Feb 14 1997

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 161644

2. To: (Receiving Organization) WRAP 1		3. From: (Originating Organization) WRAP 1		4. Related EDT No.: N/A	
5. Proj./Prog./Dept./Div.: W026/Solid Waste Construction		6. Design Authority/ Design Agent/Cog. Engr.: TL Watson		7. Purchase Order No.: N/A	
8. Originator Remarks: For release				9. Equip./Component No.: N/A	
				10. System/Bldg./Facility: N/A	
11. Receiver Remarks: 11A. Design Baseline Document? ☐ Yes ☒ No				12. Major Assm. Dwg. No.: N/A	
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(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	HNF-SD-W026-ATP-022		0	Plant Control System Hardware Plan	Q	2	1	
2	HNF-SD-W026-ATR-022		0	Plant Control System Hardware Report	Q	2	1	

16. KEY					
Approval Designator (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)		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

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Proj. Mgr.: DR Lucas	<i>[Signature]</i>	1/8/97	T4-02						
1	1	Proj. Engr.: JB Payne	<i>[Signature]</i>	1/9/97	T4-02						
1	1	Cog.Eng.: JR Weidert	<i>[Signature]</i>	1/14/97	T4-52						
1	1	Cog. Mgr.: RJ Bottenus	<i>[Signature]</i>	1/14/97	T4-52						
1	1	QA: JR McGee	<i>[Signature]</i>	1/9/97	T4-02						
		Safety									
		Eqv.									
18. JB Payne Signature of EDT Originator		19. RJ Bottenus Authorized Representative for Receiving Organization		20. RJ Bottenus Design Authority/ Cognizant Manager		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments					

W-026 ACCEPTANCE TEST PLAN PLANT CONTROL SYSTEM HARDWARE (SUBMITTAL # 216)

TL WATSON

Flour Daniel Northwest, Inc., Richland, WA 99352-1050
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X-Terminal, Server, Program, LCU, HP, LAN, DMS, CNS, Bar
Code

Abstract: Acceptance Testing of the WRAP 1 Plant Control System
Hardware will be conducted throughout the construction of
WRAP 1 with the final testing on the Process Area hardware
being completed in November 1996. The hardware tests will
be broken out by the following functional areas; Local
Control Units, Operator Control Stations in the WRAP Control
Room, DMS Server, PCS Server, Operator Interface Units,
printers, DMS terminals, WRAP Local Area
Network/Communications, and bar code equipment. This
document will contain completed copies of each of the
hardware tests along with the applicable test logs and
completed test exception reports.

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	Acceptance Test Plan	

1.0 Introduction

This document is to establish a procedure to execute and document all testing necessary for and as required by project criteria for the Waste Receiving and Proecessing (WRAP) facility. The plan presents several sections that describe each aspect of acceptance testing. Technical terms and frequently used acronyms are listed followed by a brief introduction to acceptance testing. An overview of the testing method is provided, followed by descriptions of the required test documents and the suggested test participants along with their role in testing. A test scenario is proved and includes rules for executing test procedures, the criteria used to pass or fail a test, and the requirement for stopping and resuming testing. Additional testing constraints including Safety, Schedule, Facility, and Organization responsibilities are listed. References are also provided for source materials.

This test plan is designed to support the requirements of the contract specification sections. The contract specification section will take precedence in any discrepancy between this test plan and any contract specification.

This test plan may not anticipate all contingencies present in acceptance testing. Appropriate changes in test methods, procedures, documentation, or any other testing item that are required to facilitate testing and that are consistent with contract specifications and are agreed to by Both Buyer and Seller may be made during testing.

2.0 References

Raytheon Specifications for Hanford WRAP Module 1 Project:

Section 13461, "Plant Management System Hardware", Oct 1993.

Section 13462, "Plant Management System Software", Oct 1994.

Section 01655 - Division 1 Specification ATP Requirements, Oct 1993.

IEEE Standard 829-1983, "IEEE Standard for Software Test Documentation"

"WRAP 1 PMS Hardware Requirements" by Westinghouse Hanford Co.

"WRAP 1 PMS Software Requirements" by Westinghouse Hanford Co.

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3.0 Glossary of Terms and Acronyms

ATP	<u>Acceptance Test Procedure. The assembly of all documents required to complete a test of a particular device or software module.</u>
Buyer	<u>The company purchasing an item, component, module, or assembly. Westinghouse Hanford Company is herein referred to as the "Buyer"</u>
Cognizant Witness	<u>The person designated as the primary test witness. This person verifies that each test procedure step is correctly executed and that the output received from each step matches the output expected from each step. This person is also authorized to resolve exceptions.</u>
Exception Log	<u>The form used to record test step output that differs from the expected test step output.</u>
FAT	Factory Acceptance Test
GFE	Government Furnished Equipment
HATP	Hardware Acceptance Test Procedure (The test procedure used for both factory and plant acceptance tests).
HBFATP	Hardware Buyer Factory Acceptance Test Procedure
HBPATP	Hardware Buyer Plant Acceptance Test Procedure
HSFATP	Hardware Seller Factory Acceptance Test Procedure
HSPATP	Hardware Seller Plant Acceptance Test Procedure
ICF KEH	<u>ICF Kaiser Engineers Hanford Company</u>
LLW	<u>Low Level Waste</u>
PCS	Plant Control System
PMS	Plant Management System
Regression Test	<u>Testing resulting from changing a test procedure in a way that affects other test procedures so that the affected test procedures must also be rerun.</u>
Seller	<u>The company or organization producing an item, component, module, or assembly which must be tested.</u>

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PCL Construction Services Inc. and its subcontractors are herein referred to as the "Seller".

SATP Software Acceptance Test Procedure (The test procedure used for both factory and plant acceptance tests).

SBFATP Software Buyer Factory Acceptance Test Procedure

SBPATP Software Buyer Plant Acceptance Test Procedure

SSFATP Software Seller Factory Acceptance Test Procedure

SSPATP Software Seller Plant Acceptance Test Procedure

Test Director The person designated to facilitate and manage testing.

Test Operator The person designated to prepare equipment for testing and perform Test Procedures.

Test Plan The overview document which describes how testing will be performