disables the IOK keyboard for the window that was quit. To re-enable the IOK for that window, must exit the window using the trackball, then re-enter the window.
- *14. TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 54:
Ramp rate on function 17 does not work. We used a ramp value of 1 which resulted in a rate of change on the CRT of about 8% per display update (about 2 - 3 seconds). It appears the ramp rate may be per second rather than per minute as the function compiler documentation indicates.

Also, it appears the setpoint limits (loop scale) are not picked up by function 17. When we used a ramp rate of 10000 in function 17 as soon as the file was compiled the setpoint in the loop "pegged out". That is, it went to infinity as far as we could see (a monumental wind-up).
- *15. TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 54:
Function 21 PIDRB asks for Ratio and Bias parameters to be defined, but these parameters are already in the database. When the file is saved, these 2 parameters are written to the controller file by the Controller Configure utility but the compiler generates an error. We stripped these

W-030 MICON S.A.T. EXCEPTIONS

2 parameters out of the controller file using text editor, downloaded this file, it compiled with no error, and the function worked. (See /Run/README file for version 3.0.40, item 1. This correction needs to be implemented for function 21.)

***16. TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 55:**

Function 26 works for setpoint, ratio, and bias. It does not compile for the PID parameters (gain, reset, rate). There seems to be a syntax error in the statement downloaded to the controller. The compile error file provides the following message:

```
"LET :TAG= (GENPT:161) lval required on left of assignment"  
"LET :TAG= $$$ CP=1"
```

***17. TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 55:**

Function 27 works for proportional, integral, setpoint, ratio, bias, scan time, and deviation. It does not compile for the PID derivative parameters. Controller Configure inserts 'CR', which possibly should be 'CD'.

18. TEST REFERENCE 4.2.10, APPENDIX B.13, PAGES 56, 57, 59:

The parameter that function 34 (SQRT) operates on is not saved to the scroll file. However, Function 34 works and the parameter is saved to the controller file.

The following functions also perform correctly, but their function parameters also are not saved to the scroll file:

```
Function 36 (ABS)  
Function 38 (EXP)  
Function 48 (MIN)  
Function 64 (GOTO)  
Function 80 (DBM)  
Function 107 (MAX)  
Function 108 (MEAN)  
Function 109 (MEDIAN)
```

***19. TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 53:**

Function 9 (MUD) can be defined, saved correctly to the controller file, and it works. But if you follow the MUD with a Function 0 (END), then only the first 12 (0-11) states of the MUD are written to the scroll file. If you follow the MUD with other functions, then these functions are saved to the scroll file along with all 16 MUD states, but the last step (the END) is not saved. This can only be cleaned up by inserting an END statement ahead of the last step needed, which deletes all steps following the inserted END step. The deleted steps, if needed, must be re-inserted.

W-030 MICON S.A.T. EXCEPTIONS

20. TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 59:
Long expressions are not completely saved to the scroll file although they are saved correctly in the database and controller file. This is true for any function where expressions can be entered and for loop export/import data. Discovered for the following functions which perform correctly:

Function 69 (logic calc)
Function 103 (IFA)
Function 104 (IFD), except #24

- *21. TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 61:
Function 86 (mode select interlock) does not inhibit cascade mode, and does not inhibit properly on combination modes. Below is a list of the options and how they actually work.

<u>OPTION</u>	<u>OBSERVED OPERATION</u>
Man	inhibits manual mode
Auto	inhibits automatic mode
Casc	inhibits manual and auto (sets cascade)
Man + Auto	no mode inhibited (allows all modes)
Man + Casc	inhibits manual only (allows auto and cascade)
Auto + Casc	inhibits auto only (allows manual and cascade)
M + A + C	inhibits manual and auto (allows cascade)

- *22. TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 61:
Function 90 (Alarm Management) works as designed. It includes the capability to suppress or inhibit alarms based on tag or group. However, the act of suppressing or removing suppression is a configuration change, which does not meet the specification requirement. Also, complete flexibility for suppression is not provided in the function (for example function 11 alarms such as HIHI, HI, LO, and LOLO cannot be inhibited individually - although they can be acknowledged as a block of alarms associated with a single tag).

- *23. TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 62:
Function 101 (Keep Alive) did not work using a DI for the tag. We tried a VD instead (using text editor because FNC 101 only allows selection of DI tags) and got the same result. There was no documentation describing specifically how this function is supposed to work. Function compiler document describes the parameters, but does not describe the function or how it works.

- *24. TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 62:
Function 104 works in reverse logic. When the variable is equal to the

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condition (true) the ELSE statement is executed, and when the variable is not equal to the condition (false) the THEN statement is executed. It should work in opposite fashion; when true execute the THEN, and when false execute the ELSE.

- *25. **TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 62:**
The INVERT option on Function 106 does not work. Controller Configure puts a double "not" in the controller file on the EXTEND function and TAG. The "not" should only be on the tag. If you remove the "not" (ie: with text editor) from the EXTEND then the function works.
- *26. **TEST REFERENCE 4.2.10, APPENDIX B.13, PAGE 63:**
The NORMAL option on Function 112 does not work. Controller Configure puts a double "not" in the controller file on the DELAY function and TAG. The "not" should only be on the tag. If you remove the "not" (ie: with text editor) from the DELAY then the function works.
- *27. **TEST REFERENCE 4.2.6, APPENDIX B.10, PAGE 49, STEPS I AND J:**
Archiving to tape failed (step i), even when using a blank tape. Therefore, reloading of the archive files could not be tested (step j).
- *28. **TEST REFERENCE APPENDIX F, PAGE 71:**
Graphics package permits linking discrete tags such as alarms to graphic symbols. However, graphic displays created with this package do not perform the color change when the discrete state changes.
- *29. **TEST REFERENCE APPENDIX I, PAGE 78:**
Display call-up time is too long and not meet the specification requirement of less than 2 seconds for any display.
- *30. **TEST REFERENCE APPENDIX D, EXCEPTIONS LIST, PAGE 69-c:**
The SAT procedure does not test for all system alarms. Therefore, the only reference is the exceptions list. The only system alarm anomaly is the four fieldbus failure alarms that are always present but are meaningless on our system. The Urgent alarm message is "Backup node sec fieldbus failed". There are one of these alarms for each cabinet. Since we do not have redundant RCMs, the secondary fieldbus is not used, and hence the alarm is always present. The alarm is meaningless on the W-030 system because we don't have the redundant RCMs and do not use the secondary fieldbus. This alarm was created by a Micon software patch (for controller eeproms) to fix a loss of U-32 controller redundancy caused by fieldbus lock-up. Before the patch, the alarm did not exist but the

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fieldbus lock-up and subsequent loss of redundancy are not acceptable either.

S.A.T. FUNCTION NOTES, 2-2-95
(See Appendix B.13 of S.A.T.)

Run Version 3.0.41
sys_cnfg version 1.2.3
Display Builder version 4B29
U32 eeprom versions: UR 4B03, UB 4B03
RCMA eeprom version RCA 4B03
RCMD eeprom version RCD 4B03
RCMF eeprom version RCF 5119
GPLI eeprom versions: GB 4A19, GBX 4A19
LOI eeprom version 4915

1. Password on VD's and DI's (at the point or function level) is not implemented. Configurations still require VD definition with function 6 prior to use of the VD in a loop.
2. Function 99 (NOP) does not accept LABEL on first entry. You must Save it, then click on the step, re-enter the label, and Save again.
3. For AI or VA alarms that are linked to logic, make the alarm an EVENT (EVENTs get logged into Message History but not Alarm History) to cycle equipment at some specific level or setpoint. If you tie interlocks to Attention, Caution, or Urgent alarms then the interlock is set until the alarm is acknowledged regardless of whether or not the alarm clears.

The same goes for VD or DI alarms, or any alarm level that you want as a control point for logic.

4. Function 75 has an output tag parameter, but you must use a Function 57 immediately after the Function 75 to physically drive an output to the field. All other functions that have output designated don't require the use of Function 57 (ie: Function 68 does not).
5. Function 11, if linear and with alarms, can be used with Function 20 with MSV as the input to Function 20. If Function 11 is SQRT and you have defined alarms in the function, then Function 20 must use AI Input Tag. Otherwise Function 20 will pick up the DI alarm state rather than the floating point output of Function 11.
6. The Function 11 LO alarm Discrete can't be used by itself. You must configure a HI alarm Discrete first. This seems like a problem if you don't need a HI alarm Discrete, but there is a work-around. The work-around is to set the HI Alarm trip level off-scale, then use the SAME VD for the HI and LO alarm Discretes. These "bogus" HI alarm parameters are written to the scroll file but do not get into the controller file, so the controller is not configured for the HI alarm.
7. The Function 55 output indication (Reverse or Direct) is useful for fail open valves to provide operators with consistent indications (instrument may get confused though).

8. Function 18 reset (manual):
 - REGIONS 1 and 3 are not defined as decimal values between 0 and 1. Need to use engineering range.
 - RESET is not a constant between 0 - 1, but < 0.5 worked well
 - very small BIAS (ie: .01) worked well
 - GAIN <= 0.5 worked well
9. To delete a loop:
 - click on "Loop Description"
 - click on "delete"
 - click on any step and Save
10. Documentation and Controller Configure function library list for functions 22 (PIDAR) and 23 (PIDAB) are incorrect. Function 22 puts the PIDAB into the controller file, and Function 23 inserts the PIDAR function in the controller file.
11. Function 25 description states you must answer "condition". But "condition" can be omitted (default to zero) so that gap works continuously. Also, you cannot modify Function 25 - you must remove it and re-insert it.
12. Function 40 documentation only covers first six parameters, but the pop-up window has 8 parameters. Function 40 documentation is missing descriptions of "Interlock Tag" and "Interlock Time" parameters.
13. In the Function 47 pop-up, the "AB" button should be "A < B".
14. Function 49 documentation says bias is added to the HI and subtracted from the LO limit. The opposite is true - Bias is subtracted from HI and added to LO.
15. If Function 53 is used in PID loop you cannot use MSV for the PID input if MSV is being used elsewhere.
16. Function 68 documentation is incorrect for C_OUT parameter. The document says it is available, but it is not in Controller Configure.
17. Function 73 documentation does not describe the "Both: 'Zero' and 'One' buttons that appear in the Latch pop-up of Controller Configure.
18. Function 74 incorrectly evaluates the negative transition. That is when:
 - the input goes from 1 to 0, the output goes from 0 to 1 with no delay, and
 - the input goes from 0 to 1, the output goes from 1 to 0 with a delay.Therefore, a time-delay on deenergize (TDD) with function 74 alone is not possible. This is no problem because the TDD can be provided using a Function 72 following Function 74. However, this should be explained better in the documentation.
19. Function 76 (VD Access) prevents operator changes from keyboard or mouse but does not prevent changes of the VD by logic.

20. Function 67 Strobe time on/off must be whole seconds. Fractional seconds between 0 and 1 are saved as 0 (zero).
21. Function 77 Event Counter documentation is incorrect. Transition parameter 2 in documentation is not in Controller Configure.
22. Function 79 documentation refers to DITAG, RESET DI, and RESET TIME, whereas Controller Configure menu refers to TAG, CONDITION, and TIME, respectively.
23. Function 90 documentation says it is not supported for RCMs, but it is. Function 90 Alarm Management works as follows:
 - TAG, if specified, performs management only on the selected tag. If TAG is not specified, management is performed on the Group specified.
 - MGMT parameters work as follows:
 - CLEAR = no management
 - ACK = ack now (upon download or power-up) if alarm is unack
 - AUTOACK = acknowledge automatically when alarm trips
 - SUPPRESS = inhibit all alarms for specified tag or group of tags
 - EXPRESSION = perform user defined expression
24. Function 95 parameter 2 is referred to as COMMAND in documentation, but is referred to as CONDITION in Controller Configure.
25. Function 105 requires two parameters. The documentation describes one parameter. The function's first parameter is the function's result (stored as a VA), and the second parameter is the input that is evaluated.
26. Function 113 (Select) looks at the integer of an analog value and "rounds it down". So an AI of 1.5 is interpreted as 1 and the output is the second value or tag of the (0-based) list. An AI of 2.4 is interpreted as 2 and the output is the third value or tag in the list, and so on.
27. Function 116 is not documented. The Controller Configure parameters are as follows:
 - parameter 1 (REF) = AI input tag
 - parameter 2 (Time) = in minutes (1 min is lowest acceptable)
 - parameter 3 (Reset) = Normal usually
 - parameter 4 (Array) = array tag, which must be defined (ie: using function 45) prior to Function 116
28. Function 45 parameters are as follows:
 - parameter 1 = array tag defined here
 - parameter 2 = 4-99 allowed array sized used to specify holding places for data dumped to it
 - parameter 3 = elements used to enter tags or constants to access (get data from)
29. Function 117 is not documented. The Controller Configure parameters are as follows:
 - parameter 1 = AI tag (select one)
 - parameter 2 = cold junction (Y/N)
 - parameter 3 = T/C type (JEKTSR) ('-' sign in file for deg F)
 - parameter 4 = degrees (F/C)

- parameter 5 = Filter (seconds)
- parameter 6 = Drift (up/down/no change), drift is by groups (ie: points 1-8, 9-16, 17-24, 25-26)

30. If using Controller Configure utility with the system running, occasionally the utility causes corruption of the MCNDEF.DAT file. This causes the workstation to be unable to see the controllers. Other controllers continue to see the controllers and communications are not lost. This is not critical, and recovery is simple (shut down the system on the effected workstation only and redefine the controllers, which only takes several minutes).

APPENDIX A.1

MICON CONTROLLER POWER SUPPLY OPTIONAL POWER FAILURE DISCRETE INPUT CONFIGURATION

APPENDIX A.1.1.1

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 1, SUB-RACK NO.1 Section 4.2.2

PT. NO.	POSITION A U-32-R-PRIMARY			POSITION B U-32-R-BACKUP			POSITION C RCM-32-A RCM 2		
							FT. TYPE	DATE/ INITIAL	REMARKS
1							AI	MT	1/12/95 OK
2							AI		
3							AI		
4							AI		
5							AI		
6							AI		
7							AI		
8							AI		
9							AI		
10							AI		
11							AI		
12							AI		
13							AI		
14							AI		
15							AI		
16							AI		
17							AI		
18							AI		
19							AI		
20							AI		
21							AI		
22							AI		
23							AI		
24							AI		
25							AI		
26							AI		
27							AO		
28							AO		
29							AO		
30							AO		
31							DI/O		
32							DI/O	✓	✓

—NA—
MICON QUALITY ASSURANCE MGR.
LO P. 00 2/2/95
MICON PROJECT MGR.

—NA—
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Gatta 1-12-95
WESTINGHOUSE HANFORD CO.

APPENDIX A.1.1.2

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 1, SUB-RACK NO. 1 Section 4.2.2

PT. NO.	POSITION D RCM-32-A RCM 3			POSITION E SPARE			POSITION F SPARE		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	AI	MT	1/12/95						
2	AI		OK						
3	AI								
4	AI								
5	AI								
6	AI								
7	AI								
8	AI								
9	AI								
10	AI								
11	AI								
12	AI								
13	AI								
14	AI								
15	AI								
16	AI								
17	AI								
18	AI								
19	AI								
20	AI								
21	AI								
22	AI								
23	AI								
24	AI								
25	AI								
26	AI								
27	AO								
28	AO								
29	AO								
30	AO								
31	DI/O								
32	DI/O								

MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

WHC QUALITY ASSURANCE/QUALITY CONTROL

WESTINGHOUSE HANFORD CO.

APPENDIX A.1.2.1

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 1, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITIONS A RCM-32-D RCM-4			POSITION B RCM-32-D RCM-5			POSITION C RCM-32-D RCM-6		
	PT. TYPE	DATE/ INITIAL	REMARKS	PT. TYPE	DATE/ INITIAL	REMARKS	PT. TYPE	DATE/ INITIAL	REMARKS
1	DI	MT 1/13/95 *		DI	MT 1/16/95 *		DI	MT 1/16/95 *	
2	DI			DI			DI		
3	DI			DI			DI		
4	DI			DI			DI		
5	DI			DI			DI		
6	DI			DI			DI		
7	DI			DI			DI		
8	DI			DI			DI		
9	DI			DI			DI		
10	DI			DI			DI		
11	DI			DI			DI		
12	DI			DI			DI		
13	DI			DI			DI		
14	DI			DI			DI		
15	DI			DI			DI		
16	DI			DI			DI		
17	DI			DI			DI		
18	DI			DI			DI		
19	DI			DI			DI		
20	DI			DI			DI		
21	DI			DI			DI		
22	DI			DI			DI		
23	DI			DI			DI		
24	DI			DI			DI		
25	DI			DI			DI		
26	DI			DI			DI		
27	DI			DI			DI		
28	DI			DI			DI		
29	DI			DI			DI		
30	DI			DI			DI		
31	DI			DI			DI		
32	DI	↓	↓	DI	↓	↓	DI	↓	↓

— NA —
MICON QUALITY ASSURANCE MGR.

NO LAD 2/2/95
MICON PROJECT MGR.

Hank M. Chelin 1-16-95
WHC QUALITY ASSURANCE/QUALITY CONTROL

MT.C 1-16-95
WESTINGHOUSE HANFORD CO.

* TEST EXCEPTION #2

Passed Retest 3/15/95

MC [Signature]

APPENDIX A.1.2.2

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 1, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITION D RCM-32-Dr RCM-7			POSITION E RCM-32-Dr RCM-8			POSITION F RCM-32-Dr RCM-9		
	PT. TYPE	DATE/ INITIAL	REMARKS	PT. TYPE	DATE/ INITIAL	REMARKS	PT. TYPE	DATE/ INITIAL	REMARKS
1	DO	MT 1/16/95 *		DO	MT 1/16/95 *		DO	MT 1/16/95 OK	
2	DO			DO			DO		
3	DO			DO			DO		
4	DO			DO			DO		
5	DO			DO			DO		
6	DO			DO			DO		
7	DO			DO			DO		
8	DO			DO			DO		
9	DO			DO			DO		
10	DO			DO			DO		
11	DO			DO			DO		
12	DO			DO			DO		
13	DO			DO			DO		
14	DO			DO			DO		
15	DO			DO			DO		
16	DO			DO			DO		
17	DO			DO			DO		
18	DO			DO			DO		
19	DO			DO			DO		
20	DO			DO			DO		
21	DO			DO			DO		
22	DO			DO			DO		
23	DO			DO			DO		
24	DO			DO			DO		
25	DO			DO			DO		
26	DO			DO			DO		
27	DO			DO			DO		
28	DO			DO			DO		
29	DO			DO			DO		
30	DO			DO			DO		
31	DO			DO			DO		
32	DO	↓	↓	DO	↓	↓	DO	↓	↓

- N A -
MICON QUALITY ASSURANCE MGR.

[Signature]
MICON PROJECT MGR.

Handwritten: Han M. Chafin 1-16-95
WHC QUALITY ASSURANCE/QUALITY CONTROL

Handwritten: M.C. Deats 1-16-95
WESTINGHOUSE HANFORD CO.

* TEST EXCEPTION #2 Passed Retest 3/16/95 MTC

APPENDIX A.1.3.1

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 2, SUB-RACK NO. 1 Section 4.2.2

PT. NO.	POSITION A U-32-R-FRI			POSITION B U-32-R-SEC			POSITION C RCM-32-A RCM11		
	PT. TYPE	DATE/ INITIAL	REMARKS	PT. TYPE	DATE/ INITIAL	REMARKS	PT. TYPE	DATE/ INITIAL	REMARKS
1							AI	MT	1/12/85 OK
2							AI		
3							AI		
4							AI		
5							AI		
6							AI		
7							AI		
8							AI		
9							AI		
10							AI		
11							AI		
12							AI		
13							AI		
14							AI		
15							AI		
16							AI		
17							AI		
18							AI		
19							AI		
20							AI		
21							AI		
22							AI		
23							AI		
24							AI		
25							AI		
26							AI		
27							AO		
28							AO		
29							AO		
30							AO		
31							DI/O		
32							DI/O		

AI
-NA-
MICON QUALITY ASSURANCE MGR.
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. G. 1-13-95
WESTINGHOUSE HANFORD CO.

APPENDIX A.1.3.2

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 2, SUB-RACK NO.1 Section 4.2.2

PT. NO.	POSITIONS D RCM-32-A RCM12			POSITION E SPARE			POSITION F SPARE		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	AI	2/12/95	OK						
2	AI								
3	AI								
4	AI								
5	AI								
6	AI								
7	AI								
8	AI								
9	AI								
10	AI								
11	AI								
12	AI								
13	AI								
14	AI								
15	AI								
16	AI								
17	AI								
18	AI								
19	AI								
20	AI								
21	AI								
22	AI								
23	AI								
24	AI								
25	AI								
26	AI								
27	AO								
28	AO								
29	AO								
30	AO								
31	DI/O								
32	DI/O								

MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

WHC QUALITY ASSURANCE/QUALITY CONTROL

WESTINGHOUSE HANFORD CO.

APPENDIX A.1.4.1

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 2, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITION A RCM-32-D RCM-13			POSITION B RCM-32-D RCM-14			POSITION C RCM-32-D RCM-15		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DI	MT 1/16/95 *		DI	MT 1/16/95 *		DI	MT 1/16/95 *	
2	DI			DI			DI		
3	DI			DI			DI		
4	DI			DI			DI		
5	DI			DI			DI		
6	DI			DI			DI		
7	DI			DI			DI		
8	DI			DI			DI		
9	DI			DI			DI		
10	DI			DI			DI		
11	DI			DI			DI		
12	DI			DI			DI		
13	DI			DI			DI		
14	DI			DI			DI		
15	DI			DI			DI		
16	DI			DI			DI		
17	DI			DI			DI		
18	DI			DI			DI		
19	DI			DI			DI		
20	DI			DI			DI		
21	DI			DI			DI		
22	DI			DI			DI		
23	DI			DI			DI		
24	DI			DI			DI		
25	DI			DI			DI		
26	DI			DI			DI		
27	DI			DI			DI		
28	DI			DI			DI		
29	DI			DI			DI		
30	DI			DI			DI		
31	DI			DI			DI		
32	DI			DI			DI		

NA -
MICON QUALITY ASSURANCE MGR.
2/2/95
MICON PROJECT MGR.

Hand M. Chapin 1-16-95
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Gert 1-16-95
WESTINGHOUSE HANFORD CO.

* TEST EXCEPTIONS 2 and 4.

Passed Retest 3-16-95
M Gert

APPENDIX A.1.4.2

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 2, SUB-RACK NO.2 Section 4.2.2

PT. NO.	POSITION D RCM-32-Dr RCM-16			POSITION E RCM-32-Dr RCM-17			POSITION F RCM-32-Dr RCM-18		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DO	MT 1/16/95 *		DO	MT 1/16/95 *		DO	MT 1/16/95 *	
2	DO			DO			DO		
3	DO			DO			DO		
4	DO			DO			DO		
5	DO			DO			DO		
6	DO			DO			DO		
7	DO			DO			DO		
8	DO			DO			DO		
9	DO			DO			DO		
10	DO			DO			DO		
11	DO			DO			DO		
12	DO			DO			DO		
13	DO			DO			DO		
14	DO			DO			DO		
15	DO			DO			DO		
16	DO			DO			DO		
17	DO			DO			DO		
18	DO			DO			DO		
19	DO			DO			DO		
20	DO			DO			DO		
21	DO			DO			DO		
22	DO			DO			DO		
23	DO			DO			DO		
24	DO			DO			DO		
25	DO			DO			DO		
26	DO			DO			DO		
27	DO			DO			DO		
28	DO			DO			DO		
29	DO			DO			DO		
30	DO			DO			DO		
31	DO			DO			DO		
32	DO	↓	↓	DO	↓	↓	DO	↓	↓

-NA-
MICON QUALITY ASSURANCE MGR.

[Signature] 2/6/95
MICON PROJECT MGR.

* TEST EXCEPTION 2.

[Signature] 1-16-95
WHC QUALITY ASSURANCE/QUALITY CONTROL

[Signature] 1/16/95
WESTINGHOUSE HANFORD CO.

Passed retest. 3/16/95 M Gento

APPENDIX A.1.5.1

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 3, SUB-RACK NO. 1 Section 4.2.2

PT. NO.	POSITION A U-32-R-PRI			POSITION B U-32-R-BU			POSITION C RCM-32-A <i>RCM20</i>		
							PT. TYPE	DATE/ INITIAL	REMARKS
1							AI	<i>MT</i>	<i>1-13-95 OK</i>
2							AI		
3							AI		
4							AI		
5							AI		
6							AI		
7							AI		
8							AI		
9							AI		
10							AI		
11							AI		
12							AI		
13							AI		
14							AI		
15							AI		
16							AI		
17							AI		
18							AI		
19							AI		
20							AI		
21							AI		
22							AI		
23							AI		
24							AI		
25							AI		
26							AI		
27							AO		
28							AO		
29							AO		
30							AO		
31							DI/O		
32							DI/O		

-NA-
MICON QUALITY ASSURANCE MGR.
Al Ptl 2/2/95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M. C. Galt 1-13-95
WESTINGHOUSE HANFORD CO.

APPENDIX A.1.5.2

WHC-SD-W030-TRP-DD1, Rev. 0
Attachment 2, p. A2-30

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 3, SUB-RACK NO.1 Section 4.2.2

PT. NO.	POSITION D RCM-32-A RCM21			POSITION E RCM-32-A RCM22			POSITION F RCM-32-A RCM23		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	AI	MT	1/13/95 OK	AI	MT	1/13/95 OK	AI	MT	1/13/95 OK
2	AI			AI			AI		
3	AI			AI			AI		
4	AI			AI			AI		
5	AI			AI			AI		
6	AI			AI			AI		
7	AI			AI			AI		
8	AI			AI			AI		
9	AI			AI			AI		
10	AI			AI			AI		
11	AI			AI			AI		
12	AI			AI			AI		
13	AI			AI			AI		
14	AI			AI			AI		
15	AI			AI			AI		
16	AI			AI			AI		
17	AI			AI			AI		
18	AI			AI			AI		
19	AI			AI			AI		
20	AI			AI			AI		
21	AI			AI			AI		
22	AI			AI			AI		
23	AI			AI			AI		
24	AI			AI			AI		
25	AI			AI			AI		
26	AI			AI			AI		
27	AO			AO			AO		
28	AO			AO			AO		
29	AO			AO			AO		
30	AO			AO			AO		
31	DI/O			DI/O			DI/O		
32	DI/O			DI/O			DI/O		

- NA -
MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

WESTINGHOUSE HANFORD CO.

APPENDIX A.1.6.1

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-31

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 3, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITION A RCM-32-D RCM24			POSITION B RCM-32-D RCM25			POSITION C RCM-32-D RCM26		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DI	MT 1/16/95 *		DI	MT 1/16/95 *		DI	MT 1/16/95 *	
2	DI			DI			DI		
3	DI			DI			DI		
4	DI			DI			DI		
5	DI			DI			DI		
6	DI			DI			DI		
7	DI			DI			DI		
8	DI			DI			DI		
9	DI			DI			DI		
10	DI			DI			DI		
11	DI			DI			DI		
12	DI			DI			DI		
13	DI			DI			DI		
14	DI			DI			DI		
15	DI			DI			DI		
16	DI			DI			DI		
17	DI			DI			DI		
18	DI			DI			DI		
19	DI			DI			DI		
20	DI			DI			DI		
21	DI			DI			DI		
22	DI			DI			DI		
23	DI			DI			DI		
24	DI			DI			DI		
25	DI			DI			DI		
26	DI			DI			DI		
27	DI			DI			DI		
28	DI			DI			DI		
29	DI			DI			DI		
30	DI			DI			DI		
31	DI			DI			DI		
32	DI	↓	↓	DI	↓	↓	DI	↓	↓

- N A -
MICON QUALITY ASSURANCE MGR.
[Signature] 2/2/95
MICON PROJECT MGR.

Hank M. Chalm 1-16-95
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. [Signature] 1-16-95
WESTINGHOUSE HANFORD CO.

* TEST EXCEPTION 2 and 5. Passed retest on
34 Exception #2 & #5
M. [Signature] 3-16-95

APPENDIX A.1.6.2

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 3, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITION D RCM-32-Dr RCM27			POSITION E RCM-32-Dr RCM28			POSITION F RCM-32-F RCM29		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DO	MT 1/16/95 *		DO	MT 1/16/95 *		RTD	MT	1/13/95 * * MT 1-16
2	DO			DO			RTD		
3	DO			DO			RTD		
4	DO			DO			RTD		
5	DO			DO			RTD		
6	DO			DO			RTD		
7	DO			DO			RTD		
8	DO			DO			RTD		
9	DO			DO			RTD		
10	DO			DO			RTD		
11	DO			DO			RTD		
12	DO			DO			RTD		
13	DO			DO			RTD		
14	DO			DO			RTD		
15	DO			DO			RTD		
16	DO			DO			RTD		
17	DO			DO			RTD		
18	DO			DO			RTD		
19	DO			DO			RTD		
20	DO			DO			RTD		
21	DO			DO			RTD		
22	DO			DO			RTD		
23	DO			DO			RTD		
24	DO			DO			RTD		
25	DO			DO			RTD		
26	DO			DO			RTD		
27	DO			DO			AO	MT 1/13/95 OK	
28	DO			DO			AO	MT 1/13/95 OK	
29	DO			DO			AO	MT 1/13/95 OK	
30	DO			DO			AO	MT 1/13/95 OK	
31	DO			DO			DI/O	MT 1/23/95 OK	
32	DO			DO			DI/O	MT 1/13/95 OK	

-NA-
MICON QUALITY ASSURANCE MGR.

[Signature] 2/2/95
MICON PROJECT MGR.

* TEST EXCEPTION #1.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL

[Signature] 1-13-95
WESTINGHOUSE HANFORD CO.

* TEST EXCEPTION #2

35 Passed Retest of exceptions
142. M. Dec 3-16-95

APPENDIX A.1.7.1

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 4, SUB-RACK NO. 1 Section 4.2.2

PT. NO.	POSITION A U-32-R-PRI			POSITION B U-32-R-BU			POSITION C RCM-32-A RCM 31		
							PT. TYPE	DATE/ INITIAL	REMARKS
1							AI	MT	1/13/95 OK
2							AI		
3							AI		
4							AI		
5							AI		
6							AI		
7							AI		
8							AI		
9							AI		
10							AI		
11							AI		
12							AI		
13							AI		
14							AI		
15							AI		
16							AI		
17							AI		
18							AI		
19							AI		
20							AI		
21							AI		
22							AI		
23							AI		
24							AI		
25							AI		
26							AI		
27							AO		
28							AO		
29							AO		
30							AO		
31							DI/O		
32							DI/O	✓	✓

- NA -
MICON QUALITY ASSURANCE MGR.
Al Bell 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Santa 1-13-95
WESTINGHOUSE HANFORD CO.

APPENDIX A.1.7.2

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 4, SUB-RACK NO. 1 Section 4.2.2

PT. NO.	POSITIONS D RCM-32-F <i>RCM32</i>			POSITION E SPARE			POSITION F SPARE		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	RTD	<i>MT</i>	<i>1/13/95</i> <i>OK</i>						
2	RTD		<i>*</i>						
3	RTD		<i>MT</i>						
4	RTD		<i>1/14/95</i>						
5	RTD								
6	RTD								
7	RTD								
8	RTD								
9	RTD								
10	RTD								
11	RTD								
12	RTD								
13	RTD								
14	RTD								
15	RTD								
16	RTD								
17	RTD								
18	RTD								
19	RTD								
20	RTD								
21	RTD								
22	RTD								
23	RTD								
24	RTD								
25	RTD								
26	RTD								
27	AO	<i>MT</i>	<i>1/13/95</i> <i>OK</i>						
28	AO	<i>MT</i>	<i>1/13/95</i> <i>OK</i>						
29	AO	<i>MT</i>	<i>1/13/95</i> <i>OK</i>						
30	AO	<i>MT</i>	<i>1/13/95</i> <i>OK</i>						
31	DI/O	<i>MT</i>	<i>1-23-95</i> <i>OK</i>						
32	DI/O	<i>MT</i>	<i>1/13/95</i> <i>OK</i>						

MICON QUALITY ASSURANCE MGR.

2/2/95
MICON PROJECT MGR.

WHC QUALITY ASSURANCE/QUALITY CONTROL

1-13-95
WESTINGHOUSE HANFORD CO.

TEST EXCEPTION #2. Passed Retest

APPENDIX A.1.8.1

I/O Termination Assignments LCU NO. 4, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITION A RCM-32-D RCM 33			POSITION B RCM-32-Df RCM 34			POSITION C SPARE		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DI	MT 1/16/95 *		DO	MT 1/16/95 OK				
2	DI			DO					
3	DI			DO					
4	DI			DO					
5	DI			DO					
6	DI			DO					
7	DI			DO					
8	DI			DO					
9	DI			DO					
10	DI			DO					
11	DI			DO					
12	DI			DO					
13	DI			DO					
14	DI			DO					
15	DI			DO					
16	DI			DO					
17	DI			DO					
18	DI			DO					
19	DI			DO					
20	DI			DO					
21	DI			DO					
22	DI			DO					
23	DI			DO					
24	DI			DO					
25	DI			DO					
26	DI			DO					
27	DI			DO					
28	DI			DO					
29	DI			DO					
30	DI			DO					
31	DI			DO					
32	DI			DO					

N/A

(SPARES)
no cards installed

- N/A -
MICON QUALITY ASSURANCE MGR.
[Signature] 2/2/95
MICON PROJECT MGR.

Hank M. Chubbin 1-16-95
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. [Signature] 1-16-95
WESTINGHOUSE HANFORD CO.

* TEST EXCEPTION 2.

Passed Retest.

M. [Signature] 3-16-95

APPENDIX A.1.8.2

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 4, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITION D SPARE			POSITION E SPARE			POSITION F SPARE		
	PT. TYPE	DATE/ INITIAL	REMARKS	PT. TYPE	DATE/ INITIAL	REMARKS	PT. TYPE	DATE/ INITIAL	REMARKS
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									

NA

(SPARES)
no cards installed

-NA-

MICON QUALITY ASSURANCE MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

-NA-

MICON PROJECT MGR.

-NA-

WESTINGHOUSE HANFORD CO.

APPENDIX B.1

JUMPER CONFIGURATION DIAGRAM SECTION 4.2.2

RCM-32-A & B Modules Jumper Placement
for W1 & W31

RCM-32-A & B Module Jumper Placement
for W9

RCM-32-C Module Jumper Placement

RCM-32-D Module Jumper Placement

RCM-32-F Module Jumper Placement

APPENDIX B.2

WHC-SD-W030-TRP-001, Rev.
Attachment 2, p. A2-38

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	S S I O N R A C L E	S V I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-1 RCM-2 Pt. 1	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 4.875 4.93	49.75 49.85	446.9 44.85	MT 1-10-95			OK	MT	11/10/95
e		The display tracks the input signal.	OK										MT	11/10/95
f		Error A 0.25% FS	OK										MT	11/10/95
h		Input signals within A 0.25% FS of the setpoint when the alarm is tripped.	OK										MT	11/10/95
i		CRT display notices the alarm.	OK										MT	11/10/95
j		correct printer response	OK										MT	3/15/95
k		Input signal at 0 mA yield -25% display value	OK	OK	OK	N/A						OK	MT	11/10/95

$$\text{Calculated \% Error} = \frac{\text{Measured PV} - \text{Ref Value}}{\% \text{ Full Scale}} \times 100$$

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

Reference Value from meter, measured value is PV

-NA-
MICON QUALITY ASSURANCE MGR.

Al Bell 2/6/95
MICON PROJECT MGR.

Hank M. Chubin 1-10-95
WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Seitz 1-10-95
WESTINGHOUSE HANFORD CO.

TEST EXCEPTION #1

Passed Retest
3/15/95
M. Seitz

APPENDIX B.2

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-39

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	SSIO GNR AC LE	SV GL NU AE L	DV IS PU LE AY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AE LR AR OR MR	IN IT IAL	DA TE
						5%	50%	95%	5%	50%	95%			
d	LCU-1 RCM-3 Pt. 2	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 7.86 4.93 1.03 %	49.69 49.77 .16 %	94.5 99.65 .16 %	.05 %	.08 %	.15 %	OK	mt	1/10/95
e		The display tracks the input signal.	OK										mt	1/10/95
f		Error A 0.25% FS	OK										mt	1/10/95
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	OK										mt	1/10/95
i		CRT display notices the alarm.	OK										mt	1/10/95
j		correct printer response	OK										mt	1/10/95
k		Input signal at 0 mA yield -25% display value	OK	OK	OK	N/A						OK	mt	1/10/95

TEST
EXCEPTION
mt
1-10-95

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

Hank M. Chapin 1-10-95
WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Dect 1-10-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-40

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	SS IO GN R AC LE	SV IA GL NU AE L	DV IA SL FU LE A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AE LR RO MR	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-2 RCM-11 PT. 3	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 4.875 4.93	44.75 44.85	446.3 94.8				OK	MT	1/10/95
e		The display tracks the input signal.	OK			1.13 %	.2 %	.18 %	.05 %	.1 %	.18 %	OK	MT	1/10/95
f		Error A 0.25% FS	OK									OK	MT	1/10/95
h		Input signals within A 0.25% FS of the setpoint when the alarm is tripped.	OK									OK	MT	1/10/95
i		CRT display notices the alarm.	OK									OK	MT	1/10/95
j		correct printer response	OK									OK	MT	3/15/95
k		Input signal at 0 mA yield -25% display value	OK	OK	OK				N/A			OK	MT	1/10/95

TEST
EXCEPTION
#1

Passed
Retest
3/15/95
M. Dent

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.
MICON PROJECT MGR.

Hank M. Chapin 1-10-95
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Dent 1-10-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-41

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	S S I G N A C L E	S V A L G L N U A L	D Y A S L P L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-2 RCM-12 PT. #3	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 4.875 4.94 1.33 %	49.81 49.88 .16 %	94.81 94.90 -.09 %				OK	MT	1/10/95
e	MT 1/10/95	The display tracks the input signal.	OK										MT	1/10/95
f		Error A 0.25% FS	OK										MT	1/10/95
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	OK										MT	1/10/95
i		CRT display notices the alarm.	OK										MT	1/10/95
j		correct printer response	OK										MT	3/15/95
k	V	Input signal at 0 mA yield -25% display value	OK	OK	OK	N/A						OK	MT	1/10/95

TEST
EXCEPTION
#1

Paused
Retest
3/15/95
M. C. S.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.
[Signature] 2/2/95
MICON PROJECT MGR.

[Signature] 1-10-95
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. S. 1-10-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

WHC-SD-W030-TRP-001, Rev.
Attachment 2, p. A2-42

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	SIO GNR ACLE	SV IAG LNU AEAL	DV IAL SL PU LE AY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AEL R AR O MR	INI T IAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-20 PT. 1	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 4.838 4.96	49.613 49.65	146.83 147.5				OK	MT	1/10/95
e		The display tracks the input signal.	OK										MT	1/10/95
f		Error A 0.25% FS	OK										MT	1/10/95
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	OK										MT	1/10/95
i		CRT display notices the alarm.	OK										MT	1/10/95
j		correct printer response	OK										MT	1/10/95
k	↓	Input signal at 0 mA yield -25% display value	OK	OK	OK	N/A						OK	MT	1/10/95

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.

Al P. 2/2/95
MICON PROJECT MGR.

Hank M. Chafin 1-10-95
WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Deats 1-10-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-43

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	S I O G U N R A C L E	S V I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-21 PT. 1	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 4.843 4.843	49.563 49.65	94.37 94.47	MT MT MT	1-12-95 0.09 0.10 0.09	0.05 0.05 0.09	OK	MT	1/12/95
e		The display tracks the input signal.	OK										MT	1/12/95
f		Error A 0.25% FS	OK										MT	1/12/95
h		Input signals within ±0.25% FS of the setpoint when the alarm is tripped.	OK										MT	1/12/95
i		CRT display notices the alarm.	OK										MT	1/12/95
j		correct printer response	OK										MT	3/15/95
k		Input signal at 0 mA yield -25% display value	OK	OK	OK				N/A			OK	MT	1/12/95

TEST EXCEPTION #1

Passed
Retest
3/15/95
M. Deate

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.
Al Bell 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Deate 1-12-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-44

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	SIOGNRALE	SVIAGLNUAE L	DVIALS PULEAY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELR ARORMR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-22 PT. 3	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	4.875 4.86	44.815 44.91	44.813 44.90						1/11/95
e		The display tracks the input signal.	OK			1.74 %	0.2 %	0.09 %	0.08 %	0.10 %	0.09 %	OK	MT	1/11/95
f		Error A 0.25% FS	OK										MT	1/11/95
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	OK										MT	1/11/95
i		CRT display notices the alarm.	OK										MT	1/11/95
j		correct printer response	OK										MT	3/15/95
k		Input signal at 0 mA yield -25% display value	OK	OK	OK	N/A						OK	MT	1/11/95

TEST EXCEPTION #2

Passed
Retest
3/15/95
M. Gust

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.

R. P. Hill 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

M. C. Seato 1-11-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

WHC-SO-W030-TRP-001, Rev. 0
Attachment 2, p. A2-45

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	S S I O U N R A C L E	S V I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-23 PT. 3	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 4.936 4.946	44.513 49.84	94.75 94.8				OK	MT	1/1/95
e		The display tracks the input signal.	OK			.86 %	.06 %	.05 %	.04 %	.03 %	.05 %		MT	1/1/95
f		Error A 0.25% FS	OK										MT	1/1/95
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	OK										MT	1/1/95
i		CRT display notices the alarm.	OK										MT	1/1/95
j		correct printer response	OK										MT	3/15/95
k	↓	Input signal at 0 mA yield -25% display value	OK	OK	OK	N/A						OK	MT	1/1/95

TEST EXCEPTION #2
Passed
Retest
3/15/95
M. C. DeT...

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.
DePelle 2/2/95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. DeT. 1-11-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-46

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	SIOGNRALE	SVIAGLNUALE	DVIALPULEY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELRARMR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-4 RCM-31 PT. 1	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 4.813 4.86 1.4 %	44.625 44.7 15 %	44.438 44.58 15 %	.07 %	.08 %	.14 %	OK	MT	11/1/95
e		The display tracks the input signal.	OK										MT	11/1/95
f		Error A 0.25% FS	OK										MT	11/1/95
h		Input signals within ±0.25% FS of the setpoint when the alarm is tripped.	OK										MT	11/1/95
i		CRT display notices the alarm.	OK										MT	11/1/95
j		correct printer response	OK										MT	11/1/95
k	↓	Input signal at 0 mA yield -25% display value	OK	OK	OK	N/A						OK	MT	11/1/95

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.

Al Bell 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Steele 1-11-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

WHC-SO-W030-TRP-001, Rev. 0
Attachment 2, p. A2-47

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	SIO GNR ACLE	S I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-1 RCM-2 PT.5	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF 5.1 5.22	50.25 50.35	95.825 95.88				SEE NOTE ① NA	NA	1/12/95
e		The display tracks the input signal.	OK			2.35 %	.30 %	.06 %	.12 %	.15 %	.06 %			1/14/95
f		Error A 0.25% FS	SEE NOTE ① NA											
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	SEE NOTE ① NA											
i		CRT display notices the alarm.	SEE NOTE ① NA											
j		correct printer response	OK											
k		Input signal of 0 volt yield -25% display value	OK	OK	OK	N/A						SEE NOTE ① NA	NA	1/12/95

Note: ① Checked on mA inputs, page 41-b. System Feature.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.
Al Bell 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Roberts 1-12-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-48

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	S S I O G U N R A C L E	S V I A G L N U A E L	D V I A S L P U L E A V	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-1 RCM-3 PT. 5	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 5.025 5.05	50.1 50.22	45.25 45.42				SEE NOTE ① NA	mt	11/95
e		The display tracks the input signal.	OK										mt	11/95
f		Error A 0.25% FS	NOTE ① NA											
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	SEE NOTE ① NA											
i		CRT display notices the alarm.	SEE NOTE ① NA											
j		correct printer response	OK										mt	3/1/95
k		Input signal of 0 volt yield -25% display value	OK	OK	OK	N/A			NA			SEE NOTE ① NA OK	mt	11/95

NOTE: ① Checked on mA input, page 41-b. System Feature. 3/15/95
TEST EXCEPTION #2
Passed
Retest
M. Deato

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.
APB 2/2/95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Deato 1-11-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

WHC-SO-WO30-TRP-001, Rev. 0
Attachment 2, p. A2-49

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	SIOGNRACLE	SVIAGLNUAEL	DVIALSPLULEY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELRARMR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-2 RCM-11 PT.5	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	5.075 5.18	50.175 50.35	95.443 95.51				NA	NA	1/12/95
e		The display tracks the input signal.	OK											1/12/95
f		Error A 0.25% FS	NA											
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	NA											
i		CRT display notices the alarm.	NA											
j		correct printer response	OK											3/15/95
k		Input signal of 0 volt yield -25% display value	OK	OK	OK	N/A						NA	NA	1/12/95

Note: ① SEE NOTE, page 42-b.

TEST EXCEPTION #1

Passed
Retest
3/15/95
M. Deats

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.
Ad Hill 2/2/95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Deats 1-12-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-50

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	SIOGNRA L	SVIAGLNU AEL	DVIALS PU LEY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELR AR RMR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-2 RCM-12 PT. 5	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 5.525 5.6	51.10 51.85 51.03	46.50 46.71				① NA	MT	11/1/95
e		The display tracks the input signal.	OK			1.36 %	.35 %	.22 %	.07 %	.18 %	.21 %		MT	11/1/95
f		Error A 0.25% FS	① NA											
h		Input signals within ±0.25% FS of the setpoint when the alarm is tripped.	① NA											
i		CRT display notices the alarm.	① NA											
j		correct printer response	OK										MT	3/15/95
k		Input signal of 0 volt yield -25% display value	OK	OK	OK			N/A			NA	① NA	MT	11/1/95

Note: ① SEE NOTE 1, page 42-b.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.
Al Bell 2/2/95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. [Signature] 1-11-95
WESTINGHOUSE HANFORD CO.

TEST
EXCEPTION
#2
Phased
Retest
3/15/95
M. [Signature]

APPENDIX B.3

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-51

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	S O G U N R A C L E	S V I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-20 PT. 5	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 5.15 5.14 .78 %	50.275 50.42 .29 %	95.5 95.67 .18 %	.04 %	.14 %	.17 %	① NA	MT	1/1/95
e		The display tracks the input signal.	OK										MT	1/1/95
f		Error A 0.25% FS	① NA											
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	① NA											
i		CRT display notices the alarm.	① NA											
j		correct printer response	OK										MT	3/15/95
k		Input signal of 0 volt yield -25% display value	OK	OK	OK			N/A			NA	① NA	MT	1/1/95

Note: ① SEE NOTE 1, page 42-b.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.
Al Rlo 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Felt 1-11-95
WESTINGHOUSE HANFORD CO.

TEST
EXCEPTION
#2
Passed
Retest
3/15/95
M. Gent

APPENDIX B.3

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-52

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	SIO GNR ACLE	SVAL GLN AEAL	DV IAL SL PU LEY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AEL ROR MR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-21 PT.	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	5.10 5.16	50.25 50.38	95.5 95.63				① NA	MT	1/12/95
e		The display tracks the input signal.	OK			1.18 %	.26 %	.14 %	.06 %	.13 %	.13 %			1/12/95
f		Error A 0.25% FS	① NA											
h		Input signals within ±0.25% FS of the setpoint when the alarm is tripped.	① NA											
i		CRT display notices the alarm.	① NA											
j		correct printer response	OK											TEST EXCEPTION #1
k		Input signal of 0 volt yield -25% display value	OK	OK	OK			N/A			NA	① NA	MT	1/12/95

Note: ① SEE NOTE 1, page 42-b.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.
A. P. [Signature] 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. [Signature] 1-12-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-55

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	SIGNATURE	SVIAGLNUAEAL	DVIALPULEY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELRARRORMR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-3 Rcm-22 PT. 9	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF 5.075 5.02 89 %	50.2 50.35 30 %	95.5 95.7 21 %		.05 .15 %	.20 %	① NA	MT	11/95
e		The display tracks the input signal.	OK										MT	11/95
f		Error A 0.25% FS	① NA											
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	① NA											
i		CRT display notices the alarm.	① NA											
j		correct printer response	OK										MT	3/15/95
k	↓	Input signal of 0 volt yield -25% display value	OK	OK	OK	N/A					NA	① NA	MT	11/95

Note: ① SEE NOTE 1, page A2-B.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.
Al Bell 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Deats 1-11-95
WESTINGHOUSE HANFORD CO.

TEST EXCEPTION #2
Passed
Retest
3/15/95
M. Deats

APPENDIX B.3

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-54

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	SIGNATURE	STATUS	DVI ASL PULLEY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELR ARMR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-23 PT.5	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF 5.1 PV 5.15	50.175 50.28	95.348 95.52				① NA	MT	11/15
e		The display tracks the input signal.	OK				.98 %	.21 %	.03 %	.05 %	.10 %			11/15
f		Error A 0.25% FS	① NA											→
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	① NA											→
i		CRT display notices the alarm.	① NA											→
j		correct printer response	OK											→
k		Input signal of 0 volt yield -25% display value	OK	OK	OK	N/A						① NA	MT	11/15

Note: ① SEE NOTE 1, page 42-b.

TEST
EXCEPTION
#2
3/15/95
M. Deat

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.
R. Pool 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M. C. Deat 1-11-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-55

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	S S I O U N R A C L E	S V I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R O R M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-4 RCM-31 PT.	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 5.1 5.17	50.25 50.4	45.5 45.49				① NA	MT	1/2 95
e		The display tracks the input signal.	OK											1/2 95
f		Error A 0.25% FS	① NA											
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	① NA											
i		CRT display notifies the alarm.	① NA											
j		correct printer response	OK											3/15/95 MT
k		Input signal of 0 volt yields -25% display value	OK	OK	OK			N/A			NA	① NA	MT	1/2 95

Note: ① SEE NOTE 1, page 42-b.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.
Al Pll 2/2/95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Sparto 1-12-95
WESTINGHOUSE HANFORD CO.

TEST
EXCEPTION
#2
Passed
Retest
3/15/95
M. Sparto

APPENDIX B.4

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-56

RCM-32 RESISTANCE TEMPERATURE DETECTOR (RTD) INPUTS TEST SECTION 4.2.2.3

LCU-3, RCM-29

STEP	ACCEPTANCE CRITERIA	ACTUAL RESULT	INITIALS	DATE
a	Verify the location of the RTD Modules. LCU-3/RCM-29	OK	MT	1/12/95
b	Note the temperature in the RTD Table.	$100.26 \Omega = 34.2^\circ\text{F}$ $150.26 \Omega = 268^\circ\text{F}$ $180.26 \Omega = 414^\circ\text{F}$	MT	1/12/95
d	Note the temperature in the MICON-View and compare with (b).	$100 \Omega = 34-35^\circ\text{F}$ $150 \Omega = 269-270^\circ\text{F}$ $180 \Omega = 414-417^\circ\text{F}$	MT	1/12/95

LOK

*OK
1-23-95

-NA-

MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Deats

1-12-95
WESTINGHOUSE HANFORD CO.

RTD Range : $-200 - 630^\circ\text{C}$

$-328 - 1166^\circ\text{F}$

($\Delta = 1494^\circ\text{F}$)

$3^\circ\text{F} = 0.2\%$

* Retest For Exception #6 Resolution

$100 \Omega = 34.5^\circ$

$150 \Omega = 274^\circ$

APPENDIX B.4

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-57

RCM-32 RESISTANCE TEMPERATURE DETECTOR (RTD) INPUTS TEST SECTION 4.2.2.3

LCU-4, RCM-32

STEP	ACCEPTANCE CRITERIA	ACTUAL RESULT	INITIALS	DATE
a	Verify the location of the RTD Modules. <i>LCU-4/RCM-32</i>	<i>OK</i>	<i>MT</i>	<i>1/12/95</i>
b	Note the temperature in the RTD Table.	<i>100.26 Ω = 34 °F 150.26 Ω = 268 °F 180.26 Ω = 414 °F</i>	<i>MT</i>	<i>1/12/95</i>
d	Note the temperature in the MICON-View and compare with (b).	<i>100 Ω = 36-37 °F 150 Ω = 271-272 °F 180 Ω = 417-418 °F</i>	<i>MT</i>	<i>1/12/95</i>

OK

** OK
1/23/95*

- NA -

MICON QUALITY ASSURANCE MGR.

A. Bell 2/2/95
MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Speck 1-12-95
WESTINGHOUSE HANFORD CO.

** Retest for Exception #6 Resolution*

150 Ω = 274 °F

100 Ω = 34 °F

APPENDIX B.5 **CONTROL INPUT/OUTPUT FUNCTION TEST** **SECTION 4.2.2.4**

WHC-SO-W030-TRP-001, Rev. 0
Attachment 2, p. A2-58

(Tested in Appendix A.1.1-A.1.8)
(All RCMs with control loops)

STEP	CRITERIA	SELECTED OUTPUT			INITIALS	DATE
		5%	50%	95%		
b	The analog input shall follow the analog output in magnitude and direction.	OK	OK	OK	MT	1-17-95
c	Verify Manual Control Operation	OK	OK	OK	MT	1-17-95
d *	Verify Operation of Auto/Man transfer and Local, Remote & Cascade. mt 1/17/95	OK	OK	OK	MT	1-17-95
e	Verify the correct response for Integral & Derivative settings.	OK	OK	OK	MT	1-17-95
f	Verify correct response for Gain/PB settings.	OK	OK	OK	MT	1-17-95

* Verify on RCM-2 using /Oconfig/ma2 case.

— NA —
MICON QUALITY ASSURANCE MGR.
[Signature] 2/2/95
MICON PROJECT MGR.

Harold M. Chapman 1-17-95
WHC QUALITY ASSURANCE/QUALITY CONTROL
M. C. [Signature] 1-17-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.6

DISCRETE INPUT/OUTPUT TEST SECTION 4.2.2.5

(All D + Dr Cards Tested, See Appendix A.1.1-A.1.8)

STEP	CHANNEL	CRITERIA	ACTUAL RESULT	INITIALS	DATE
c	- NA -	Verify: the selected LED's are OFF.	OK	MT	1-17-95
c	- NA -	Verify: Group Display is ON & Dr Module LED turns ON.	OK	MT	1-17-95

- NA -
MICON QUALITY ASSURANCE MGR.
Ad Hill 2/2/95
MICON PROJECT MGR.

Harold M. Chapin 1-17-95
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Deane 1-17-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.7

WHC-SD-W030-TSP-001, Rev. 0
Attachment 2/ p. A2-60

U-32R REDUNDANCY TEST SECTION 4.2.3.1

TEST STEPS	REDUNDANT CONTROLLER LOCATION	CRITERIA	ACTUAL RESULT	INITIAL	DATE
b		Backup Controller will come ON indicating that it is in control.			
c		Deviation should not be noted upon transfer.			
e		The analog output value remains the same as when the backup controller was active.			
f		Transfer will occur and an alarm message will be generated.			
g		The backup controller will come ON indicating that it is in control.			
m		An Alarm will be initiated when communication lines are broken.			

MICON QUALITY ASSURANCE MGR.

WHC QUALITY ASSURANCE/QUALITY CONTROL

MICON PROJECT MGR.

WESTINGHOUSE HANFORD CO.

Replace with new Appendix B.7.

[see next page]

MT
1-17-95

APPENDIX B.7

U-32R REDUNDANCY TEST SECTION 4.2.3

TEST STEP	REDUNDANT U32 LOCATION	CRITERIA	ACTUAL RESULT	INITIAL	DATE
a	LCU-1/U321	DISABLE PRIMARY U32	NA	NA	NA
b		Verify transfer to backup U32 and alarm messages	OK	MT	1/17/95
c		Verify analog output maintained	OK	MT	1/17/95
d		Verify system status on CRT	OK	MT	1/17/95
e		RESTORE PRIMARY U32 AND ACTIVATE	NA	NA	NA
e		Verify analog output maintained after primary activated	OK	MT	1/17/95
f		DISABLE BACKUP U32 AND INTRODUCE FAULT	NA	NA	NA
g		Verify no transfer to backup and outputs freeze	OK	MT	1/17/95
h		Verify system status and alarms on CRT, and deviation of outputs	OK	MT	1/17/95
i		Verify sample configuration from LOI and PV/outputs track	OK	MT	1/17/95
j		RESTORE HARDWARE	NA	NA	NA
k		Verify LOI changes reflected on CRT	OK	MT	1/17/95
l		SIMULATE DATA HIGHWAY FAILURE	NA	NA	NA
m		Verify U32 operation not effected and system status on CRT is okay	OK	MT	1/17/95

-NA-
MICON QUALITY ASSURANCE MGR.

Al Bell 2/2/95
MICON PROJECT MGR.

Harold M. Chapman 1-17-95
WHC QUALITY ASSURANCE/QC

M.C. Gault 1-17-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.7

U-32R REDUNDANCY TEST SECTION 4.2.3

TEST STEP	REDUNDANT U32 LOCATION	CRITERIA	ACTUAL RESULT	INITIAL	DATE
a	LCU-2/U32-1D	DISABLE PRIMARY U32	NA	NA	NA
b		Verify transfer to backup U32 and alarm messages	OK	MT	1/17/95
c		Verify analog output maintained	OK	MT	1/17/95
d		Verify system status on CRT	OK	MT	1/17/95
e		RESTORE PRIMARY U32 AND ACTIVATE	NA	NA	NA
e		Verify analog output maintained after primary activated	OK	MT	1/17/95
f		DISABLE BACKUP U32 AND INTRODUCE FAULT.	NA	NA	NA
g		Verify no transfer to backup and outputs freeze	OK	MT	1/17/95
h		Verify system status and alarms on CRT, and deviation of outputs	OK	MT	1/17/95
i		Verify sample configuration from LOI and PV/outputs track	OK	MT	1/17/95
j		RESTORE HARDWARE	NA	NA	NA
k		Verify LOI changes reflected on CRT	OK	MT	1/17/95
l		SIMULATE DATA HIGHWAY FAILURE	NA	NA	NA
m		Verify U32 operation not effected and system status on CRT is okay	OK	MT	1/17/95

TEST
EXCEPT,
#6
Fixed
1-23-9

-NA-

MICON QUALITY ASSURANCE MGR.

Al RLL 2/2/95
MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

M.C. Skits 1-23-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.7

U-32R REDUNDANCY TEST SECTION 4.2.3

TEST STEP	REDUNDANT U32 LOCATION	CRITERIA	ACTUAL RESULT	INITIAL	DATE
a	LCU-3/1132-19	DISABLE PRIMARY U32	NA	NA	NA
b		Verify transfer to backup U32 and alarm messages	OK	MT	1/17/95
c		Verify analog output maintained	OK	MT	1/17/95
d		Verify system status on CRT	OK	MT	1/17/95
e		RESTORE PRIMARY U32 AND ACTIVATE	NA	NA	NA
e		Verify analog output maintained after primary activated	OK	MT	1/17/95
f		DISABLE BACKUP U32 AND INTRODUCE FAULT	NA	NA	NA
g		Verify no transfer to backup and outputs freeze	OK	MT	1/17/95
h		Verify system status and alarms on CRT, and deviation of outputs	OK	MT	1/17/95
i		Verify sample configuration from LOI and PV/outputs track	OK	MT	1/17/95
j		RESTORE HARDWARE	NA	NA	NA
k		Verify LOI changes reflected on CRT	OK	MT	1/17/95
l		SIMULATE DATA HIGHWAY FAILURE	NA	NA	NA
m		Verify U32 operation not effected and system status on CRT is okay	OK	MT	1/17/95

TEST
EXCEPTION
#6
Fixed
1-23-95

-NA-
MICON QUALITY ASSURANCE MGR.
AC Kel 2/2/95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QC
M.C. Smith 1-23-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.7

U-32R REDUNDANCY TEST SECTION 4.2.3

TEST STEP	REDUNDANT U32 LOCATION	CRITERIA	ACTUAL RESULT	INITIAL	DATE
a	LCU-4/U32-30	DISABLE PRIMARY U32	NA	NA	NA
b		Verify transfer to backup U32 and alarm messages	OK	MT	1/17/95
c		Verify analog output maintained	OK	MT	1/17/95
d		Verify system status on CRT	OK	MT	1/17/95
e		RESTORE PRIMARY U32 AND ACTIVATE	NA	NA	NA
e		Verify analog output maintained after primary activated	OK	MT	1/17/95
f		DISABLE BACKUP U32 AND INTRODUCE FAULT	NA	NA	NA
g		Verify no transfer to backup and outputs freeze	OK	MT	1/17/95
h		Verify system status and alarms on CRT, and deviation of outputs	OK	MT	1/17/95
i		Verify sample configuration from LOI and PV/outputs track	OK	MT	1/17/95
j		RESTORE HARDWARE	NA	NA	NA
k		Verify LOI changes reflected on CRT	OK	MT	1/17/95
l		SIMULATE DATA HIGHWAY FAILURE	NA	NA	NA
m		Verify U32 operation not effected and system status on CRT is okay	OK	MT	1/17/95

TEST EXCEPTION #6
Fixed 1-23-95

-NA-
MICON QUALITY ASSURANCE MGR.
Al P. [Signature] 2/2/95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QC
M.C. [Signature] 1-23-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.8

WHC-SD-W030-TRP-001, Rev. C
Attachment 2, p. A2-65

FIELD-BUS COMMUNICATIONS SECTION 4.2.4

STEP	CRITERIA	ACTUAL RESULT	INITIALS	DATE
b	Equation shall be correctly solved			
c	Equation shall be correctly solved			
d	Verify that the Pressure goes to zero.			
e	Verify transfer to backup GPLI and failure alarm of Primary.			
f	Verify redundant power supply can support GPLI.			

Replace with
new Appendix B.8

MT 1/18/95
[see next page]

MICON QUALITY ASSURANCE MGR.

WHC QUALITY ASSURANCE/QUALITY CONTROL

MICON PROJECT MGR.

WESTINGHOUSE HANFORD CO.

APPENDIX B.8

FIELD BUS COMMUNICATIONS SECTION 4.2.4

ENGINEERING WORK STATION & GPLIs:

STEP	CRITERIA	RESULT	INITIAL	DATE
a	INSERT SAMPLE CONFIGURATION IN RCM 2 AND 3.	NA	NA	NA
b	Equation correctly solved	OK	MT	1/18/95
c	Equation correctly solved	OK	MT	1/18/95
d	Remove RCM 3 and verify the calculated pressure does not change	OK	MT	1/18/95
e	Verify transfer to backup GPLI and failure alarm of primary	OK	MT	3/17/95
f	Verify redundant power supply can support GPLIs	OK	MT	1/18/95

TEST
EXCEPTIO
#7

Passed
Re-test

- NA -
MICON QUALITY ASSURANCE MGR.
[Signature] 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QC
M.C. [Signature] 1-18-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.8

FIELD BUS COMMUNICATIONS SECTION 4.2.4

HORSESHOE CONSOLE OCSs & GPLI:

STEP	CRITERIA	RESULT	INITIAL	DATE
a	INSERT SAMPLE CONFIGURATION IN RCM 2 AND 3.	NA	NA	NA
b	Equation correctly solved	NA (1)	NA (1)	NA (1)
c	Equation correctly solved	NA (1)	NA (1)	NA (1)
d	Remove RCM 3 and verify the calculated pressure does not change	NA (1)	NA (1)	NA (1)
e	Verify transfer to backup GPLI and failure alarm of primary	OK	MT	3/1/95
f	Verify redundant power supply can support GPLIs	OK MT	MT 1/19/95	1/19/95

TEST
EXCEPTION
#7

Passed
Retest

Note: (1) Field Bus tested on page 47-a.

- NA -
MICON QUALITY ASSURANCE MGR.
[Signature] 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QC
M.C. [Signature] 1-19-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.9

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-68

U-32R CONTROLLER POWER SUPPLY TEST SECTION 4.2.5

TEST STEPS	CRITERIA	LCU NO.				PRIMARY/ SECONDARY	INITIALS	DATE
		1	2	3	4			
a	The display on the CRT's and indicating lights on the U-32 controller will remain the same as before when the primary power supply was providing power.	OK	OK	OK	OK	OK / OK	MT	1-19-95
b	Power-on light is illuminated.	OK	OK	OK	OK	OK / OK	MT	1-19-95
c	Primary power supply has taken control.	OK	OK	OK	OK	OK / OK	MT	1-19-95
d c	The operation will be indicated by an alarm if the primary or secondary power supply has failed.	NA	NA					

MT 1-19-95

- NA -

MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

WESTINGHOUSE HANFORD CO.

APPENDIX B.10

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-69

CONSOLE TEST SECTION 4.2.6

TEST STEPS	CRITERIA	ACTUAL RESULT	INITIAL	DATE
d	The remaining system operation should not be affected.			
e	The remaining system operation should not be affected.			
f	The number of bytes should be the same.			
g	There is no disruption on the systems operation as monitored by the Trend Display.			
h	The communication alarm message will be generated.			
i	Verify the archiving of Historical Trending & Configuration Data			
j	Verify the reloading of the Archive File			
k	Verify the security definition of the system			

MICON QUALITY ASSURANCE MGR.

WHC QUALITY ASSURANCE/QUALITY CONTROL

MICON PROJECT MGR.

WESTINGHOUSE HANFORD CO.

Replace with new Appendix B.10

MT 1/19/95

[see next page]

APPENDIX B.10

CONSOLE TEST SECTION 4.2.6

STEP	CRITERIA	RESULT	INITIAL	DATE
b-c	Verify download and upload	OK	MT	1/19/95
d	Turn off UPS. Verify the remaining system operation is not affected.	OK	MT	1/19/95
e	Wait 20 minutes then turn on UPS. Verify the remaining system operation is not affected.	OK	MT	1/19/95
f	Restore display config from disk and verify against original file (bytes should be the same).	OK	MT	1/19/95
g	FOR BOTH [*] GPLI PAIRS: Disconnect GPLI primary input from TBI. Disconnect primary LAN from GPLI. Verify no disruption of system operation as monitored by trend display and/or other display.	OK	MT	1/19/95
h	Verify system status and alarm messages are correct.	OK	MT	1/19/95
i	Verify archiving of historical, trend, and configuration data.	OK OK	MT MT	3/31/95 1/19/95
j	Verify reloading of archive file.	OK	MT	3/31/95
k	Verify all security definitions of the system.	OK	MT	3/17/95

EXCEPTION
#27

EXCEPTION
#27

TEST
EXCEPTION
#8

Passed
Retest

* HORSESHOE & EWS.

- NA -

MICON QUALITY ASSURANCE MGR.

[Signature] 2/2/95
MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QC

M.C. Felt 1-19-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.10 ATTACHMENT
SECTION 4.2.6

APPENDIX B.11

WHC-SO-W030-TRF-001, Rev. 0
Attachment 2, p. A2-72

SYSTEM TEST SECTION 4.2.7

STEP	CRITERIA	ACTUAL RESULT	INITIAL	DATE
c	All loops are in manual mode.	OK	MT	1/20/95
d *	Alarms and Setpoints are initialized. * add below	OK	MT	1/20/95
e	Analog Input values are zero.			
g	All digital input values are 1.	OK	MT	1/20/95
i	Bargraph is at a maximum low deviation. L1 deviation alarm is present. Alarm valve is negative and at same magnitude as set point.	OK	MT	1/20/95
n	Digital output #1 group display is 1-OFF. Digital output is 1-ON.	OK	MT	1/20/95
1	Alarm Functions	OK	MT	1/20/95
2	Alarm Priorities	OK	MT	1/20/95
3	Alarm Color	OK	MT	1/20/95
④	Annunciator Window			
5	Printer Functions	OK Passed Retest	MT	3/17/95
6	I/O Operation	SEE APPENDIX G	-NA-	-NA-
7	16 Character Tags	OK	MT	1/20/95
d *	PV and outputs are zero			
d *	PID output and fnc #55 output is zero			

★ TEST EXCEPTION #9. ④ TEST EXCEPTION 10, AND 13
③ TEST EXCEPTIONS 1 & 2.

-NA-
MICON QUALITY ASSURANCE MGR.
AD Rell 2/2/95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Jett 1-23-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.12

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-73

LCU REDUNDANCY TEST SECTION 4.2.9

STEP	CRITERIA	ACTUAL RESULT	INITIALS	DATE
1	Primary LCU cabinet becomes active upon power application to LCU1 & 2 simultaneously.	OK	MT	1/25/95
2	Standby LCU becomes active when hardware and/or software failure is simulated in one active LCU.	OK	MT	1/25/95
3	Replace RCM controller in the LCU and verify on CRT that it is ready.	OK	MT	1/25/95
4	Activate standby LCU cabinet from the A/S View console.	OK	MT	1/25/95
5	Test for the following fault condition (refer to Figure 1, Sec. 5.2.10).	/	/	/
	a. Wire A Open Test Light in LCU-1 is OFF and test light in LCU is ON.	OK	MT	1/25/95
	b. Wire B Open LCU-1 Cabinet sends a backup failed alarm.	OK	MT	1/25/95
MT 1/25/95	c. Wires A and B open simultaneously Test Light in the LCU-1 is ON and Test Light in LCU-2 is OFF.	NA	NA	NA
	d. Wire A shorted to earth ground Test Light in LCU-1 is ON and Test Light in LCU-2 is OFF. Remove short from Wire A.	OK	MT	1/25/95

APPENDIX B.12

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-74

Continued
LCU REDUNDANCY TEST
SECTION 4.2.9

STEP	CRITERIA	ACTUAL RESULT	INITIALS	DATE
	<p>e. Wire B shorted to earth ground.</p> <p>Test Light in LCU-1 is OFF and Test Light in LCU-2 is ON.</p> <p>Remove short from Wire B.</p>	OK	MT	1/25/95
<p>MT 1/25/95</p>	<p>f. Wires A and B shorted to earth ground.</p> <p>Test Light in LCU-1 is ON and Test Light in LCU-2 is OFF.</p>	NA	NA	NA

- NA -
MICON QUALITY ASSURANCE MGR.
Al Rile 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Spets 1-26-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. 1
Attachment 2, p. A2-75

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
0	END	OK	MT	1/26/95
6	VD (His Def, Status, color, modify) Fac level, Passwd, Syn scan not sup.	OK (Note 1)	MT	1/26/95
7	DI (His Def, Status, color, invert)	OK	MT	1/26/95
9	MUD (MDI) (DI, DO, VD, IS Tags)	EXCEPTION # 19		
10	LET	OK	MT	1/26/95
11	CONFIG AI	OK (Notes 3, 5, 6)	MT	1/26/95
12	TCOMP (T > Ref → Lower PV) (T < Ref → Larger PV)	OK	MT	1/26/95
13	PCOMP (P > Ref → Larger PV) (P < Ref → Lower PV)	OK	MT	1/26/95

- NA -

MICON QUALITY ASSURANCE MGR.

Not available - F#H

MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

Resolved by Negotiated Settlement
J. F. Rhee 5/6/96

WESTINGHOUSE HANFORD CO.

See also Note 9 for Loop deletions.

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-76

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
14	INPUT SWITCHES Use A if $LO < A < HI$ Use B if $A < LO$, or $A > HI$	OK	MT	1/27/95
16	Convert Analog To Boolean at Some Level	OK	MT	1/27/95
17	CONSTRAINT Ramps up/down at prescribed rate within Loop setpoint Limits	EXCEPTION #14		
18	PID BATCH Adaptive PID functions	OK (Note 8)	MT	1/27/95
20	Reverse/ Direct, Tracking - Non Balancing - Balancing, SP Ramping	EXCEPTION #9		
21	PIDRB	EXCEPTION #15		
22	PID RATIO/AUTO BIAS (NOT AUTO RATIO!)	OK (Note 10)	MT	1/27/95
23	PID AUTO RATIO/BIAS (NOT AUTO BIAS!)	OK (Note 10)	MT	1/27/95

-NA-

MICON QUALITY ASSURANCE MGR.

Not available *ZZH*

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

Resolved by Negotiated Settlement
R. F. Hill 5/6/96

WESTINGHOUSE HANFORD CO.

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-77

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
24	PID CASCADE	OK	MT	1/27/95
25	PID GAP (Eng Limits)	OK (Note 11)	MT	1/27/95
26	INSERT PID PARAMETERS (a) SP-RATIO-BIAS (b) PROP-INT-DERIV	EXCEPTION #16		
27	LOAD PID TERM'S VALUE Gain, Reset, Rate, SP, Ratio, Bias, Scan	EXCEPTION #17		
28	MANUAL STATION	NA (New FNC - No Documentation)	NA	NA
30	MULTIPLY	OK	MT	1/30/95
31	DIVIDE	OK	MT	1/30/95
32	ADD	OK	MT	1/30/95

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available L&H

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

Resolved by Negotiated Settlement
L & H 5/6/96

WESTINGHOUSE HANFORD CO.

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-78

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
33	SUBTRACT	OK	MT	1/30/95
34	EXTRACT SQRT + documentation	EXCEPTION #18		
35	CALCULATOR (Exp, *, /, +, -, SQRT)	OK	MT	1/30/95
36	ABSOLUTE VALUE	EXCEPTION #18		
37	LOG (Natural, Base 10)	OK	MT	1/30/95
38	Exponential (e^x)	EXCEPTION #18		
39	Polynomial (complex)	OK	MT	1/30/95
40	Hold (NOTE 12) (Note 12) NA	NA	NA	NA

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available *2/2/96*

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

Resolved by Negotiated Settlement
2/2/96

WESTINGHOUSE HANFORD CO.

MICON PROJECT MGR.

MICON QUALITY ASSURANCE MGR.

- NA -

Not Available

WESTINGHOUSE HANFORD CO.

WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -

Resolved by Negotiated Settlement
A. J. Smith 5/1/96

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
42	Hold (Note 12) N/A	N/A	N/A	N/A
44	Hold (Note 12) N/A	N/A	N/A	N/A
45	Hold (Note 12) ARRAY	OK	MT	2/2/95
46	MSV CHANGE BASED ON DISCRETE	OK	MT	1/30/95
47	MSV CHANGE BASED ON ANALOG	OK	MT	1/30/95
48	MINIMUM SECTOR	EXCEPTION #18. (Note 13)		
49	MEDIAN HI/LO SELECT PV > HI, - was HI; PV < LO, - was LO; HI-BIAS, LOT BIAS	OK (Note 14)	MT	1/30/95
50	LEAD/LAG	OK	MT	1/30/95

MICON PROGRAMMABLE FUNCTION TEST
SECTION 42.10

APPENDIX B.13

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-80

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
51	DEAD TIME	OK	MT	1/30/95
52	RATE/VELOCITY LIMIT	OK	MT	1/30/95
53	TOTALIZER	OK (Note 15)	MT	1/30/95
55	ANALOG OUTPUT	OK (Note 7)	MT	1/26/95
57	DISCRETE OUTPUT	OK	MT	1/30/95
58	PULSER (PLSR) or FREQUENCY OUTPUT (FO) FOR HW PT #32	OK	MT	1/30/95
60	GOTO BASED ON AI COMPARISON	OK	MT	1/30/95
62	Command, Normal/Off Normal Condition, GOTO Label (TARGET)	OK (Note 2)	MT	1/26/95

-NA-

MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

Al P. [Signature] 5/2/95

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

WESTINGHOUSE HANFORD CO.

M.C. [Signature] 1-30-95

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. D
Attachment 2, p. A2-81

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
64	UNCONDITIONAL GOTO (JUMP)	EXCEPTION #18		
65	GOTO BASED ON LOOP MODE (Manual, Auto, M+A, Csc, M+C, A+C, M+A+C)	OK	MT	1/31/95
66	DISCRETE STATUS CHANGE BASED ON LOOP MODE USED W/FNL 87	OK	MT	1/31/95
67	STROBE Pulse DI, DO base on VD	OK (Note 20)	MT	1/31/95
68	VALVE CONTROL ON/OFF	OK	MT	1/31/95
69	LOGIC CALCULATOR	EXCEPTION #20		
70	AND 4-input	OK	MT	1/31/95
71	OR 4-input	OK	MT	1/31/95

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available *[Signature]*

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

Resolved by Negotiated Settlement
[Signature] 5/6/96

WESTINGHOUSE HANFORD CO.

APPENDIX B.13

WHC-SD-WD3D-TRP-001, Rev. 0
Attachment 2, p. A2-82

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
72	INVERT	OK	MT	1/31/95
73	LATCH (lat, unlatch, powerup-reset, both set)	OK (Note 17)	MT	1/31/95
74	TIME DELAY (Input, reset, transition, delay)	OK (Note 18)	MT	1/31/95
75	DISCRETE STATUS CTRL (input - invert - contin- momentary - output - MSV)	OK (Note 4)	MT	1/27/95
76	VD ACCESS	OK (Note 19)	MT	2/1/95
77	EVENT COUNTER	OK (Note 21)	MT	2/1/95
78	MOTOR CONTROL	OK	MT	2/1/95
79	RESET VD - w/ TD (F74) - using Time w/o Condition	OK (Note 22)	MT	2/1/95

-NA-

MICON QUALITY ASSURANCE MGR.

Al Piller 2/2/95
MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Jett 2-1-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. C
Attachment 2, p. A2-83

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
80	DISCRETE STATUS BASED ON MSV	EXCEPTION #18		
86	MODE SELECT INTERLOCK	EXCEPTION #21		
87	LOOP MODE CHANGE BASED ON DISCRETE STATUS CHANGE	OK	MT	1/31/95
89	LOOK UP TABLE	OK	MT	2/3/95
90	ALARM MGT (XM, PV, Group, Suppress, Clear, ACK, Auto Ack)	EXCEPTION #22 (Note 23)		
95	STOPWATCH	OK (Note 24)	MT	2/1/95
99	INOPERABLE STEP IS TARGET OF GOTO FNC (ie: #62)	OK (Note 2)	MT	1/26/95
100	AVERAGE	OK	MT	2/1/95

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available - *SAH*

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

Resolved by Negotiated Settlement

L. F. Zille 5/6/96

WESTINGHOUSE HANFORD CO.

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. C
Attachment 2, p. A2-B4

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
101	WATCH DOG KEEP ALIVE	EXCEPTION #23		
102	CLOCK RCM (GMT)	OK	MT	2/1/95
103	IF ANALOG, THEN... ELSE	OK EXCEPTION #20	MT	2/1/95
104	IF DISCRETE, THEN... ELSE	EXCEPTION #24, 20		
105	ZERO LIMIT	OK (Note 25)	MT	2/1/95
106	EXTEND PULSE	EXCEPTION #25		
107	MAX	EXCEPTION #18		
108	MEAN VALUE	EXCEPTION #18		

- NA -

MICON QUALITY ASSURANCE MGR.

Not Available *[Signature]*

MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

Resolved by Negotiated Settlement
[Signature] 2/24/95 5/6/96

WESTINGHOUSE HANFORD CO.

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-85

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
109	MEDIAN	EXCEPTION #18		
110	RATE OF CHANGE	OK	MT	2/2/95
111	DEADBAND	OK	MT	2/2/95
112	DELAY PULSE	EXCEPTION #26		
113	SELECT	OK (Note 26)	MT	2/2/95
114	FILTER (Used $G = .85$ reset = 80% to make unstable)			
115	CUTOFF	OK	MT	2/2/95
116	MOVING AVERAGE (w/ARRAY)	OK (Note 27)	MT	2/2/95

- NA -

MICON QUALITY ASSURANCE MGR.

Not Available *PSH*

MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

Resolved by Negotiated Settlement
L. F. Hill 5/6/96

WESTINGHOUSE HANFORD CO.

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-86

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
117	A-I THERMOCOUPLE	NA (No T/C on W-30) (Note 29)	NA	NA

-NA-

MICON QUALITY ASSURANCE MGR.

Al Piller 2/2/95
MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Deats 2-2-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-87

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
	NA			

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
MICON PROJECT MGR.

- NA -
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-88

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
	NA			

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

WHC-SO-W030-TRP-001, Rev.
Attachment 2, p. A2-89

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
	NA			

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
MICON PROJECT MGR.

- NA -
WESTINGHOUSE HANFORD CO.

APPENDIX C

WHC-SD-W030-TRP-001, Rev. 0
Attachment 2, p. A2-90

SPECIFICATION CROSSREFERENCE LIST

ITEM	MICON SAT PROCEDURE	WHC SPECIFICATION WHC-S-4013
1	2.2	3.1.8
2	2.3	3.1.6
3	3.2	3.1.1
4	4.2.2	3.2.2.1 through 3.2.2.3
5	4.2.5.1	3.2.4.2
6	4.2.5.2	3.2.4.3 and 3.2.4.7
7	4.2.6	3.2.4.1 and 3.2.5.1
8	4.2.6f	3.2.6.4 through 3.2.6.6, 3.2.7.3 through 3.2.7.5 and 3.2.8 through 3.2.13
9	4.2.7	3.2.5.1
10	4.2.9	3.2.2.1
11	4.2.9	ECN153033

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
MICON PROJECT MGR.

- NA -
WESTINGHOUSE HANFORD CO.

THIS LIST DOES NOT GUARANTEE THAT ALL
SPECIFICATION REQUIREMENTS FOUND IN THE ABOVE
REFERENCED SPECIFICATION SECTIONS (AND
UNREFERENCED SECTIONS) ARE MET.

APPENDIX D

Test Exceptions

(This section has been moved to the front of this attachment.)

APPENDIX E

WHC-SD-W030-TRP-001, Rev. 1
Attachment 2, p. A2-92

MICON LOCAL OPERATOR INTERFACE (LOI) FUNCTION TEST SECTION 4.2.8

STEP NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
1	LOI Connected to U32R	OK	MT	1/23/95
2	Disconnect Token Buss	OK	MT	1/23/95
3	Turn on Power at CB-3	OK	MT	1/23/95
4	Verify Operation (it runs) See APPENDIX H- DETAILS	OK	MT	1/23/95
5	Verify 16 Character Tag	OK	MT	1/23/95
6	Verify Password	OK	MT	1/23/95
7	Verify Alarm Acknowledge Prohibit	OK	MT	1/23/95
General	See Appendix H	- NA -	- NA -	- NA -

- NA -

MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

WESTINGHOUSE HANFORD CO.

APPENDIX F

WHC-SD-W030-TRP-001, Rev. 1
Attachment 2, p. A2-93

MICON CONFIGURATION UTILITIES TEST

UTILITY NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
1	Controller Configuration	See Appendix E, Exceptions 14-26. (See Note 3D)		
2	Graphics Package	EXCEPTION # 28 OK	MT	3/2/95 *
3	Group Configure	OK	MT	2/2/95
4	Download of Files	OK	MT	2/2/95
5	Historian Configure	OK	MT	2/2/95
6	GPLI & Controller Definition	OK	MT	2/2/95
7	Lan Manager for GPLI & U32	OK	MT	2/2/95
8	System Administration	EXCEPTION #8 OK	MT	3/2/95 *

* Passed Retest

- NA -

MICON QUALITY ASSURANCE MGR.

Not Available *LSH*

MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL
Resolved by Negotiated Settlement

R. J. Hill 5/6/96

WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON 11 OCS:

KEY	RESULT	INITIAL	DATE
ANNUNCIATOR *	OK	MT	1/20/95
NODE STATUS	OK	MT	1/20/95
URG ALARM *	OK passed retest	LEH	6/26/95
ALARM SUMM	OK	MT	1/20/95
PAGE DOWN	OK		
PAGE UP	OK		
DETAIL * (LOOP SEL/PER)	OK		
GROUP OVER (2x) *, ENTER)	OK		
HIST (#, enter) *	OK		
GEN TREND (#, enter) *	OK		
GEN GRAPH (#, enter) *	OK	↓	↓
Arrow Keys:			
UP-LEFT	OK	MT	1/20/95
UP-RIGHT	OK		
DOWN-LEFT	OK		
DOWN-RIGHT	OK		
UP	OK		
DOWN	OK		
LEFT	OK		
RIGHT	OK	↓	↓
HOME * (Unused)	-NA-	-NA-	-NA-

EXCEPTIONS
#11

-NA-
MICON QUALITY ASSURANCE MGR.

[Signature]
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QC

M.C. [Signature]
WESTINGHOUSE HANFORD CO.

APPENDIX G

I/O KEYBOARD FUNCTIONS

Micon 11 - Cont:

KEY	RESULT	INITIAL	DATE
Group Display Select:			
1	OK	MT	1/20/95
2			
3			
4			
5 *			
6 *			
7 *			
8 *			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20	↓	↓	↓

-NA-

MICON QUALITY ASSURANCE MGR.

[Signature] 2/2/95

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

[Signature] 1-20-95

WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

Micon 11 - Cont:

KEY	RESULT	INITIAL	DATE
21	OK	MT	1/20/95
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
Function Keys:			
1	OK	MT	1/20/95
2			
3			
4			
5			

-NA-

MICON QUALITY ASSURANCE MGR.

Al Pade 2/2/95

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

M. C. Davis 1-20-95

WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON 11 - Cont:

KEY	RESULT	INITIAL	DATE
6	OK	MT	1/20/95
7	↓	↓	↓
8			
MAN (enter)			
AUTO (enter)			
CAS (enter)			
SET POINT (enter 2x)			
VALVE (output)	↓	↓	↓
Micon Control:			
DISCR OFF	OK	MT	1/20/95
DISCR ON	OK	↓	↓
RATIO (# enter enter)	OK	↓	↓
BIAS (# enter enter)	OK	↓	↓
GROUP-NUMERIC-ENTER	OK	↓	↓
GROUP-CLEAR	OK	↓	↓
SILENCE	OK	↓	↓
ACKNOWLEDGE	OK	MT	1/20/95
VIDEO PRINT	OK	MT	3/21/95
CONF KEYB + USER CONF.	OK	MT	1/20/95

EXCEPTION
#12

Passed
Retest

-NA-

MICON QUALITY ASSURANCE MGR.

Al Piller 2/2/95
MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

MC Dents 1-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON 2 OCS:

KEY	RESULT	INITIAL	DATE
ANNUNCIATOR *			
NODE STATUS	OK	MT	1/23/95
URG ALARM *	OK - Passed retest	LZH	6/26/95
ALARM SUMM	OK	MT	1/23/95
PAGE DOWN	OK		
PAGE UP	OK		
DETAIL * (Loop Sel/Def)	OK		
GROUP OVER (2x) * enter	OK		
HIST (#, enter) *	OK		
GEN TREND (#, enter) *	OK		
GEN GRAPH (#, enter) *	OK		
Arrow Keys:			
UP-LEFT	OK	MT	1/23/95
UP-RIGHT	OK		
DOWN-LEFT	OK		
DOWN-RIGHT	OK		
UP	OK		
DOWN	OK		
LEFT	OK		
RIGHT	OK		
HOME * (Unused)	- NA -	- NA -	- NA -

EXCEPTION
13

EXCEPTION
11

- NA -
MICON QUALITY ASSURANCE MGR.

Al [Signature] 2/2/95
MICON PROJECT MGR.

Harold M. Chapin 1-23-95
WHC QUALITY ASSURANCE/QC

M.C. [Signature] 1-23-95
WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON2:

KEY	RESULT	INITIAL	DATE
Group Display Select:			
1	OK	MT	1/23/95
2			
3			
4			
5 *			
6 *			
7 *			
8 *			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

-NA-

MICON QUALITY ASSURANCE MGR.

Al Piel 2/2/95
MICON PROJECT MGR.

Harold M. Phelan 1-23-95
WHC QUALITY ASSURANCE/QC

M.C. Reut 1-23-95
WESTINGHOUSE HANFORD CO.

APPENDIX G

I/O KEYBOARD FUNCTIONS

MICON 2:

KEY	RESULT	INITIAL	DATE
21	OK	MT	1/23/95
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
Function Keys:			
1	OK	MT	1/23/95
2			
3			
4			
5			

- NA -

MICON QUALITY ASSURANCE MGR.

[Signature] 2/2/95

MICON PROJECT MGR.

[Signature] 1-23-95

WHC QUALITY ASSURANCE/QC

[Signature] 1-23-95

WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON 2:

KEY	RESULT	INITIAL	DATE
6	OK	MT	1/23/95
7	OK		
8	OK		
MAN (enter)	OK		
AUTO (enter)	OK		
CAS (enter)	OK -		
SET POINT (enter 2x)	OK		
VALVE (output)	OK		
Micon Control:			
DISCR OFF	OK	MT	1/23/95
DISCR ON	OK		
RATIO (# enter enter)	OK		
BIAS (# enter enter)	OK		
GROUP-NUMERIC-ENTER	OK		
GROUP-CLEAR	OK		
SILENCE	OK		
ACKNOWLEDGE	OK	MT	1/23/95
VIDEO PRINT	OK	MT	3/21/95
CONF KEYB + USER CONF.	OK	MT	1/23/95

EXCEPTION
#12

Passed
Retest

-NA-

MICON QUALITY ASSURANCE MGR.

Al Pithwa 2/2/95
MICON PROJECT MGR.

Frank M. Chalmers 1-23-95
WHC QUALITY ASSURANCE/QC

M.C. Deats 1-23-95
WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON IZ OCS:

KEY	RESULT	INITIAL	DATE
ANNUNCIATOR *	OK	MT	1/23/95
NODE STATUS	OK	MT	1/23/95
URG ALARM *	OK - passed test	LGH	6/26/95
ALARM SUMM	OK	MT	1/23/95
PAGE DOWN	OK		
PAGE UP	OK		
DETAIL * (LOOSEL / DET)	OK		
GROUP OVER (2x) #, enter	OK		
HIST (#, enter) *	OK		
GEN TREND (#, enter) *	OK		
GEN GRAPH (#, enter) *	OK	↓	↓
Arrow Keys:			
UP-LEFT	OK	MT	1/23/95
UP-RIGHT	OK		
DOWN-LEFT	OK		
DOWN-RIGHT	OK		
UP	OK		
DOWN	OK		
LEFT	OK		
RIGHT	OK	↓	↓
HOME * (Unused)	- NA -	- NA -	- NA -

EXCEPTIONS
11

MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

WHC QUALITY ASSURANCE/QC

WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON 12:

KEY	RESULT	INITIAL	DATE
Group Display Select:			
1	OK	mt	1/23/95
2	OK		
3	OK		
4	OK		
5 *	OK -		
6 *	OK		
7 *	OK		
8 *	OK		
9	OK		
10	OK		
11	OK		
12	OK		
13	OK		
14	OK		
15	OK		
16	OK		
17	OK		
18	OK		
19	OK		
20	OK	↓	↓

-NA-

MICON QUALITY ASSURANCE MGR.

[Signature] 2/2/95

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

[Signature] 1-24-95

WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON 12 :

KEY	RESULT	INITIAL	DATE
21	OK	MT	1/24/95
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
Function Keys:			
1	OK	MT	1/24/95
2			
3			
4			
5			

- NA -

MICON QUALITY ASSURANCE MGR.

[Signature] 2/2/95

MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QC

M.C. Reuts 1-24-95

WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON12:

KEY	RESULT	INITIAL	DATE
6	OK	MT	1/24/95
7	OK		
8	OK		
MAN (enter)	OK		
AUTO (enter)	OK		
CAS (enter)	OK -		
SET POINT (enter 2x)	OK		
VALVE (output)	OK		
Micon Control:			
DISCR OFF	OK	MT	1/24/95
DISCR ON	OK		
RATIO	OK		
BIAS	OK		
GROUP-NUMERIC-ENTER	OK		
GROUP-CLEAR	OK		
SILENCE	OK		
ACKNOWLEDGE	OK		
VIDEO PRINT	OK	MT	3/21/95
CONF KEYB + USER CONF.	OK	MT	1/24/95

EXCEPTION
#12

Passed
Retest

- NA -

MICON QUALITY ASSURANCE MGR.

[Signature] 2/2/95

MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QC

M.C. Dents 1-24-95

WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON 14 OCS:

KEY	RESULT	INITIAL	DATE
ANNUNCIATOR *			
NODE STATUS	OK	MT	1/23/95
URG ALARM *	OK - passed retest	MT	6/26/95
ALARM SUMM	OK	MT	1/23/95
PAGE DOWN	OK		
PAGE UP	OK		
DETAIL (LAP SEL/DET)	OK		
GROUP OVER (2x) (#enter)	OK		
HIST (#, enter) *	OK		
GEN TREND (#, enter) *	OK		
GEN GRAPH (#, enter) *	OK		
Arrow Keys:			
UP-LEFT	OK	MT	1/23/95
UP-RIGHT	OK		
DOWN-LEFT	OK		
DOWN-RIGHT	OK		
UP	OK		
DOWN	OK		
LEFT	OK		
RIGHT	OK		
HOME* (Unused)	- NA -	- NA -	- NA -

EXCEPTOR
#13

EXCEPTOR
#11

- NA -

MICON QUALITY ASSURANCE MGR.

Al Pelt 2/2/95

MICON PROJECT MGR.

Hank M. Chafin 1-23-95

WHC QUALITY ASSURANCE/QC

M.C. Gents 1-23-95

WESTINGHOUSE HANFORD CO.

APPENDIX G

I/O KEYBOARD FUNCTIONS

MICON 14:

KEY	RESULT	INITIAL	DATE
Group Display Select:			
1	OK	MT	1/23/95
2			
3			
4			
5 *			
6 *			
7 *			
8 *			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

-NA-

MICON QUALITY ASSURANCE MGR.
Al P. [Signature] 2/2/95
MICON PROJECT MGR.

Hank M. Chafin 1-23-95
WHC QUALITY ASSURANCE/QC

MC [Signature] 1-23-95
WESTINGHOUSE HANFORD CO.

APPENDIX G

I/O KEYBOARD FUNCTIONS

MICON 14:

KEY	RESULT	INITIAL	DATE
21	OK	MT	1/23/95
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
Function Keys:			
1	OK	MT	1/23/95
2			
3			
4			
5			

- NA -

MICON QUALITY ASSURANCE MGR.

[Signature] 2/2/95

MICON PROJECT MGR.

[Signature] 1-23-95

WHC QUALITY ASSURANCE/QC

[Signature] 1-23-95

WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

micon 14:

KEY	RESULT	INITIAL	DATE
6	OK	MT	1/23/95
7	OK		
8	OK		
MAN (enter)	OK		
AUTO (enter)	OK		
CAS (enter)	OK-		
SET POINT (enter 2x)	OK		
VALVE (output)	OK		
Micon Control:			
DISCR OFF	OK	MT	1/23/95
DISCR ON	OK		
RATIO (# enter enter)	OK		
BIAS (# enter enter)	OK		
GROUP-NUMERIC-ENTER *	OK		
GROUP-CLEAR	OK		
SILENCE	OK		
ACKNOWLEDGE	OK		
VIDEO PRINT	OK	MT	3/21/95
CONF KEYB + USER CONF.	OK	MT	1/23/95

EXCEPTION
12

*Passed
Retest*

- NA -

MICON QUALITY ASSURANCE MGR.

Hank M. Chapin 1-23-95
WHC QUALITY ASSURANCE/QC

M. C. Deets 3/2/95
MICON PROJECT MGR.

M. C. Deets 1-23-95
WESTINGHOUSE HANFORD CO.

* Must Make Sure that if use trackball to view group selections that put cursor back into desired window.

APPENDIX H

LOI FUNCTIONS

BUTTON	RESULT	INITIAL	DATE
Main (8 tag) Display:			
CNTRL	OK	MT	1/23/95
LST-DP	OK	↓	↓
STL	OK NA -	- NA -	- NA -
ACK	OK	MT	1/23/95
ALARM SUMM PAGE	OK -	↓	↓
Control Sub-Display:			
MAN	OK	MT	1/23/95
VAL	OK	↓	↓
AUTO	OK	↓	↓
SP	OK	↓	↓
CASC	OK	↓	↓
REM	- NA -	- NA -	- NA -
ON	OK	MT	1/23/95
OFF	OK	↓	↓
R/B (ratio)	OK	↓	↓
R/B (bias)	OK	↓	↓
CLEAR	OK	↓	↓
GROUP	OK	↓	↓
LST-DP	OK	↓	↓
STL	- NA -	- NA -	- NA -

- NA -
MICON QUALITY ASSURANCE MGR.

M. Patel 2/2/95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QC

M.C. Davis 1-23-95
WESTINGHOUSE HANFORD CO.

APPENDIX H

LOI FUNCTIONS

BUTTON	RESULT	INITIAL	DATE
ACK	OK	MT	1/23/95
ALARM SUMM PAGE	OK	↓	↓
Alarm Summ Page:			
RESET	OK	MT	1/23/95
ENGNR	OK	↓	↓
PG-UP	OK	↓	↓
PG-DN	OK	↓	↓
CNTRL	OK	↓	↓
LST-DP	OK	↓	↓
SIL	NA -	-NA-	-NA-
ACK	OK	MT	1/23/95
Engineer's Mode:			
ENABLE CONTROL ACTION	OK	MT	1/23/95
PREVENT CONTROL ACTIONS	OK	↓	↓
ENABLE HORN	-NA-	-NA-	-NA-
DISABLE HORN	-NA-	-NA-	-NA-
CHANGE PASSWORD	OK	MT	1/23/95
SAVE ENVIRONMENT	OK	↓	↓
EXIT ENGR'S MODE	OK	↓	↓

-NA-
MICON QUALITY ASSURANCE MGR.

Al P. [Signature] 2/2/95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QC

M.C. [Signature] 1-23-95
WESTINGHOUSE HANFORD CO.

APPENDIX I

DISPLAY ACCESS TIME

DISPLAY	FROM MENU BAR	FROM TILE	INITIALS/DATE
Group Ops:			
GROUP	12 sec	2.5 sec	
GROUP OVERVIEW	25-50* sec	13-37* sec	
LOOP DETAIL	8 sec	N/A	
AI DETAIL	8 sec	N/A	
Summaries:			
ALARM SUMMARY	7 sec	4.5 sec	
URGENT ALARM	7 sec	N/A	
CAUTION ALARM	7 sec	N/A	
ATTENTION ALARM	7 sec	N/A	
MESSAGE HISTORY	8 sec	N/A	
ALARM HISTORY	7 sec	N/A	
OPERATOR ACTION	7 sec	N/A	
OFFLINE LOOPS	5 sec	N/A	
NODE STATUS	7 sec	N/A	
Trend/History:			
TREND DISPLAY	7 sec		
HISTORY DISPLAY	7 sec		
HISTORY SUMMARY	5 sec	N/A	
Graphics Disp:			
GRAPHICS	11.5 sec	2 sec	

EXCEPTION
#29

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

Accepted in conjunction w/ Negotiated Settlement

WESTINGHOUSE HANFORD CO.

* low value is for a light display (not many points) -
high value is for a busy display (many points)

Attachment 3

SAT #2 Results

Attachment 3 Table of Contents

Test Exceptions & Notes (Appendix D)	p. A3-2
Appendix A Data Sheets	p.
Appendix B Data Sheets	p.
Appendix C Data Sheets	p.
Appendix E Data Sheets	p.
Appendix F Data Sheets	p.
Appendix G Data Shets	p.
Appendix H Data Sheets	p.
Appendix I Data Sheets	p.

APPENDIX D

TEST EXCEPTIONS LIST

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-2

ITEM	DESCRIPTION	RESOLUTION
1	PRIMARY COMM. ERROR, PHONY ALARM	} see TE #30 in Summary Table
2	FIELD BUS FAIL, PHONY ALARM	
3	FIELD BUS FAIL, PHONY ALARM	
4	PID RECALL Φ	see TE #9 in Summary
5	ANN. WINDOW COLOR	see TE #10 in Summary
6	U/C/A ALARM COMPRESSION	see TE #11 in Summary
7	DOCUMENTATION	} see TE's 14-26 in Summary
8	CONTROLLER CONFIGURE UT.	
9	Graphics Documentation	see TE #34 of Summary
10	Display Call up Time	see TE 29 of Summary

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available ~~for~~

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

L. J. Hill 5/6/96
WESTINGHOUSE HANFORD CO.

TE's carried forward to
~~the~~ Summary Table.

W-030 MICON VERSIONS, 3-14-95

Sun Microsystems Layer:

Sun Operating System:	4.1.4 (Solaris 1.1.2, new)
Sun Openwindows:	3_414 (new)

Micon-Powell Layer:

Run Version:	3.0.44 (new)
sys_cnfg version:	1.2.4 (new)
Display Builder version:	5209 (new)
U32 eeprom versions:	UR 5309 (new), UB 5313 (new)
RCMA eeprom version:	RCA 5313 (new)
RCMD eeprom version RCD:	5313 (new)
RCMF eeprom version RCF:	5313 (new)
GPLI eeprom versions:	GB/GBX 5310 (new)
LOI eeprom version:	5310 (new)

Note: U32 CPU eeproms are designated "UR", and U32 Bridge eeproms are designated "UB"

W-030 MICON S.A.T. EXCEPTIONS

Version Installation Data: 3-14-95

Sun Operating System: 4.1.4 (Solaris 1.1.2, new)
Sun Openwindows: 3.414 (new)
Run Version 3.0.44 (new)
sys cnfg version 1.2.4 (new)
Display Builder version 5209 (new)
U32 eeprom versions: UR 5309 (new), UB 5313 (new)
RCMA eeprom version RCA 5313 (new)
RCMD eeprom version RCD 5313 (new)
RCMF eeprom version RCF 5313 (new)
GPLI eeprom versions: GB/GBX 5310 (new)
LDI eeprom version 5310 (new)

Note: U32 CPU eeproms are designated "UR", and
U32 Bridge eeproms are designated "UB"

Test Conducted: March 15 to March 21, 1995

1. **TEST REFERENCE 4.2.3, APPENDIX B.7, PAGE 46-b:**
For LCU-2, step f (disable backup and introduce fault by pulling the primary U32 primary tap) proceeded without exception. But on hardware restoration (step j) plugging the backup U32 in after restoring the tap connection caused a spurious "primary communication error" alarm (item d below). This only occurred in LCU-2. The testing went as follows:
(a) With U32-P on primary tap, pulled U32-B and got following alarms:
 "Secondary communication error" on node 10
 "Controller's partner failed" on node 10
(b) Then disconnected U32-P primary tap and:
 the above cleared, and
 "Controller Offline" on node 10
(c) Restored primary tap and:
 "Controller Offline" cleared, and
 the alarms in (a) re-appear on page 1 or 2 of alarm summary
(d) Plug U32-B back in and:
 alarms in (a) cleared, and got following alarm:
 "Primary communication error" on node 10
2. **TEST REFERENCE 4.2.3, APPENDIX B.7, PAGE 46-c:**
This was reported in test exception #30 of the January 1995 acceptance testing, and was supposed to be fixed (by the new eeprom version) as reported by Micon on March 1 prior to resuming the SAT on March 15, 1995.

For LCU-3, hardware restoration (step j) resulted in "backup node sec fieldbus failed" alarm (item d below). This only occurred in LCU-3. Because the backup fieldbus is not used on our system, this is an alarm

W-030 MICON S.A.T. EXCEPTIONS

misnomer. The March 1995 testing went as follows:

- (a) With U32-P on primary tap, pulled U32-B and got following alarms:
"Secondary communication error" on node 19
"Controller's partner failed" on node 19
- (b) Then disconnected U32-P primary tap and:
the above cleared, and
"Controller Offline" on node 19
- (c) Restored primary tap and:
"Controller Offline" cleared, and
the alarms in (a) re-appear on page 1 of alarm summary
- (d) Plug U32-B back in and:
alarms in (a) cleared, and got following alarm:
"Backup node sec fieldbus failed" on node 19

3. **TEST REFERENCE 4.2.3, APPENDIX B.7, PAGE 46-c, d:**

These were reported in test exception #30 of the January 1995 acceptance testing, and are not fixed (by the new eeprom version) as reported by Micon on March 1 prior to resuming the SAT on March 15, 1995.

Data highway failure test (step m) caused "Primary node sec fieldbus failed" alarm. This only happened on LCU-3.

Restoring primary U32 (step e) caused "Primary node sec fieldbus failed" and "Backup node sec fieldbus failed" alarms. This happened only on LCUs 3 and 4.

4. **TEST REFERENCE 4.2.7, APPENDIX B.11, PAGE 50:**

This was reported in test exception #9 of the January 1995 acceptance testing.

Configuration file setup for PID RECALL of 0, and function 55 AO RECALL of 0. First set the loop for auto mode, with setpoint > 20, and allowed PV to stabilize. Upon power loss of RCM, group display shows "OFFLINE" as it should and parameters freeze. Upon power up we observed the fnc-55 output go to zero then immediately get set to the previous output value. We also observed the fnc-20 PID output and fnc-11 AI PV remain constant (the PID output and PV never initialize to zero). So the fnc-20 PID RECALL of '0' does not work, causing the fnc-55 output to be set to the PID output. PID RECALL of '1' does what it is supposed to where all parameters are recalled.

5. **TEST REFERENCE 4.2.7, APPENDIX B.11, PAGE 50:**

This was reported in test exception #10 of the January 1995 acceptance testing, and is not fixed as reported by Micon on March 1 prior to resuming the SAT on March 15, 1995.

Alarm colors are fine in all displays except the annunciator window.

W-030 MICON S.A.T. EXCEPTIONS

Actually, colors in the annunciator window are fine with exception of the inverse video. In the annunciator window the foreground/background color format to indicate acknowledged alarms does not match the foreground/background color usage in the group displays. When an alarm is active and acknowledged, the background in the annunciator window should be the alarm color and the foreground lettering should be other (ie: black as in group display). For red alarms, the two colors used in the annunciator window before the alarm is acknowledged are red and white, which are both alarm colors. According to the spec, a color shall not be used for two different meanings, and no two colors shall be used for the same meaning.

6. **APPENDIX G, IOK KEYBOARD FUNCTIONS, 'URG ALARM', PAGE 72-a:**
This was reported in test exception #11 of the January 1995 acceptance testing, and is not fixed as reported by Micon on March 1 prior to resuming the SAT on March 15, 1995.

'Urgent Alarms', whether accessed from IOK or trackball, strips the caution and attention alarms out of the 'Recent Alarms' list but does not properly compress the resulting data. This results in partially full pages, and succeeding pages that contain the exact same data.

'Cautions Alarms' and 'Attention Alarms' (only accessible with trackball) does the same thing.

7. **APPENDIX F, MICON CONFIG UTILITIES TEST, CONTROLLER CONFIG, PAGE 71:**
The Controller Configure utility has numerous bugs, most of which have work-arounds. These work-arounds are not described in any of the Micon documentation. Additionally, a complete set of documentation for the current version of A/S VIEW (3.0.44) is lacking. It was previously agreed with Micon that this documentation shall be provided reflecting the final A/S VIEW version that W-030 ends up with. This could be 3.0.44 or some other version should Projects elect to obtain fixes for these SAT exceptions.
8. **APPENDIX F, MICON CONFIG UTILITIES TEST, CONTROLLER CONFIG, PAGE 71:**
All exceptions reported in the January 1995 acceptance testing regarding the Controller Configure utility are still not fixed. Refer to the following exception numbers in Jan-Feb 1995 exceptions list:
9, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, and 26
9. **APPENDIX F, MICON CONFIG UTILITIES TEST, GRAPHICS PACKAGE, PAGE 71:**
Documentation for the current version (5209) of the Display Builder Graphics Package is lacking. We do have some older, out-dated documentation for the previous graphics package version (4B29), but even it is very inadequate because it does not contain descriptions on how to create all features of dynamic displays (ie: linking graphic elements to the database for the W-030 controls). Some of the graphics building done

W-030 MICON S.A.T. EXCEPTIONS

to conduct acceptance testing required phone consultation with Micon personnel in Houston.

10. **TEST REFERENCE APPENDIX I, PAGE 78:**

This was reported in test exception #29 of the January 1995 acceptance testing, and is not fixed to the letter of the specification.

Display call-up time is too long and does not meet the specification requirement of less than 2 seconds for any display. The call-up of most displays is very slow and is actually worse than the previous version. However, graphics will probably be used for most control operations and the access time of a graphic from an existing window is very good (less than 1 to 2 seconds).

S.A.T. NOTES

3-15-95

1. Annunciator window displays "chinese" characters in individually unused windows. These were cleaned up and have not returned.
2. Global alarm silence stops working occasionally. Reason unknown. AsTool message "miconNN: RPC: Unknown host" appears, where NN is the micon number of the other workstations (ie: if message is on micon2, then a message for the other 3 workstations appears with NN = 11, 12, 14).

3-16-95

3. Exiting group display causes a string of DataViews error messages in AsTool of the following types:
 "VOhpAccess: Invalid Object Specified"
 "VOexfBox: Not valid Rectangle Object"
4. Opening group 260 display, group 261 was drawn first, then the window is repainted with group 260. Occurred on MICON14 in the first group window opened; subsequent group windows seemed to be OK.
5. Operator is not informed of un-ACK'D alarms beyond those on the "Recent Alarms" window. Alarm management will require periodic scanning of the Alarm Summary pages to detect un-ACK'D alarms.
6. At 10:00 am A1 made a change to /etc/rpc file, adding the following line:
 "transport_server 536871065 transport_svc"
This change is a factory "fix" intended to correct the global alarm silencing problem noted in 2 above. The assumption is being made that this does not invalidate tests already completed.

Subsequently, still could not silence globally and the new AsTool messages are:

 "miconNN: RPC: Unknown host"
 ": RPC: unknown protocol"

7. U-32 Redundancy Test
Took all systems down and redefined U32 controllers. Brought systems back up. Then saved and downloaded lm-tables from micon14 and micon11. Also downloaded LOI groups. The initial alarms present included:
 "Backup node sec fieldbus failed" on unit 19

LCU-1:

- (a) With U32-P on primary tap, pulled U32-B and got following alarms:
 "Secondary communication error" on node 1
 "Controller's partner failed" on node 1
- (b) Then disconnected U32-P primary tap and:
 the above cleared, and
 "Controller Offline" on node 1
- (c) Restored primary tap and:
 "Controller Offline" cleared, and

- the alarms in (a) re-appear on page 2 of alarm summary
- (d) Plug U32-B back in and:
alarms in (a) cleared

LCU-2:

- (a) With U32-P on primary tap, pulled U32-B and got following alarms:
"Secondary communication error" on node 10
"Controller's partner failed" on node 10
- (b) Then disconnected U32-P primary tap and:
the above cleared, and
"Controller Offline" on node 10
- (c) Restored primary tap and:
"Controller Offline" cleared, and
the alarms in (a) re-appear on page 1 or 2 of alarm summary
- (d) Plug U32-B back in and:
alarms in (a) cleared, and got following alarm:
"Primary communication error" on node 10

LCU-3:

- (a) With U32-P on primary tap, pulled U32-B and got following alarms:
"Secondary communication error" on node 19
"Controller's partner failed" on node 19
- (b) Then disconnected U32-P primary tap and:
the above cleared, and
"Controller Offline" on node 19
- (c) Restored primary tap and:
"Controller Offline" cleared, and
the alarms in (a) re-appear on page 1 of alarm summary
- (d) Plug U32-B back in and:
alarms in (a) cleared, and got following alarm:
"Backup node sec fieldbus failed" on node 19

LCU-4:

- (a) With U32-P on primary tap, pulled U32-B and got following alarms:
"Secondary communication error" on node 30
"Controller's partner failed" on node 30
- (b) Then disconnected U32-P primary tap and:
the above cleared, and
"Controller Offline" on node 30
- (c) Restored primary tap and:
"Controller Offline" cleared, and
the alarms in (a) re-appear on page 1 of alarm summary
- (d) Plug U32-B back in and:
alarms in (a) cleared, and no fieldbus alarm occurred

Note: After disconnecting the U32-P primary tap, ACK'd the controller offline alarm at the EWS with the tap disconnected. This ACK'd the alarm on the EWS but not on the other OCSs (alarm is generated and cleared at the GPLI level). Reconnecting the tap results in discrete alarms in that LCU to be reported at the printer as being ACK'd at the original alarm ACK date and time. Re-tried, but this time reconnected the tap before ACK'ing the alarm and the alarm is ACK'd on all OCSs, and the discrete alarms in that LCU are also printed out with the original alarm ACK date and time.

3-17-95

8. If a tap connecting a U32 to the token bus fails, an alarm is generated. When the tap is restored the alarm does not clear on its own. The alarm must be cleared by manually selecting the other U32.
9. Historian data is collected by controllers, stored in buffer in controller, and sent out by controller to OCSs. When a new controller file is downloaded, the historian activity in the controller stops (which we saw as an hour lapse of data in A/S VIEW). The controller historian is only reactivated if A/S VIEW is restarted on the MASTER. So when this happens, take the MASTER's A/S VIEW down and bring it back up.

3-20-95

10. ACK'ing an alarm using a LOI does not silence the operator station horns, but the alarm message shown on the operator stations shows the alarm has been ACK'D. This means operators entering the unmanned control room may hear an audible alarm but not be able to associate the audible to an alarm message on the operator station. The operator will have to read the alarm print-out to find out what alarm has been ACK'D.
11. Down-loading and executing a new controller configuration file causes the LOI in the LCU to which the file was down-loaded to stop updating, even if the tags in the new configuration are the same as the old configuration. The LOI must be re-booted to get it to work again.
12. The 'GEN GRAPH' IOK key works only if a display window (ie: group or graphic) is already open. This IOK key does not work if a window is not open.
13. On OCS micon2 only, IOK keys 5, 6, 7, and 8 of the primary group display select do not work. The same keys work on the other OCSs. This is probably just cabling related.
14. The IOK 'Video Print' key works, but when pressed the track ball must be used to complete the operation of selecting the display to print.

APPENDIX A.1.1.1

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0.
Attachment 3, p. A3-11

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 1, SUB-RACK NO.1 Section 4.2.2

PT. NO.	POSITION A RCM-R-PRIMARY			POSITION B U-32-R-BACKUP			POSITION C RCM-32-A RCM-2		
							PT. TYPE	DATE/ INITIAL	REMARKS
1							AI	NA	NA
2							AI	MT	3/15/95
3							AI	NA	NA
4							AI		
5							AI		
6							AI		
7							AI		
8							AI		
9							AI		
10							AI		
11							AI		
12							AI		
13							AI		
14							AI		
15							AI		
16							AI		
17							AI		
18							AI		
19							AI		
20							AI		
21							AI		
22							AI		
23							AI		
24							AI		
25							AI		
26							AI		
27							AO		
28							AO	MT	3/15/95
29							AO	NA	NA
30							AO		
31							DI/O	MT	3/15/95
32							DI/O	NA	NA

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APPENDIX A.1.1.2

Run 3.0-44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-12

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 1, SUB-RACK NO. 1 Section 4.2.2

PT. NO.	POSITION D RCM-32-A RCM-3			POSITION E SPARE			POSITION F SPARE R		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	AI	MT	3/15/95						
2	AI	NA	NA						
3	AI								
4	AI								
5	AI								
6	AI								
7	AI								
8	AI								
9	AI								
10	AI								
11	AI								
12	AI								
13	AI								
14	AI								
15	AI								
16	AI								
17	AI								
18	AI								
19	AI								
20	AI								
21	AI								
22	AI								
23	AI								
24	AI								
25	AI								
26	AI								
27	AO	MT	3/15/95						
28	AO	NA	NA						
29	AO								
30	AO								
31	DI/O	MT	3/15/95						
32	DI/O	NA	NA						

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APPENDIX A.1.2.1

Run 3.0-44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A5-13

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 1, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITIONS A RCM-32-D RCM-4			POSITION B RCM-32-D RCM-5			POSITION C RCM-32-D RCM-6		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DI	MT	3/15/95	DI	NA	NA	DI	NA	NA
2	DI	NA	NA	DI	↓	↓	DI	↓	↓
3	DI			DI	MT	3/15/95	DI	MT	3/15/95
4	DI			DI	NA	NA	DI	NA	NA
5	DI			DI			DI		
6	DI			DI			DI		
7	DI			DI			DI		
8	DI			DI			DI		
9	DI			DI			DI		
10	DI			DI			DI		
11	DI			DI			DI		
12	DI			DI			DI		
13	DI			DI			DI		
14	DI			DI			DI		
15	DI			DI			DI		
16	DI			DI			DI		
17	DI			DI			DI		
18	DI			DI			DI		
19	DI			DI			DI		
20	DI			DI			DI		
21	DI			DI			DI		
22	DI			DI			DI		
23	DI			DI			DI		
24	DI			DI			DI		
25	DI			DI			DI		
26	DI			DI			DI		
27	DI			DI			DI		
28	DI			DI			DI		
29	DI			DI			DI		
30	DI			DI			DI		
31	DI			DI			DI		
32	DI	↓	↓	DI	↓	↓	DI	↓	↓

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APPENDIX A.1.2.2

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-14

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 1, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITION D RCM-32-Dr RCM-7			POSITION E RCM-32-Dr RCM-8			POSITION F RCM-32-Dr RCM-9		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DO	NA	NA	DO	NA	NA	DO	MT	3/16/95
2	DO	↓	↓	DO	↓	↓	DO	NA	NA
3	DO	MT	3/15/95	DO	MT	3/16/95	DO		
4	DO	NA	NA	DO	NA	NA	DO		
5	DO			DO			DO		
6	DO			DO			DO		
7	DO			DO			DO		
8	DO			DO			DO		
9	DO			DO			DO		
10	DO			DO			DO		
11	DO			DO			DO		
12	DO			DO			DO		
13	DO			DO			DO		
14	DO			DO			DO		
15	DO			DO			DO		
16	DO			DO			DO		
17	DO			DO			DO		
18	DO			DO			DO		
19	DO			DO			DO		
20	DO			DO			DO		
21	DO			DO			DO		
22	DO			DO			DO		
23	DO			DO			DO		
24	DO			DO			DO		
25	DO			DO			DO		
26	DO			DO			DO		
27	DO			DO			DO		
28	DO			DO			DO		
29	DO			DO			DO		
30	DO			DO			DO		
31	DO			DO			DO		
32	DO	↓	↓	DO	↓	↓	DO	↓	↓

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APPENDIX A.1.3.1

INPUT/OUTPUT FUNCTIONAL TEST
I/O Termination Assignments
LCU NO. 2, SUB-RACK NO. 1
Section 4.2.2

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-15

PT. NO.	POSITION A U-32-R-PRI			POSITION B U-32-R-SEC			POSITION C RCM-32-A <i>RCM11</i>		
	PT. TYPE	DATE/ INITIAL	REMARKS	PT. TYPE	DATE/ INITIAL	REMARKS	PT. TYPE	DATE/ INITIAL	REMARKS
1							AI	MT	3/15/95
2							AI	NA	NA
3							AI		
4							AI		
5							AI		
6							AI		
7							AI		
8							AI		
9							AI		
10							AI		
11							AI		
12							AI		
13							AI		
14							AI		
15							AI		
16							AI		
17							AI		
18							AI		
19							AI		
20							AI		
21							AI		
22							AI		
23							AI		
24							AI		
25							AI		
26							AI		
27							AO	MT	3/15/95
28							AO	NA	NA
29							AO		
30							AO		
31							DI/O	MT	3/15/95
32							DI/O	NA	NA

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APPENDIX A.1.3.2

Run 3.0.44
WHC-SD-4030-TRP-001, Rev. 0
Attachment 3, p. A3-16

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 2, SUB-RACK NO.1 Section 4.2.2

PT. NO.	POSITIONS D RCM-32-A RCM12			POSITION E SPARE			POSITION F SPARE		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	AI	MT	3/15/95						
2	AI	NA	NA						
3	AI								
4	AI								
5	AI								
6	AI								
7	AI								
8	AI								
9	AI								
10	AI								
11	AI								
12	AI								
13	AI								
14	AI								
15	AI								
16	AI								
17	AI								
18	AI								
19	AI								
20	AI								
21	AI								
22	AI								
23	AI								
24	AI								
25	AI								
26	AI								
27	AO	MT	3/15/95						
28	AO	NA	NA						
29	AO								
30	AO								
31	DI/O	MT	3/15/95						
32	DI/O	NA	NA						

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APPENDIX A.1.4.1

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Attachment 3, p. A3-17

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 2, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITION A RCM-32-D RCM13			POSITION B RCM-32-D RCM14			POSITION C RCM-32-D RCM15		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DI	NA	NA	DI	NA	NA	DI	NA	NA
2	DI	↓	↓	DI	↓	↓	DI	↓	↓
3	DI	MT	3/16/95	DI	MT	3/16/95	DI	MT	3/16/95
4	DI	NA	NA	DI	NA	NA	DI	NA	NA
5	DI			DI			DI		
6	DI			DI			DI		
7	DI			DI			DI		
8	DI			DI			DI		
9	DI			DI			DI		
10	DI			DI			DI		
11	DI			DI			DI		
12	DI			DI			DI		
13	DI			DI			DI		
14	DI			DI			DI		
15	DI			DI			DI		
16	DI			DI			DI		
17	DI			DI			DI		
18	DI			DI			DI		
19	DI			DI			DI		
20	DI			DI			DI		
21	DI			DI			DI		
22	DI			DI			DI		
23	DI			DI			DI		
24	DI			DI			DI		
25	DI			DI			DI		
26	DI			DI			DI		
27	DI			DI			DI		
28	DI			DI			DI		
29	DI			DI			DI		
30	DI			DI			DI		
31	DI			DI			DI		
32	DI	↓	↓	DI	↓	↓	DI	↓	↓

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APPENDIX A.1.4.2

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-18

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 2, SUB-RACK NO.2 Section 4.2.2

PT. NO.	POSITION D RCM-32-Dr RCM16			POSITION E RCM-32-Dr RCM17			POSITION F RCM-32-Dr RCM18		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DO	MT	3/16/95	DO	MT	3/16/95	DO	MT	3/16/95
2	DO	NA	NA	DO	NA	NA	DO	NA	NA
3	DO			DO			DO		
4	DO			DO			DO		
5	DO			DO			DO		
6	DO			DO			DO		
7	DO			DO			DO		
8	DO			DO			DO		
9	DO			DO			DO		
10	DO			DO			DO		
11	DO			DO			DO		
12	DO			DO			DO		
13	DO			DO			DO		
14	DO			DO			DO		
15	DO			DO			DO		
16	DO			DO			DO		
17	DO			DO			DO		
18	DO			DO			DO		
19	DO			DO			DO		
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21	DO			DO			DO		
22	DO			DO			DO		
23	DO			DO			DO		
24	DO			DO			DO		
25	DO			DO			DO		
26	DO			DO			DO		
27	DO			DO			DO		
28	DO			DO			DO		
29	DO			DO			DO		
30	DO			DO			DO		
31	DO			DO			DO		
32	DO	↓	↓	DO	↓	↓	DO	↓	↓

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APPENDIX A.1.5.1

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 3, SUB-RACK NO. 1 Section 4.2.2

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-19

PT. NO.	POSITION A U32-R-FRI			POSITION B U32-R-BU			POSITION C RCM-32-A RCM-20		
							PT. TYPE	DATE/ INITIAL	REMARKS
1							AI	MT	3/15/95
2							AI	NA	NA
3							AI		
4							AI		
5							AI		
6							AI		
7							AI		
8							AI		
9							AI		
10							AI		
11							AI		
12							AI		
13							AI		
14							AI		
15							AI		
16							AI		
17							AI		
18							AI		
19							AI		
20							AI		
21							AI		
22							AI		
23							AI		
24							AI		
25							AI		
26							AI	↓	↓
27							AO	MT	3/15/95
28							AO	NA	NA
29							AO	↓	↓
30							AO	↓	↓
31							DI/O	MT	3/15/95
32							DI/O	NA	NA

MICON QUALITY ASSURANCE MGR.

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APPENDIX A.1.5.2

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-20

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 3, SUB-RACK NO.1 Section 4.2.2

PT. NO.	POSITION D RCM-32-A RCM21			POSITION E RCM-32-A RCM22			POSITION F RCM-32-A RCM23		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	AI	NA	NA	AI	MT	3/15/95	AI	MT	3/15/95
2	AI	MT	3/15/95	AI	NA	NA	AI	NA	NA
3	AI	NA	NA	AI			AI		
4	AI			AI			AI		
5	AI			AI			AI		
6	AI			AI			AI		
7	AI			AI			AI		
8	AI			AI			AI		
9	AI			AI			AI		
10	AI			AI			AI		
11	AI			AI			AI		
12	AI			AI			AI		
13	AI			AI			AI		
14	AI			AI			AI		
15	AI			AI			AI		
16	AI			AI			AI		
17	AI			AI			AI		
18	AI			AI			AI		
19	AI			AI			AI		
20	AI			AI			AI		
21	AI			AI			AI		
22	AI			AI			AI		
23	AI			AI			AI		
24	AI			AI			AI		
25	AI			AI			AI		
26	AI	↓	↓	AI	↓	↓	AI	↓	↓
27	AO	NA	NA	AO	MT	3/15/95	AO	MT	3/15/95
28	AO	MT	3/15/95	AO	NA	NA	AO	NA	NA
29	AO	NA	NA	AO	↓	↓	AO	↓	↓
30	AO	↓	↓	AO	↓	↓	AO	↓	↓
31	DI/O	MT	3/15/95	DI/O	MT	3/15/95	DI/O	MT	3/15/95
32	DI/O	NA	NA	DI/O	NA	NA	DI/O	NA	NA

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MICON PROJECT MGR.

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WHC QUALITY ASSURANCE/QUALITY CONTROL

WESTINGHOUSE HANFORD CO.

APPENDIX A.1.6.1

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 3, SUB-RACK NO. 2 Section 4.2.2

Run 3.0-44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-21

PT. NO.	POSITION A RCM-32-D RCM24			POSITION B RCM-32-D RCM25			POSITION C RCM-32-D RCM26		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DI	NA	NA	DI	NA	NA	DI	NA	NA
2	DI	↓	↓	DI	↓	↓	DI	↓	↓
3	DI	MT	3/16/95	DI	MT	3/16/95	DI	MT	3/16/95
4	DI	NA	NA	DI	NA	NA	DI	NA	NA
5	DI			DI			DI		
6	DI			DI			DI		
7	DI			DI			DI		
8	DI			DI			DI		
9	DI			DI			DI		
10	DI			DI			DI		
11	DI			DI			DI		
12	DI			DI			DI		
13	DI			DI			DI		
14	DI			DI			DI		
15	DI			DI			DI		
16	DI			DI			DI		
17	DI			DI			DI		
18	DI			DI			DI		
19	DI			DI			DI		
20	DI			DI			DI		
21	DI			DI			DI		
22	DI			DI			DI		
23	DI			DI			DI		
24	DI			DI			DI		
25	DI			DI			DI		
26	DI			DI			DI		
27	DI			DI			DI		
28	DI			DI			DI		
29	DI			DI			DI		
30	DI			DI			DI		
31	DI			DI			DI		
32	DI	↓	↓	DI	↓	↓	DI	↓	↓

-NA-
MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL

WESTINGHOUSE HANFORD CO.

APPENDIX A.1.6.2

Run 3.0.44
WHC-SO-W030-TRP-001, Rev. 0
Attachment 3, p. A5-22

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 3, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITION D RCM-32-Dr RCM27			POSITION E RCM-32-Dr RCM28			POSITION F RCM-32-F RCM29		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DO	MT	3/16/95	DO	MT	3/16/95	RTD	NA	NA
2	DO	NA	NA	DO	NA	NA	RTD		
3	DO	1		DO			RTD		
4	DO			DO			RTD	MT	3/15/95
5	DO			DO			RTD	NA	NA
6	DO			DO			RTD		
7	DO			DO			RTD		
8	DO			DO			RTD		
9	DO			DO			RTD		
10	DO			DO			RTD		
11	DO			DO			RTD		
12	DO			DO			RTD		
13	DO			DO			RTD		
14	DO			DO			RTD		
15	DO			DO			RTD		
16	DO			DO			RTD		
17	DO			DO			RTD		
18	DO			DO			RTD		
19	DO			DO			RTD		
20	DO			DO			RTD		
21	DO			DO			RTD		
22	DO			DO			RTD		
23	DO			DO			RTD		
24	DO			DO			RTD		
25	DO			DO			RTD		
26	DO			DO			RTD		
27	DO			DO			AO		
28	DO			DO			AO		
29	DO			DO			AO		
30	DO			DO			AO		
31	DO			DO			DI/O		
32	DO			DO			DI/O		

-NA-
MICON QUALITY ASSURANCE MGR.
AO Kelly 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Deets 3-16-95
WESTINGHOUSE HANFORD CO.

APPENDIX A.1.7.1

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 4, SUB-RACK NO. 1 Section 4.2.2

Run 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-23

PT. NO.	POSITION A U32-R-FRI			POSITION B U32-R-BU			POSITION C RCM-32-A RCM31		
							PT. TYPE	DATE/ INITIAL	REMARKS
1							AI	MT	3/15/95
2							AI	NA	NA
3							AI		
4							AI		
5							AI		
6							AI		
7							AI		
8							AI		
9							AI		
10							AI		
11							AI		
12							AI		
13							AI		
14							AI		
15							AI		
16							AI		
17							AI		
18							AI		
19							AI		
20							AI		
21							AI		
22							AI		
23							AI		
24							AI		
25							AI		
26							AI		
27							AO	MT	3/15/95
28							AO	NA	NA
29							AO		
30							AO		
31							DI/O	MT	3/15/95
32							DI/O	NA	NA

-NA-
MICON QUALITY ASSURANCE MGR.
Al Kell 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
MC D 3-15-95
WESTINGHOUSE HANFORD CO.

APPENDIX A.1.7.2

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 4, SUB-RACK NO. 1 Section 4.2.2

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-24

PT. NO.	POSITIONS D RCM-32-F RCM32			POSITION E SPARE			POSITION F SPARE		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	RTD	NA	NA						
2	RTD								
3	RTD								
4	RTD								
5	RTD								
6	RTD	MT	3/15/95						
7	RTD								
8	RTD								
9	RTD								
10	RTD								
11	RTD								
12	RTD								
13	RTD								
14	RTD								
15	RTD								
16	RTD								
17	RTD								
18	RTD								
19	RTD								
20	RTD								
21	RTD								
22	RTD								
23	RTD								
24	RTD								
25	RTD								
26	RTD								
27	AO								
28	AO								
29	AO								
30	AO								
31	DI/O								
32	DI/O								

- NA -
MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

WESTINGHOUSE HANFORD CO.

APPENDIX A.1.8.1

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-25

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 4, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITION A RCM-32-D RCM33			POSITION B RCM-32-Dr RCM34			POSITION C SPARE		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1	DI	NA	NA	DO	MT	3/16/95			
2	DI	↓	↓	DO	NA	NA			
3	DI	MT	3/16/95	DO					
4	DI	NA	NA	DO					
5	DI			DO					
6	DI			DO					
7	DI			DO					
8	DI			DO					
9	DI			DO					
10	DI			DO					
11	DI			DO					
12	DI			DO					
13	DI			DO					
14	DI			DO					
15	DI			DO					
16	DI			DO					
17	DI			DO					
18	DI			DO					
19	DI			DO					
20	DI			DO					
21	DI			DO					
22	DI			DO					
23	DI			DO					
24	DI			DO					
25	DI			DO					
26	DI			DO					
27	DI			DO					
28	DI			DO					
29	DI			DO					
30	DI			DO					
31	DI			DO					
32	DI	↓	↓	DO	↓	↓			

-NA-
MICON QUALITY ASSURANCE MGR.
[Signature]
MICON PROJECT MGR. 3-21-95

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. [Signature] 3-16-95
WESTINGHOUSE HANFORD CO.

APPENDIX A.1.8.2

Run 3.0-44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-26

INPUT/OUTPUT FUNCTIONAL TEST I/O Termination Assignments LCU NO. 4, SUB-RACK NO. 2 Section 4.2.2

PT. NO.	POSITION D SPARE			POSITION E SPARE			POSITION F SPARE		
	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS	PT. TYPE	DATE/INITIAL	REMARKS
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									

-NA-
MICON QUALITY ASSURANCE MGR.

NA
WHC QUALITY ASSURANCE/QUALITY CONTROL

NA
MICON PROJECT MGR.

NA
WESTINGHOUSE HANFORD CO.

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-27

JUMPER CONFIGURATION DIAGRAM SECTION 4.2.2

RCM-32-A & B Modules Jumper Placement for W1 & W31

RCM-32-A & B Module Jumper Placement for W9

RCM-32-C Module Jumper Placement

RCM-32-D Module Jumper Placement

RCM-32-F Module Jumper Placement

APPENDIX B.2

RCM-32 mA INPUT TEST SECTION 4.2.2.1

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-28

STEP	CHANNEL ID	CRITERIA	S S I G N A C L E	S V I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-1 RCM-2 PT2	Output is at 5%, 50% and 95% of input signal span.	OK	OK	OK	REF PV 5.049 5.05	50.019 50.08	95.05 95.2				OK	MT	3/15/95
e		The display tracks the input signal.	OK										MT	3/15/95
f		Error A 0.25% FS	OK										MT	3/15/95
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	OK										MT	3/15/95
i		CRT display notices the alarm.	OK										MT	3/15/95
j		correct printer response	OK										MT	3/15/95
k		Input signal at 0 mA yield -25% display value	OK	OK	OK	N/A						OK	MT	3/15/95

$$\text{CALCULATED \% ERROR} = \frac{\text{MEASURED PV} - \text{REF PV}}{\% \text{ SCALE}} \times 100$$

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

REF VALUE FROM METER, MEASURED VALUE IS PV

-NA-

MICON QUALITY ASSURANCE MGR.

[Signature] 3-21-95

MICON PROJECT MGR.

[Signature] 3-15-95
WHC QUALITY ASSURANCE/QUALITY CONTROL

[Signature] 3-15-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-29

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	SIGNATURE	INITIALS	DATE	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELRORMR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-1 RCM-3 PT	Output is at 5%, 50% and 95% of input signal span.												
e		The display tracks the input signal.												
f		Error A 0.25% FS												
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.												
i		CRT display notices the alarm.												
j		correct printer response												
k		Input signal at 0 mA yield -25% display value												

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.

NA
MICON PROJECT MGR.

NA
WHC QUALITY ASSURANCE/QUALITY CONTROL

NA
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

RCM-32 mA INPUT TEST SECTION 4.2.2.1

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-30

STEP	CHANNEL ID	CRITERIA	SIOGNRA CLE	SVIAGLNU AE L	DVIALS PU LE A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELR AR RO MR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-2 RCM-11 PT	Output is at 5%, 50% and 95% of input signal span.	NA											
e		The display tracks the input signal.	NA											
f		Error A 0.25% FS	NA											
h		Input signals within A 0.25% FS of the setpoint when the alarm is tripped.	NA											
i		CRT display notices the alarm.	NA											
j		correct printer response	OK											3/15/95
k		Input signal at 0 mA yield -25% display value	NA						N/A					

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.
Al Kill 3-21-95
MICON PROJECT MGR.

Frank M. Chapin 3-15-95
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Gault 3-15-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

Run 3.0-44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-31

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	STATUS	SYMBOL	DISPLAY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			ALARM	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-Z RCM-12 PT	Output is at 5%, 50% and 95% of input signal span.	NA											
e		The display tracks the input signal.	NA											
f		Error A 0.25% FS	NA											
h		Input signals within ±0.25% FS of the setpoint when the alarm is tripped.	NA											
i		CRT display notices the alarm.	NA											
j		correct printer response	OK											3/5/95
k		Input signal at 0 mA yield -25% display value	NA						N/A					

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.
[Signature] 3-21-95
MICON PROJECT MGR.

Handwritten: Hank M. Chapin 3-15-95
WHC QUALITY ASSURANCE/QUALITY CONTROL
Handwritten: M.C. Bantz 3-15-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

Run 3.0-44

WHC-SO-W030-TRP-001, Rev. 0
Attachment 3, p. A3-32

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	SIO GNR ACLE	SV IAG LNU AE L	DV IAS LPU LE A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-26 PT	Output is at 5% 50% and 95% of input signal span.	/											
e		The display tracks the input signal.												
f		Error A 0.25% FS												
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.				N A								
i		CRT display notices the alarm.												
j		correct printer response												
k		Input signal at 0 mA yield -25% display value				N/A								

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- N A -
MICON QUALITY ASSURANCE MGR.

NA
WHC QUALITY ASSURANCE/QUALITY CONTROL

NA
MICON PROJECT MGR.

NA
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

RCM-32 mA INPUT TEST SECTION 4.2.2.1

Run 3.0-44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-33

STEP	CHANNEL ID	CRITERIA	SIOGNRALE	SVIAGLNUAE	DVIAISLPULEY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELRARRORMR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-21 PT	Output is at 5%, 50% and 95% of input signal span.	NA											
e		The display tracks the input signal.	NA											
f		Error A 0.25% FS	NA											
h		Input signals within A 0.25% FS of the setpoint when the alarm is tripped.	NA											
i		CRT display notices the alarm.	NA											
j		correct printer response	OK											3/15/95
k		Input signal at 0 mA yield -25% display value	NA			N/A								

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.
MICON PROJECT MGR. 3-21-95

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Dent 3-15-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

RCM-32 mA INPUT TEST SECTION 4.2.2.1

Run 3-0-44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-34

STEP	CHANNEL ID	CRITERIA	SIO GU NR AC LE	S V I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-22 PT	Output is at 5%, 50% and 95% of input signal span.	NA											
e		The display tracks the input signal.	NA											
f		Error A 0.25% FS	NA											
h		Input signals within ±0.25% FS of the setpoint when the alarm is tripped.	NA											
i		CRT display notices the alarm.	NA											
j		correct printer response	OK											11/7 3/15/95
k		Input signal at 0 mA yield -25% display value	NA						N/A					

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

WESTINGHOUSE HANFORD CO.

APPENDIX B.2

Run 3.0-44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-35

RCM-32 mA INPUT TEST SECTION 4.2.2.1

STEP	CHANNEL ID	CRITERIA	S O U R C E	S V I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-23 PT	Output is at 5%, 50% and 95% of input signal span.	NA											
e		The display tracks the input signal.	NA											
f		Error A 0.25% FS	NA											
h		Input signals within $\pm 0.25\%$ FS of the setpoint when the alarm is tripped.	NA											
i		CRT display notices the alarm.	NA											
j		correct printer response	OK											3/15/95
k		Input signal at 0 mA yield -25% display value	NA						N/A					

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.
Al Bell 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Deets 3-15-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.2

RCM-32 mA INPUT TEST SECTION 4.2.2.1

Run 3.0.44
WHC-SO-W030-TRP-001, Rev. 0
Attachment 3, p. A3-36

STEP	CHANNEL ID	CRITERIA	S O I G N A C L E	S V I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-4 RCM-31 PT	Output is at 5%, 50% and 95% of input signal span.	/											
e		The display tracks the input signal.												
f		Error A 0.25% FS												
h		Input signals within ±0.25% FS of the setpoint when the alarm is tripped.				N/A								
i		CRT display notices the alarm.												
j		correct printer response												
k		Input signal at 0 mA yield -25% display value				N/A								

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.

-NA-
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL

-NA-
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

Run 3-0-44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-37

STEP	CHANNEL ID	CRITERIA	S O I G U R N A C E	S V I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-1 RCM-2 PT	Output is at 5%, 50% and 95% of input signal span.										NOTE 1 NA		
e	1	The display tracks the input signal.												
f		Error A 0.25% FS	NA	(NOTE 1)										
h		Input signals within ±0.25% FS of the setpoint when the alarm is tripped.	NA	(NOTE 1)										
i		CRT display notices the alarm.	NA	(NOTE 1)										
j		correct printer response												
k		Input signal of 0 volt yield -25% display value							N/A			NOTE 1 NA NA		

Note: ① Checked on mA inputs as system feature.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL

-NA-
MICON PROJECT MGR.

-NA-
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

Run 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-38

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	SIOGNRALE	SVIAGLNUAE L	DVIA SLPULE AY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELR ARORMR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-1 RCM-3 PT	Output is at 5%, 50% and 95% of input signal span.										NOTE 1 NA		
e		The display tracks the input signal.												
f		Error A 0.25% FS	NA	(NOTE 1)										
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	NA	(NOTE 1)										
i		CRT display notices the alarm.	NA	(NOTE 1)										
j		correct printer response												
k		Input signal of 0 volt yield -25% display value							N/A			NOTE 1 NA NA		

Note: ① Checked on mA input as system feature.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
MICON PROJECT MGR.

- NA -
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

Run 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-39

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	SIGNATURE	SVIAGLNUAEAL	DVIASLPULEY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELRARMR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-2 RCM-11 PT	Output is at 5%, 50% and 95% of input signal span.										NOTE 1		
c		The display tracks the input signal.										NA		
f		Error A 0.25% FS	NA		(NOTE 1)									
h		Input signals within ±0.25% FS of the setpoint when the alarm is tripped.	NA		(NOTE 1)									
i		CRT display notices the alarm.	NA		(NOTE 1)									
j		correct printer response												
k		Input signal of 0 volt yield -25% display value										NOTE 1		
												NA	NA	

Note: ① Checked on mA input as system feature.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-

MICON QUALITY ASSURANCE MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

-NA-

MICON PROJECT MGR.

-NA-

WESTINGHOUSE HANFORD CO.

APPENDIX B.3

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-40

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	SIOGNRACLE	SVIAGLNUAE L	DVIA SLPU LEAY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELR ARORMR	INITIAL	DATE
						5%	50%	95%	5%	50%	95%			
d	LCU-2 RCM-12 PT	Output is at 5%, 50% and 95% of input signal span.										NOTE 1 NA		
e		The display tracks the input signal.												
f		Error A 0.25% FS	NA	(NOTE 1)										
h		Input signals within ±0.25% FS of the setpoint when the alarm is tripped.	NA	(NOTE 1)										
i		CRT display notices the alarm.	NA	(NOTE 1)										
j		correct printer response												
k		Input signal of 0 volt yield -25% display value							N/A			NOTE 1 NA	NA	

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL

-NA-
MICON PROJECT MGR.

-NA-
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

Run 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-41

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	SIO GNR ACLE	SV IAL GL NU AE L	DV IAL SL PU LE AY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AE LR AR OR MR	IN TI AL	DA TE
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-20 PT	Output is at 5%, 50% and 95% of input signal span.										NOTE 1 NA		
e		The display tracks the input signal.												
f		Error A 0.25% FS	NA	(NOTE 1)										
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	NA	(NOTE 1)					NA					
i		CRT display notices the alarm.	NA	(NOTE 1)										
j		correct printer response												
k		Input signal of 0 volt yield -25% display value							N/A			NOTE 1 NA NA		

Note: (i) Checked on mA input as system feature

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-

MICON QUALITY ASSURANCE MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

-NA-

MICON PROJECT MGR.

-NA-

WESTINGHOUSE HANFORD CO.

APPENDIX B.3

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

Run 3-0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-42

STEP	CHANNEL ID	CRITERIA	SSIOGNRA CLE	SVIAGLNU AE L	DYIASLPU LE AY	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AELR AROMR	IN ITIAL	D ATE
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-21 PT	Output is at 5%, 50% and 95% of input signal span.										NOTE 1		
e		The display tracks the input signal.										NA		
f		Error A 0.25% FS	NA	(NOTE 1)										
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	NA	(NOTE 1)										
i		CRT display notifies the alarm.	NA	(NOTE 1)										
j		correct printer response												
k		Input signal of 0 volt yield -25% display value							N/A			NOTE 1	NA	NA

Note: (1) Checked on mA input as system feature.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

Ran 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-43

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

STEP	CHANNEL ID	CRITERIA	SSIOGNRA CLE	SVIAGLNU AE L	DVIALSL PU LE A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			AE LR AR RO MR	IN IT IAL	DA TE
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-22 PT	Output is at 5%, 50% and 95% of input signal span.										NOTE 1		
e		The display tracks the input signal.										NA		
f		Error A 0.25% FS	NA		(NOTE 1)									
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	NA		(NOTE 1)									
i		CRT display notices the alarm.	NA		(NOTE 1)									
j		correct printer response												
k		Input signal of 0 volt yield -25% display value										NOTE 1		

Note: ① Checked on mA input as system feature.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
MICON PROJECT MGR.

- NA -
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

Run 3-0-44
WHC-SO-W030-TRP-001, Rev. 0
Attachment 3, p. A3-44

STEP	CHANNEL ID	CRITERIA	SIO GNR ACLE	SV IAG LNU AE L	DV IAS LPU LE A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-3 RCM-23 PT	Output is at 5%, 50% and 95% of input signal span.										NOTE 1 NA		
e		The display tracks the input signal.												
f		Error A 0.25% FS	NA	(NOTE 1)										
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	NA	(NOTE 1)										
i		CRT display notices the alarm.	NA	(NOTE 1)										
j		correct printer response												
k		Input signal of 0 volt yield -25% display value							N/A			NOTE 1 NA NA		

Note: (D) checked on mA input as system feature.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

-NA-
MICON QUALITY ASSURANCE MGR.

-NA-
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL

-NA-
WESTINGHOUSE HANFORD CO.

APPENDIX B.3

RCM-32 VOLT INPUT TEST SECTION 4.2.2.2

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-45

STEP	CHANNEL ID	CRITERIA	S S I O G U N R A C L E	S V I A G L N U A E L	D V I A S L P U L E A Y	MEASURED % ERROR VALUE			CALCULATION % ERROR VALUE			A E L R A R O M R	I N I T I A L	D A T E
						5%	50%	95%	5%	50%	95%			
d	LCU-4 RCM-31 PT	Output is at 5%, 50% and 95% of input signal span.										NOTE 1 NA		
e		The display tracks the input signal.												
f		Error A 0.25% FS	NA	(NOTE 1)										
h		Input signals within A0.25% FS of the setpoint when the alarm is tripped.	NA	(NOTE 1)										
i		CRT display notices the alarm.	NA	(NOTE 1)										
j		correct printer response												
k		Input signal of 0 volt yield -25% display value							N/A			NOTE 1 NA NA		

Note: ① Checked on mA input as system feature.

$$\text{Measured \% Error Value} = \left[\left(\frac{\text{Data 1 (Measured Value)}}{\text{Data 2 (Reference Value)}} \right) \times (100) \right] - 100$$

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
MICON PROJECT MGR.

- NA -
WESTINGHOUSE HANFORD CO.

APPENDIX B.4

Run 3.0-44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-46

RCM-32 RESISTANCE TEMPERATURE DETECTOR (RTD) INPUTS TEST SECTION 4.2.2.3

LCU-3, RCM-29

STEP	ACCEPTANCE CRITERIA	ACTUAL RESULT	INITIALS	DATE
a	Verify the location of the RTD Modules.	OK	MT	3/15/95
b	Note the temperature in the RTD Table.	$100.26\Omega = 34^{\circ}\text{F}$ $150.26\Omega = 268^{\circ}\text{F}$ $180.26\Omega = 414^{\circ}\text{F}$	MT	3/15/95
d	Note the temperature in the MICON. View and compare with (b).	$100\Omega = 35^{\circ}\text{F}$ $150\Omega = 270^{\circ}\text{F}$ $180\Omega = 416^{\circ}\text{F}$	MT	3/15/95

-NA-
MICON QUALITY ASSURANCE MGR.
[Signature] 3-21/95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. [Signature] 3-15-95
WESTINGHOUSE HANFORD CO.

$$\text{RTD Range} = -328 \text{ to } 1166^{\circ}\text{F} = 1494^{\circ}\text{F } \Delta$$

$$0.2\% = 3^{\circ}\text{F}$$

APPENDIX B.4

Run 3.0-44
WHC-SD-W030-TRP-001, Rev.
Attachment 3, p. A3-47

RCM-32 RESISTANCE TEMPERATURE DETECTOR (RTD) INPUTS TEST SECTION 4.2.2.3

LCU-4, RCM-32

STEP	ACCEPTANCE CRITERIA	ACTUAL RESULT	INITIALS	DATE
a	Verify the location of the RTD Modules.	NA	NA	
b	Note the temperature in the RTD Table.			
d	Note the temperature in the MICON-View and compare with (b).			

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
WESTINGHOUSE HANFORD CO.

APPENDIX B.5 **CONTROL INPUT/OUTPUT FUNCTION TEST** **SECTION 4.2.2.4**

Run 3-0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-48

(Tested in APPENDIX A.1.1 - A.1.8)

STEP	CRITERIA	SELECTED OUTPUT			INITIALS	DATE
		5%	50%	95%		
b	The analog input shall follow the analog output in magnitude and direction.	OK	OK	OK	MT	3/15/95
c	Verify Manual Control Operation	OK	OK	OK	MT	3/15/95
d	Verify Operation of Auto/Man transfer and Local, Remote & Cascade. <i>MT 1-17-95</i>	OK	—————→		MT	3/15/95
e	Verify the correct response for Integral & Derivative settings.	OK	—————→		MT	3/15/95
f	Verify correct response for Gain/PB settings.	OK	—————→		MT	3/15/95

** Verify using ma2 casc. in RCM-2.*

-NA-
MICON QUALITY ASSURANCE MGR.
[Signature]
MICON PROJECT MGR. *3-21-95*

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Dents *3-15-95*
WESTINGHOUSE HANFORD CO.

APPENDIX B.6

DISCRETE INPUT/OUTPUT TEST SECTION 4.2.2.5

Run 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-49

(TESTED IN APPENDIX A.1.1 - A.1.8)

STEP	CHANNEL	CRITERIA	ACTUAL RESULT	INITIALS	DATE
c	-NA-	Verify: the selected LED's are OFF.	OK	MT	3/16/95
c	-NA-	Verify: Group Display is ON & Dr Module LED turns ON.	OK	MT	3/16/95

-NA-
MICON QUALITY ASSURANCE MGR.
AL BLO 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Dento 3-16-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.7

U-32R REDUNDANCY TEST SECTION 4.2.3

See Note # 7

TEST STEP	REDUNDANT U32 LOCATION	CRITERIA	ACTUAL RESULT	INITIAL	DATE
a	LCU-1/U32-1	DISABLE PRIMARY U32	NA	NA	NA
b		Verify transfer to backup U32 and alarm messages	OK	MT	3/16/95
c		Verify analog output maintained	OK	MT	3/16/95
d		Verify system status on CRT	OK	MT	3/16/95
e		RESTORE PRIMARY U32 AND ACTIVATE	NA	NA	NA
e		Verify analog output maintained after primary activated	OK	MT	3/16/95
f		DISABLE BACKUP U32 AND INTRODUCE FAULT	NA	NA	NA
g		Verify no transfer to backup and outputs freeze	OK	MT	3/16/95
h		Verify system status and alarms on CRT, and deviation of outputs	OK	MT	3/16/95
i		Verify sample configuration from LOI and PV/outputs track	OK	MT	3/16/95
j		RESTORE HARDWARE	NA	NA	NA
k		Verify LOI changes reflected on CRT	OK	MT	3/16/95
l		SIMULATE DATA HIGHWAY FAILURE	NA	NA	NA
m		Verify U32 operation not effected and system status on CRT is okay	OK	MT	3/16/95

Note #8

-NA-
MICON QUALITY ASSURANCE MGR.

AL FLO 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QC

M.C. Potts 3-16-95
WESTINGHOUSE HANFORD CO.

Run 3.0-44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-51

APPENDIX B.7

U-32R REDUNDANCY TEST
SECTION 4.2.3

See Note # 7

TEST STEP	REDUNDANT U32 LOCATION	CRITERIA	ACTUAL RESULT	INITIAL	DATE
a	LCU-2 / U32-10	DISABLE PRIMARY U32	NA	NA	NA
b		Verify transfer to backup U32 and alarm messages	OK	MT	3/16/95
c		Verify analog output maintained	OK	MT	3/16/95
d		Verify system status on CRT	OK	MT	3/16/95
e		RESTORE PRIMARY U32 AND ACTIVATE	NA	NA	NA
e		Verify analog output maintained after primary activated	OK	MT	3/16/95
f		DISABLE BACKUP U32 AND INTRODUCE FAULT	NA	NA	NA
g		Verify no transfer to backup and outputs freeze	OK	MT	3/16/95
h		Verify system status and alarms on CRT, and deviation of outputs	OK	MT	3/16/95
i		Verify sample configuration from LOI and PV/outputs track	OK	MT	3/16/95
j		RESTORE HARDWARE	NA	NA	NA
k		Verify LOI changes reflected on CRT	OK	MT	3/16/95
l		SIMULATE DATA HIGHWAY FAILURE	NA	NA	NA
m		Verify U32 operation not effected and system status on CRT is okay	OK	MT	3/16/95

*

Note #8

-NA-

MICON QUALITY ASSURANCE MGR.

Not Avail 2/6/96
[Signature]

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

Resolved in SAT #4
2/2/96 5/6/96
[Signature]

WESTINGHOUSE HANFORD CO.

46-b

* TEST EXCEPTION #1 (see TE #30 in Summary Table)

Run 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-52

APPENDIX B.7

U-32R REDUNDANCY TEST
SECTION 4.2.3

See Note # 7

TEST STEP	REDUNDANT U32 LOCATION	CRITERIA	ACTUAL RESULT	INITIAL	DATE
a	LCU-3/U32-19	DISABLE PRIMARY U32	NA	NA	NA
b		Verify transfer to backup U32 and alarm messages	OK	MT	3/16/95
c		Verify analog output maintained	OK	MT	3/16/95
d		Verify system status on CRT	OK	MT	3/16/95
e		RESTORE PRIMARY U32 AND ACTIVATE	NA	NA	NA
e		Verify analog output maintained after primary activated	OK	MT	3/16/95
f		DISABLE BACKUP U32 AND INTRODUCE FAULT	NA	NA	NA
g		Verify no transfer to backup and outputs freeze	OK	MT	3/16/95
h		Verify system status and alarms on CRT, and deviation of outputs	OK	MT	3/16/95
i		Verify sample configuration from LOI and PV/outputs track	OK	MT	3/16/95
j		RESTORE HARDWARE	NA	NA	NA *
k		Verify LOI changes reflected on CRT	OK	MT	3/17/95
l		SIMULATE DATA HIGHWAY FAILURE	NA	NA	NA
m		Verify U32 operation not effected and system status on CRT is okay	OK	MT	3/17/95 *

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available *PLH*

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

Resolved in SAT #4

2/24/96 5/6/96

WESTINGHOUSE HANFORD CO.

46-a

Ref TE #30 in Summ

* TEST EXCEPTION #2.

★ TEST EXCEPTION #3.

APPENDIX B.7

U-32R REDUNDANCY TEST
SECTION 4.2.3

See Note #7.

TEST STEP	REDUNDANT U32 LOCATION	CRITERIA	ACTUAL RESULT	INITIAL	DATE
a	LCU-4/U32-3d	DISABLE PRIMARY U32	NA	NA	NA
b		Verify transfer to backup U32 and alarm messages	OK	MT	3/17/95
c		Verify analog output maintained	OK	MT	3/17/95
d		Verify system status on CRT	OK	MT	3/17/95
e		RESTORE PRIMARY U32 AND ACTIVATE	NA	NA	NA *
e		Verify analog output maintained after primary activated	OK	MT	3/17/95
f		DISABLE BACKUP U32 AND INTRODUCE FAULT	NA	NA	NA
g		Verify no transfer to backup and outputs freeze	OK	MT	3/17/95
h		Verify system status and alarms on CRT, and deviation of outputs	OK	MT	3/17/95
i		Verify sample configuration from LOI and PV/outputs track	OK	MT	3/17/95
j		RESTORE HARDWARE	NA	NA	NA
k		Verify LOI changes reflected on CRT	OK	MT	3/17/95
l		SIMULATE DATA HIGHWAY FAILURE	NA	NA	NA
m		Verify U32 operation not effected and system status on CRT is okay	OK	MT	3/17/95 *

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available / JH
MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

Resolved in ~~TE#14~~
SAT #4 JH 5/6/96
WESTINGHOUSE HANFORD CO.

46-d

* TEST EXCEPTION #3. (See TE#30 in Summary)

APPENDIX B.8

FIELD BUS COMMUNICATIONS SECTION 4.2.4

ENGINEERING WORKSTATION & GPLIS:

STEP	CRITERIA	RESULT	INITIAL	DATE
a	INSERT SAMPLE CONFIGURATION IN RCM 2 AND 3.	NA	NA	NA
b	Equation correctly solved	OK	MT	3/17/95
c	Equation correctly solved	OK	MT	3/17/95
d	Remove RCM 3 and verify the calculated pressure does not change	OK	MT	3/17/95
e	Verify transfer to backup GPLI and failure alarm of primary	OK	MT	3/17/95
f	Verify redundant power supply can support GPLIs	OK	MT	3/17/95

use files fbtest2 & fbtest3

-NA-
MICON QUALITY ASSURANCE MGR.
[Signature] 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QC
[Signature] 3-17-95
WESTINGHOUSE HANFORD CO.

Run 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-55

APPENDIX B.8

FIELD BUS COMMUNICATIONS SECTION 4.2.4

HORSESHOE CONSOLE OCSs & GPLIs:

STEP	CRITERIA	RESULT	INITIAL	DATE
a	INSERT SAMPLE CONFIGURATION IN RCM 2 AND 3.	NA	NA	NA
b	Equation correctly solved	OK	MT	3/17/95
c	Equation correctly solved	OK	MT	3/17/95
d	Remove RCM 3 and verify the calculated pressure does not change	OK	MT	3/17/95
e	Verify transfer to backup GPLI and failure alarm of primary	OK	MT	3/17/95
f	Verify redundant power supply can support GPLIs	OK	MT	3/17/95

use files fbtest2 & fbtest3

- NA -
MICON QUALITY ASSURANCE MGR.
M. Bell 3-21-95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QC
M.C. Gato 3-17-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.9

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-56

U-32R CONTROLLER POWER SUPPLY TEST SECTION 4.2.5

TEST STEPS	CRITERIA	LCU NO.				PRIMARY/SECONDARY	INITIALS	DATE
		1	2	3	4			
a	The display on the CRT's and indicating lights on the U-32 controller will remain the same as before when the primary power supply was providing power.							
b	Power-on light is illuminated.							
c	Primary power supply has taken control.							
d	The operation will be indicated by an alarm if the primary or secondary power supply has failed.							

MT 1-14-95

-NA-

MICON QUALITY ASSURANCE MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

-NA-

MICON PROJECT MGR.

-NA-

WESTINGHOUSE HANFORD CO.

APPENDIX B.10

CONSOLE TEST SECTION 4.2.6

STEP	CRITERIA	RESULT	INITIAL	DATE
b-c	Verify download and upload	OK	MT	3/17/95
d	Turn off UPS. Verify the remaining system operation is not affected.	NA	—————→	
e	Wait 20 minutes then turn on UPS. Verify the remaining system operation is not affected.	NA	—————→	
f	Restore display config from disk and verify against original file (bytes should be the same).	NA	—————→	
g	FOR BOTH GPLI PAIRS: Disconnect GPLI primary input from TB1. Disconnect primary LAN from GPLI. Verify no disruption of system operation as monitored by trend display and/or other display.	OK	MT	3/17/95
h	Verify system status and alarm messages are correct.	OK	MT	3/17/95
i	Verify archiving of historical, trend, and configuration data.	OK	MT	3/20/95
j	Verify reloading of archive file.	OK	MT	3/20/95
k	Verify all security definitions of the system.	OK	MT	3/17/95

* HORSESHOE + EWS.

- NA -

MICON QUALITY ASSURANCE MGR.

Al RO 3-21-95
 MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QC

M.C. Galt 3-20-95
 WESTINGHOUSE HANFORD CO.

Note
9

APPENDIX B.11

SYSTEM TEST SECTION 4.2.7

MHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-58

Run 3.0.44

STEP	CRITERIA	ACTUAL RESULT	INITIAL	DATE
c	All loops are in manual mode.	OK	MT	3/17/95
d	Alarms and Setpoints are initialized. * ADD BELOW	OK	MT	3/17/95
e	Analog Input values are zero.			
f	All digital input values are 1.	OK	MT	3/17/95
!	Bargraph is at a maximum low deviation. Alarm valve is present and at same magnitude as set point.	OK	MT	3/17/95
n	Digital output #1 group display is 1-OF. Digital output is 1-ON.	OK	MT	3/17/95
1	Alarm Functions	OK	MT	3/17/95
2	Alarm Priorities	OK	MT	3/17/95
3	Alarm Color	OK	MT	3/17/95
4	Annunciator Window	Run 3.0.47 passed retest	MT	3/17/95
5	Printer Functions	OK	MT	3/17/95
6	IOK Operation	SEE APPENDIX G	NA	NA
7	16 Character Tags	OK	MT	3/17/95
d *	PV and outputs are zero			
d *	PID output and fnc #55 output are zero			

CMPG

CMPG

CMPG

MICON QUALITY ASSURANCE MGR

-NA-

Not Available

MICON PROJECT MGR

* TEST EXCEPTION #4.

50

Resolved in Summary
Resolved in Modification

* TEST EXCEPTION 5.

WESTINGHOUSE HANFORD CO.

5/6/96

WQC QUALITY ASSURANCE/QUALITY CONTROL
TE9 Resolved by Modification. TE9
resolved by correction. SAT#3

See TE 10 in Summary
Corrected in SAT#3

APPENDIX B.12

Run 3.0.44
MHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-59

LCU REDUNDANCY TEST SECTION 4.2.9

STEP	CRITERIA	ACTUAL RESULT	INITIALS	DATE
1	Primary LCU cabinet becomes active upon power application to LCU1 & 2 simultaneously.			
2	Standby LCU becomes active when hardware and/or software failure is simulated in one active LCU.			
3	Replace RCM controller in the LCU and verify on CRT that it is ready.			
4	Activate standby LCU cabinet from the A/S View console.			
5	Test for the following fault condition (refer to Figure 5.2.10).			
	a. Wire A Open Test Light in LCU-1 is OFF and test light in LCU is ON.	NA		
	b. Wire B Open LCU-1 Cabinet sends a backup failed alarm.			
MTT 1/25/95	c. Wires A and B open simultaneously Test Light in the LCU-1 is ON and Test Light in LCU-2 is OFF.	NA	NA	NA
	d. Wire A shorted to earth ground Test Light in LCU-1 is ON and Test Light in LCU-2 is OFF. Remove short from Wire A.			

APPENDIX B.12

Continued LCU REDUNDANCY TEST SECTION 4.2.9

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-60

STEP	CRITERIA	ACTUAL RESULT	INITIALS	DATE
	e. Wire B shorted to earth ground. Test Light in LCU-1 is OFF and Test Light in LCU-2 is ON. Remove short from Wire B.	NA		
MT 1/25/45	f. Wires A and B shorted to earth ground. Test Light in LCU-1 is ON and Test Light in LCU-2 is OFF.	NA	NA	NA

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-61

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
5	END			
6	VD			
7	DI			
9	MUD	NA		
10	LET			
11	AI			
12	TCOMP (T > Ref → Lower PV) (T < Ref → Larger PV)			
13	PCOMP (P > Ref → Larger PV) (P < Ref → Lower PV)			

- NA -

MICON QUALITY ASSURANCE MGR.

Al Pill 3-21-95
MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Set 3/20/95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-62

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
14	INPUT SWITCHES Use A if LOKAL HI Use B if A < LO or A > HI	NA		
16	Convert AI To Boolean at Some Level			
17	CONSTRAINT Ramps up/down at prescribed rate within setpoint limits			
18	PID BATCH Adaptive PID functions			
20	PID (Reverse, Direct, Tracking, Balance, Non-Balance, SP Ramp)	NA		
21	PID Ratio Bias			
22	PID Ratio / Auto Bias (Not Auto Ratio)			
23	PID Auto Ratio / Bias (Not Auto Bias)			

- NA -

MICON QUALITY ASSURANCE MGR.

Al Bell 3-21-95
MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

M. C. Dotts 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0-44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-63

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
24	PID CASCADE	NA		
25	PID GAP (Eng Limits)			
26	Insert PID parameters (a) SP-Ratio-Bias (b) Prop-Int. - Deriv.			
27	Load PID Term's Value (Gain, Reset, Rate, SP Ratio, Bias, Scan)			
28	MANUAL STATION			
30	MULTIPLY	NA		
31	DIVIDE			
32	ADD			

- NA -
MICON QUALITY ASSURANCE MGR.
Al P. Allen 3-21-95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Seals 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44
WHC-SB-W030-TRP-001, Rev. D
Attachment 3, p. A3-64

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
33	SUBTRACT	NA		
34	EXTRACT SQRT + documentation			
35	CALCULATOR (Exp, *, /, +, -, SQRT)			
36	ABSOLUTE VALUE			
37	LOG (Natural, Base 10)	NA		
38	EXPONENTIAL (e^x)			
39	POLYNOMIAL (Complex)			
40	NA		NA	NA

-NA-
MICON QUALITY ASSURANCE MGR.
Al Rill 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Galt 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-65

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
42	NA	NA	NA	NA
44	NA	NA	NA	NA
45	ARRAY			
46	MSV CHANGE BASED ON DISCRETE	NA		
47	MSV CHANGE BASED ON ANALOG			
48	MINIMUM SELECTOR			
49	MEDIAN HI/LO SELECT PV > HI, USE HI; < LO USE LO; HI + BIAS, LO + BIAS			
50	LEAD / LAG			

- NA -
MICON QUALITY ASSURANCE MGR.
Al Bell 3-21-95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Getz 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-66

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
51	DEAD TIME	NA		
52	RATE/VELOCITY LIMIT			
53	TOTALIZER			
55	ANALOG OUTPUT			
57	DISCRETE OUTPUT			
58	PULSER (PLSR) or FREQUENCY OUTPUT (FO) FOR HW PT #32			
60	GOTO BASED ON AI COMPARISON			
62	Command, Normal /off Normal Condition, Goto Label (TARGET)			

-NA-
MICON QUALITY ASSURANCE MGR.
Al Pelt 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Deets 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-67

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
64	UNCONDITIONAL GOTO (JUMP)	NA		
65	GOTO BASED ON LOOP MODE (M, A, M+A, C, M+A+C, A+C, M+C)			
66	DISCRETE STATUS CHANGE BASED ON LOOP MODE USED W/ FNC 87			
67	STROBE Pulse DF DO, base on UD			
68	VALVE CONTROL ON/OFF			
69	LOGIC CALCULATOR	NA		
70	AND (4 INPUT)			
71	OR (4 Input)			

- NA -

MICON QUALITY ASSURANCE MGR.

Al Bell 3-21-95
MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Sent 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A5-68

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
72	INVERT			
73	LATCH (lat, unlatch, power-up reset, both set)			
74	TIME DELAY (Input, reset, transition, delay)			
75	DISCRETE STATUS CONTROL (input, invert, continuous, momentary, output, MSV)	NA		
76	VD ACCESS			
77	EVENT COUNTER			
78	MOTOR CONTROL			
79	RESET VD - w/TD (Fnc 74) - using time w/o cond.			

- NA -

MICON QUALITY ASSURANCE MGR.

Al Pelt 3-21-95
MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Best 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-69

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
80	DISCRETE STATUS BASED ON NSV	NA		
86	MODE SELECT INTERLOCK			
87	LOOP MODE CHANGE BASED ON DISCRETE STATUS CHANGE			
89	LOOK UP TABLE			
90	ALARM MGT (XM, PV, Group, Suppress, Clear, Ack, Auto-Ack)	NA		
95	STOPWATCH			
99	INOPERABLE STEP IS TARGET OF GOTO Function (ie: FNC #62)			
100	AVERAGE			

-NA-
MICON QUALITY ASSURANCE MGR.
Al Bell 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. DeLo 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44
WHC-SO-W030-TRP-001, Rev. 0
Attachment 3, p. A3-70

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
101	WATCH DOG KEEP ALIVE	NA		
102	CLOCK RCM (Green Mean Time)			
103	IF ANALOG, THEN... ELSE			
104	IF DISCRETE, THEN... ELSE			
105	ZERO LIMIT			
106	EXTEND PULSE			
107	MAX			
108	MEAN VALUE			

- NA -
MICON QUALITY ASSURANCE MGR.
Al P. [Signature] 3-21-95
MICON PROJECT MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. [Signature] 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-71

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
109	MEDIAN	NA		
110	RATE OF CHANGE			
111	DEADBAND			
112	DELAY PULSE			
113	SELECT			
114	FILTER (used G=.85 reset = for mstability)			
115	CUT-OFF	NA		
116	MOVING AVERAGE (w/ARRAY)			

-NA-
MICON QUALITY ASSURANCE MGR.
APR 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
M.C. Drake 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-72

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
117	AF THERMOCOUPLE	NA (NO T/C on W-030)	NA	NA

-NA-

MICON QUALITY ASSURANCE MGR.

Al Piller 3-21-95
MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

M.C. Smith 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-73

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
		NA		

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
MICON PROJECT MGR.

- NA -
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

Run 3.0.44

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-74

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE

NA

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
MICON PROJECT MGR.

- NA -
WESTINGHOUSE HANFORD CO.

APPENDIX B.13

MICON PROGRAMMABLE FUNCTION TEST SECTION 4.2.10

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-75

FUNCTION NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE

NA

- NA -

MICON QUALITY ASSURANCE MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -

MICON PROJECT MGR.

- NA -

WESTINGHOUSE HANFORD CO.

APPENDIX C

SPECIFICATION CROSSREFERENCE LIST

ITEM	MICON SAT PROCEDURE	WHC SPECIFICATION WHC-S-4013
1	2.2	3.1.8
2	2.3	3.1.6
3	3.2	3.1.1
4	4.2.2	3.2.2.1 through 3.2.2.3
5	4.2.5.1	3.2.4.2
6	4.2.5.2	3.2.4.3 and 3.2.4.7
7	4.2.6	3.2.4.1 and 3.2.5.1
8	4.2.6f	3.2.6.4 through 3.2.6.6, 3.2.7.3 through 3.2.7.5 and 3.2.8 through 3.2.13
9	4.2.7	3.2.5.1
10	4.2.9	3.2.2.1
11	4.2.9	ECN153033

- NA -
MICON QUALITY ASSURANCE MGR.

- NA -
WHC QUALITY ASSURANCE/QUALITY CONTROL

- NA -
MICON PROJECT MGR.

- NA -
WESTINGHOUSE HANFORD CO.

THIS LIST DOES NOT GUARANTEE THAT ALL SPECIFICATION & REQUIREMENTS FOUND IN THE ABOVE REFERENCED SPECIFICATION SECTIONS (AND UN-REFERENCED SPEC SECTIONS) ARE MET.

APPENDIX D

Test Exceptions

(This section has been moved to the front of this attachment.)

APPENDIX E

Run 3.0.44
WHC-SO-W030-TRP-001, Rev. 0
Attachment 3, p. A3-78

MICON LOCAL OPERATOR INTERFACE (LOI) FUNCTION TEST SECTION 4.2.8

STEP NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
1	LOI Connected to U32R	OK	MT	3/20/95
2	Disconnect Token Buss	OK	MT	3/20/95
3	Turn on Power at CB-3	OK	MT	3/20/95
4	Verify Operation (it runs) See APPENDIX H - details	OK	MT	3/20/95
5	Verify 16 Character Tag	OK	MT	3/20/95
6	Verify Password	OK	MT	3/20/95
7	Verify Alarm Acknowledge Prohibit	OK	MT	3/20/95
General	See APPENDIX H	NA	NA	NA

* See Notes 10 and 11.

-NA-
MICON QUALITY ASSURANCE MGR.
3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QUALITY CONTROL
3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX F

Run 3.0.44
WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-79

MICON CONFIGURATION UTILITIES TEST

UTILITY NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
1	Controller Configuration			
2	Graphics Package			
3	Group Configure	OK	MT	3/17/95
4	Download of Files	OK	MT	3/17/95
5	Historian Configure	OK	MT	3/17/95
6	GPLI & Controller Definition	OK	MT	3/17/95
7	Lan Manager for GPLI & U32	OK	MT	3/17/95
8	System Administration	OK	MT	3/17/95

* TEST EXCEPTIONS 7, 8

Ref. TE 9-26 in Summary

★ TEST EXCEPTION 9

Ref. TE #34 in Summary

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available *LDH*

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

Resolved by Negotiated Settlement
2/27/96

WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

OCS STATION NAME: MICON 2 :

KEY	RESULT	INITIAL	DATE
ANNUNCIATOR *	OK	MT	3/20/95
NODE STATUS	OK	MT	3/20/95
URG ALARM *	Run 3.0.47 passed retest	FFH	3/26/95
ALARM SUMM	OK	MT	3/20/95
PAGE DOWN	OK	MT	3/20/95
PAGE UP	OK	MT	3/20/95
DETAIL * (LOPP SEL / DET)	OK	MT	3/20/95
GROUP OVER (2x) #, ENTER)	OK	MT	3/20/95
HIST (#, enter) *	OK	MT	3/20/95
GEN TREND (#, enter) *	OK	MT	3/20/95
GEN GRAPH (#, enter) *	OK	MT	3/20/95
Arrow Keys:			
UP-LEFT	OK	MT	3/20/95
UP-RIGHT	OK	MT	3/20/95
DOWN-LEFT	OK	MT	3/20/95
DOWN-RIGHT	OK	MT	3/20/95
UP	OK	MT	3/20/95
DOWN	OK	MT	3/20/95
LEFT	OK	MT	3/20/95
RIGHT	OK	MT	3/20/95
HOME * (Unused)	NA	NA	NA

EXCEPTION
#6

NOTE 12
to

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available FFH
MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

FFH 6/26/95
WESTINGHOUSE HANFORD CO.

TEG Resolved in SAT #3
page 72 -a
FFH 5/6/96

Run 3.0.44

WHC-SD-W030-TRP-001, Rev. 0
Attachment 3, p. A3-B1

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON 2 - Continued:

KEY	RESULT	INITIAL	DATE
Group Display Select:			
1	OK	MT	3/20/95
2			
3			
4			
5 *		*	
6 *		*	
7 *		*	
8 *		*	
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

*
NOTE
#13

-NA-
MICON QUALITY ASSURANCE MGR.
[Signature] 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QC
M.C. Deato 3/20/95
WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON 2 - Continued:

KEY	RESULT	INITIAL	DATE
21	OK	MT	3/20/95
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
Function Keys:			
1	OK	MT	3/20/95
2			
3			
4			
5			

-NA-

MICON QUALITY ASSURANCE MGR.
[Signature] 3-21-95
 MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC
M.C. Gerts 3/20/95
 WESTINGHOUSE HANFORD CO.

APPENDIX G

IOK KEYBOARD FUNCTIONS

MICON 2 - Continued:

KEY	RESULT	INITIAL	DATE
6	OK	MT	3/20/95
7	↓	↓	↓
8	↓	↓	↓
MAN (enter)	OK	MT	3/20/95
AUTO (enter)	OK	MT	3/20/95
CAS (enter)	OK	MT	3/20/95
SET POINT (enter 2x)	OK	MT	3/20/95
VALVE (output)	OK	MT	3/20/95
Micon Control:			
DISCR OFF	OK	MT	3/20/95
DISCR ON	OK	MT	3/20/95
RATIO (# Enter Enter)	OK	MT	3/20/95
BIAS (# Enter Enter)	OK	MT	3/20/95
GROUP-NUMERIC-ENTER	OK	MT	3/20/95
GROUP-CLEAR	OK	MT	3/20/95
SILENCE	OK	MT	3/20/95
ACKNOWLEDGE	OK	MT	3/20/95
VIDEO PRINT	OK	MT	3/20/95
CONF KEYB + USER CONF.	OK	MT	3/20/95

Note 1

-NA-

MICON QUALITY ASSURANCE MGR.

Al Rhee 3-21-95
MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

M.C. Dents 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX H

LOI FUNCTIONS

BUTTON	RESULT	INITIAL	DATE
Main (8 tag) Display:			
CNTRL	OK	MT	3/20/95
LST-DP	OK	MT	3/20/95
SIL	NA	NA	NA
ACK	OK	MT	3/20/95
ALARM SUMM PAGE	OK	MT	3/20/95
Control Sub-Display:			
MAN	OK	MT	3/20/95
VAL	OK	MT	3/20/95
AUTO	OK	MT	3/20/95
SP	OK	MT	3/20/95
CASC (file mazf24)	OK	MT	3/20/95
REM	NA	NA	NA
ON	OK	MT	3/20/95
OFF	OK	MT	3/20/95
R/B (ratio) (mazf21%)	OK	MT	3/20/95
R/B (bias) (mazf218)	OK	MT	3/20/95
CLEAR	OK	MT	3/20/95
GROUP	OK	MT	3/20/95
LST-DP	OK	MT	3/20/95
SIL	NA	NA	NA

-NA-

MICON QUALITY ASSURANCE MGR.

MICON PROJECT MGR.

3-21-95

-NA-

WHC QUALITY ASSURANCE/QC

WESTINGHOUSE HANFORD CO.

3-20-95

APPENDIX H

LOI FUNCTIONS

BUTTON	RESULT	INITIAL	DATE
ACK	OK	MT	3/20/95
ALARM SUMM PAGE	OK	MT	3/20/95
Alarm Summ Page:			
RESET	OK	MT	3/20/95
ENGR	OK	MT	3/20/95
PG-UP	OK	MT	3/20/95
PG-DN	OK	MT	3/20/95
CNTRL	OK	MT	3/20/95
LST-DP	OK	MT	3/20/95
SIL	NA	NA	NA
ACK	OK	MT	3/20/95
Engineer's Mode:			
ENABLE CONTROL ACTION	OK	MT	3/20/95
PREVENT CONTROL ACTIONS	OK	MT	3/20/95
ENABLE HORN	NA	NA	NA
DISABLE HORN	NA	NA	NA
CHANGE PASSWORD	OK	MT	3/20/95
SAVE ENVIRONMENT	OK	MT	3/20/95
EXIT ENGR'S MODE	OK	MT	3/20/95

-NA-
MICON QUALITY ASSURANCE MGR.
Al Rk 3-21-95
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QC
M.C. DeT 3-20-95
WESTINGHOUSE HANFORD CO.

APPENDIX I

DISPLAY ACCESS TIME

DISPLAY	FROM MENU BAR	FROM TILE	INITIALS/DATE
Group Ops:			
GROUP	8 sec	5 sec	
* GROUP OVERVIEW	22-50 sec	17-50 sec	
LOOP DETAIL	12 sec	N/A	
AI DETAIL	11 sec	N/A	
Summaries:			
ALARM SUMMARY	11 sec	4½ sec	
URGENT ALARM	11 sec	N/A	
CAUTION ALARM	11 sec	N/A	
ATTENTION ALARM	11 sec	N/A	
MESSAGE HISTORY	11 sec	N/A	
ALARM HISTORY	7 sec	N/A	
OPERATOR ACTION	7 sec	N/A	
OFFLINE LOOPS	9 sec	N/A	
NODE STATUS	10 sec	N/A	
Trend/History:			
TREND DISPLAY	13 sec	6-10 sec	
HISTORY DISPLAY	13 sec	6-10 sec	
HISTORY SUMMARY	9 sec	N/A	
Graphics Disp:			
GRAPHICS	10 sec	< 2 sec *	

TEST
EXCEPTION 16

- NA -

MICON QUALITY ASSURANCE MGR.

Not Available *LH*

MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QC
Accepted as part of Negotiated Settlement
LH 5/6/96
WESTINGHOUSE HANFORD CO.

* Give a range in seconds. Low time is for light display (not many points). High is for busy display (many points).
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★ MEETS SPEC REQUIREMENT OF LESS THAN 2 SECONDS,
BUT ALL OTHER OPERATIONS FAIL TO MEET SPEC.

Attachment 4

SAT #3 Results

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Appendix F Data Sheet	p.
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W-030 MICON S.A.T. # 3 EXCEPTIONS

Version Installation Data: 6-26-95

Sun Operating System: 4.1.4 (Solaris 1.1.2)
Sun Openwindows: 3_414
Run Version 3.0.47 (new)
sys_cnfg version 1.2.5 (new)
Display Builder (A/S/Draw) version 5601.47 (new)
U32 eeprom versions: UR 5309, UB 5313
RCMA eeprom version RCA 5313
RCMD eeprom version RCD 5313
RCMF eeprom version RCF 5313
GPLI eeprom versions: GB/GBX 5310
LOI eeprom version 5310

Note: U32 CPU eeproms are designated "UR", and
U32 Bridge eeproms are designated "UB"

Test Conducted: June 26 to June 28, 1995

Rather than reproduce the entire procedure (most of which was not rerun for this retest), the record copy for SAT #3 will be only the data sheets for the sections which were rerun. This constitutes the following pages: 46-a, 50, 72-b, and 71.

1. GENERIC ALARM INHIBIT OPERATION

The generic inhibit function works as expected when alarms are inhibited AND un-inhibited while the channel is NOT in the alarm state. However, if the channel is in alarm for either the inhibit or un-inhibit function, then subsequent operation is anomolous. If inhibited while in alarm, then the alarm is not cleared and it also remains even after the channel returns to normal. If un-inhibited while in alarm, then the alarm does not immediately activate; it does clear when the channel returns to normal, but fails to activate on the next transition to the alarm condition (i.e. misses the alarm).

2. GENERIC ALARM INHIBIT MONITORING

The only way to determine what alarms are being inhibited, is to page thru the 1000 groups to see if there are any inhibited in each group. Further more this must be done on EACH workstation, since the inhibiting is performed separately on each operator station. There is no summary display nor any other indication

W-030 MICON S.A.T. # 3 EXCEPTIONS

when an alarm is inhibited. This creates a high risk of losing track of what alarms are inhibited.

3. SPURIOUS RESERVED CONTROLLER ALARM: Retest of TE-1:

Section 4.2.3, steps a) - e): When the primary controller is pulled, the backup controller picks up properly and appropriate alarms are received (Reserved_Controller_Activated & Partner_Failed). When the primary controller is restored, the Partner_Failed annunciator clears, but the Reserved_Controller_Activated alarm remains even after the primary is restored to control. The alarm can be cleared by using the front panel activate switch to toggle again to the backup controller and back to the primary.

Steps f) - l): When pull secondary controller get alarm Partner_Failed, as appropriate. The first time the test is performed, when the primary comm tap is pulled, get Controller_Offline alarms for each of the RCM's in the LCU (as appropriate). However, thereafter, the same test does not produce these errors. This was repeated sequentially on each of the four LCU's. In order to reset to proper performance, need to pull the U32's and clear their memory, followed by a complete controller and LM redefinition.

4. SECONDARY FIELDBUS ALARMS

Ref TE's 1 and 2. For LCU's 3 and 4, the Backup_mode_secondary_fieldbus alarms are still generated. The hardware fieldbus cards in these controllers were replaced, but this did not change the problem. The alarms can be deleted, using the newly provided (password controlled) alarm-delete facility, and they do not immediately return. Thus potentially, we could work around the problem by making the OPS response be to simply delete the alarm. However this would require a "supervisory" password access so it would be undesirable if it occurred very frequently. All the conditions which create the alarm not clear, but one condition is the powering down and re-powering the card (such as by re-installing it).

5. USE OF MUD's ON GRAPHICS

Subdrawings, when linked to a MUD, do not update unless the screen is restarted, such as reselecting it from the menu. Also, when a regular object is linked to a MUD, it does not update properly when the screen is first started, but does update properly for changes which occur afterwards. This latter feature is used extensively in our screen design approach and the supporting logic diagrams. Both features do not work in accordance with the documentation.

W-030 MICON S.A.T. # 3 EXCEPTIONS

6. CONFIGURATION UTILITY
TE's 4 & 8 from SAT #2 remain uncorrected.
7. DOCUMENTATION
TE's 7 & 9 from SAT #2 remain uncorrected.
8. DISPLAY CALLUP TIMES
TE 10 from SAT #2 remains uncompliant, though there were some improvements in this revision.

NOTES:

a) Relative to the prior SAT, (SAT#2),

TE's 1,2,3	were reported to be corrected but did not pass retest.
TE's 5 & 6	were corrected and passed retest.
TE's 4 & 8	are configurator issues which were not worked or tested.
TE's 7 & 9	involve documentation aspects which were not not fully tested; however, some testing was conducted of functions explicitly needed for our implementation, which confirmed some operations and resulted in one new TE.
TE-10	was not explicitly worked or tested. However, faster performance was noted on a couple of screens.

b) Since the version 44 update, the Graphics Printer has been printing garbage characters when operator setpoint changes are made on any terminal. MICON corrected this by fixing the definition of "lpline".

c) ANNUNCIATOR COLOR IN UNTRIPPED STATE

When an annunciator is not tripped, the text is so light it is virtually unreadable. Maintenance and operation would be enhanced if the legend were faintly visible (such as a faint gray or dark blue) when there was no alarm. Among other advantages, this would allow clicking on the window to navigate to the screen which shows what tags will generate that particular alarm.

d) The LOI on LCU1 failed. Power supply was replaced and corrected the problem.

d) Experienced a total system crash (UNIX level) on the Engineering Workstation, requiring restart of the system.

W-030 MICON S.A.T. # 3 EXCEPTIONS

- e) Display Builder. When a tagname is assigned to an object (to display the tagname on the screen), the tag is drawn in a single 16 character line with the "Units" appended. Units should not be included, and the string cannot be reformatted to multiple lines, as is done in the group displays.
- f) Display Builder. Utilizing an active subdrawing no longer crashes the system, but it only works with the tag defined on the subdrawing. Cannot relink to a different tag when the subdrawing is included in another drawing as described in the manual.
- g) Display Builder. State names cannot be formatted in the Builder. The names end up left justified exactly as in the tag list, whereas would be desirable to be able to enter a format code, for example, to center them in a string. Currently, it appears that the only way to format them is via hard spaces in the master tag list.
- h) When returning to the console after an extended unattended period, the system is often found in a state where the alarm horn is sounding with no alarms in the alarm log. One possible explanation for this seems to be the Historian alarms, which complain when the disk gets full and no tape is available, but are then cleared automatically when the files are subsequently (automatically) deleted. It nevertheless seems that alarms should NOT be deleted until the operator acknowledges them.

Run 3.0.47

WHC-SD-W030-TRP-001, Rev. 0
Attachment 4, p. A4-6

APPENDIX B.7

U-32R REDUNDANCY TEST
SECTION 4.2.3

TEST STEP	REDUNDANT U32 LOCATION	CRITERIA	ACTUAL RESULT	INITIAL	DATE
a	LCU-1/U32-1	DISABLE PRIMARY U32	NA	NA	NA
b		Verify transfer to backup U32 and alarm messages	OK	LZH	6/30/95
c		Verify analog output maintained	OK	LZH	6/30/95
d		Verify system status on CRT	OK	LZH	6/30/95
e		RESTORE PRIMARY U32 AND ACTIVATE	NA	NA	NA
e		Verify analog output maintained after primary activated			
f		DISABLE BACKUP U32 AND INTRODUCE FAULT	NA	NA	NA
g		Verify no transfer to backup and outputs freeze			
h		Verify system status and alarms on CRT, and deviation of outputs			
i		Verify sample configuration from LOI and PV/outputs track			
j		RESTORE HARDWARE	NA	NA	NA
k		Verify LOI changes reflected on CRT			
l		SIMULATE DATA HIGHWAY FAILURE	NA	NA	NA
m		Verify U32 operation not effected and system status on CRT is okay			

TE #3

TE #3

TE #4

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available - LZH
MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QC

LZH 6/26/95
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APPENDIX B.11

RUN 3.0.47

WHC-SD-W030-TRP-001, Rev. 0
Attachment 4, p. A4-7

SYSTEM TEST SECTION 4.2.7

STEP	CRITERIA	ACTUAL RESULT	INITIAL	DATE
c	All loops are in manual mode.			
d	Alarms and Setpoints are initialized. ✗ ADD BELOW			
e	Analog Input values are zero.			
g	All digital input values are 1.			
i	Bargraph is at a maximum low deviation. L1 deviation alarm is present. Alarm valve is negative and at same magnitude as set point.			
n	Digital output #1 group display is 1-OFF. Digital output is 1-ON.			
1	Alarm Functions			
2	Alarm Priorities			
3	Alarm Color	OK	LPH	6/26/95
4	Annunciator Window	OK - see note	LPH	6/26/95
5	Printer Functions			
6	IOK Operation	SEE APPENDIX G	NA	NA
7	16 Character Tags			
d *	PV and outputs are zero			
d *	PID output and fnc #55 output are zero			

Re test
of TES
passed
LPH

- NA -

MICON QUALITY ASSURANCE MGR.

Not Available LPH

MICON PROJECT MGR.

- NA -

WHC QUALITY ASSURANCE/QUALITY CONTROL

LPH 6/26/95

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APPENDIX F

Run 3.0.47
WHC-SD-4030-TRP-001, Rev. 0
Attachment 4, p. A4-8

MICON CONFIGURATION UTILITIES TEST

UTILITY NO.	CRITERIA	ACTUAL RESULT	INITIALS	DATE
1	Controller Configuration			
2	Graphics Package	TE # 5		
3	Group Configure			
4	Download of Files			
5	Historian Configure			
6	GPLI & Controller Definition			
7	Lan Manager for GPLI & U32			
8	System Administration			

-NA-

MICON QUALITY ASSURANCE MGR.

Not Available LSH

MICON PROJECT MGR.

-NA-

WHC QUALITY ASSURANCE/QUALITY CONTROL

LS Hill 6/26/95

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RUN 3.0.47

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Attachment 4, p. A4-9

APPENDIX G

IOK KEYBOARD FUNCTIONS

OCS STATION NAME: MICON 11 :

KEY	RESULT	INITIAL	DATE
ANNUNCIATOR *			
NODE STATUS			
URG ALARM *	OK	LJH	6/26/95
ALARM SUMM	OK	LJH	6/26/95
PAGE DOWN	OK	LJH	6/26/95
PAGE UP	OK	LJH	6/26/95
DETAIL * (LOOP SEL/DET)			
GROUP OVER (2x) #, ENTER)			
HIST (#, enter) *			
GEN TREND (#, enter) *			
GEN GRAPH (#, enter) *			
Arrow Keys:			
UP-LEFT			
UP-RIGHT			
DOWN-LEFT			
DOWN-RIGHT			
UP			
DOWN			
LEFT			
RIGHT			
HOME * (Unused)	NA	NA	NA

Retest of
TE-6
passed
LJH

-NA-
MICON QUALITY ASSURANCE MGR.

Not Available
LJH
MICON PROJECT MGR.

-NA-
WHC QUALITY ASSURANCE/QC

LJH
6/26/95
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Attachment 5

SAT #4 Results

Attachment 5 Table of Contents

Test Exceptions & Notes

p. A5-2

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8/7/95, Page 1 of 2

W-030 MICON S.A.T. #4 RESULTS

Version Installation Data: 8-1-95

Sun Operating System: 4.1.4 (Solaris 1.1.2)
Sun Openwindows: 3_414
Run Version 3.0.48 (new)
w/ patches to files 'diskmgr', 'almproc', 'hsarch', 'olarch' & 'mcp' (new)
sys_cnfg version 1.2.5
Display Builder (A/S Draw) version 5601.48 (new)
U32 eeprom versions: UR 5310 (new), UB 5313
RCMA eeprom version RCA 5313
RCMD eeprom version RCD 5313
RCMF eeprom version RCF 5313
GPLI eeprom versions: GB/GBX 5310
LOI eeprom version 5310

Note: U32 CPU eeproms are designated "UR", and
U32 Bridge eeproms are designated "UB"

Test Conducted: August 1 to August 4, 1995

SUMMARY:

No new TE's were generated during the test. The testing identified some problems which would have been TE's, however MICON installed new eeprom's in all U-32's and revised versions of certain files to correct these problems. Retesting of TE's 3.1 thru 3.5 shows they are now corrected. TE's 3.6 thru 3.8 were neither worked nor tested and are still applicable.

The following problem showed up after the weekend. It was not noted during the formal test period, because it took the weekend for sufficient data to be generated to exercise the deletion function.

TE4.1: Archiver Fails to Delete Files. The archiver is supposed to delete old files from the disk after suitable warning to the user. The archiver limit alarm is generated, however old files are not being deleted. This results in the disk (partition) filling up and preventing further operation of any system task which needs to write to that disk.

This TE was subsequently corrected (the following week) by "patches" to the files 'mcp', 'diskmgr' and 'olarch'.

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8/7/95, Page 2 of 2

TEST NOTES:

1) TE-3.1 retests OK. The alarm inhibited and clearing operations now work as expected relative to active and/or new alarms. Active alarms are cleared by the inhibit operation, but are restored immediately if the alarm is un-inhibited. Similarly, alarms which occurred while inhibited and are still active (un-ack'ed) are reported when the alarm is un-inhibited.

2) TE-3.2 retests OK. Alarm inhibiting now provides a summary listing of all the alarms which are inhibited. While it would still be necessary to manually search all the lists to find the inhibited alarm, this is not really necessary since the alarm can be un-inhibited from the summary screen. Overall, this provides an acceptable situation.

3) TE-3.3 retests OK. Partner-failed and controller off-line alarms occur as expected when pulling and reinserting the Controllers and the network connections.

4) TE-3.4 is now OK with a hardware PROM upgrade. With the new AS/View run software, the "Backup mode sec fieldbus failed" alarms for controllers U19 and U30 (LCU's 3 and 4) were still constantly present. In troubleshooting the problem, it was discovered that the U-32 Bridge Boards in LCU's 3 and 4 had an older PROM revision (4B03), whereas LCU's 1 and 2 had rev 5309. MICON updated all LCU's to the current revision (5310). With this configuration the fieldbus errors are no longer generated.

5) With AS/View_Rev48 and PROM update noted above, a new annunciator problem developed. A garbage alarm (description field has greek characters) was reported, which could not be acknowledged or deleted. MICON installed "patch" changes to run files 'diskmgr', 'almproc', and 'hsarch' which corrected the problem. The "garbage message" turned out to be a "No Tape in Drive" message erroneously posted by the historian, which is now posted correctly. The change to historian also corrected the "Disk Drive Full" alarm so that it stays active when historian is unable to reclaim disk space. Previously this alarm was automatically deleting after about 1 min (even though the disk was still full), then rearming at the next historian check. Now it remains active as long as the condition is true (disk full), but also rearms at the next historian check - which is the appropriate performance.

However, a couple of ideosyncracies remain in this disk full alarm. If the disk limit is increased after the above pair of alarms occur, then the next execution of the historian removes the Disk_Full alarm but not the No_Tape_In_Drive alarm. This remaining alarm (which should have been removed) cannot be deleted except by bringing AS/VIEW down and back up. Secondly, at this same time, the horn is erroneously sounded, even though there is no new alarm. It also appears that the historian is generically sounding the horn

W-030 SAT4 Results
8/7/95, Page 3 of 2

when AS/VIEW first comes up. Neither of these is a serious defect, as they can be easily worked around. The horn can be easily silenced, and our backup procedures should preclude getting the disk full alarms anyway.

6) TE-3.5 Use of Sub-drawings with MUD's:

The system will now load subdrawings cooresponding to changes in the MUD value, and will use the colors defined in the subdrawing. The capability to draw the subdrawing in "generic white" and adjust colors where the subdrawing is used is limited (and doesn't meet our needs) because it does not handle fill colors. Other features of subdrawings still do not work as per the documentation - for example, active subdrawings which would save considerable effort. However, by using a distinct subdrawing for each desired pictorial there does appear to be a path forward which will allow us to proceed with our planned graphics. It appears we can treat the remaining issues as "documentation" deficiencies.

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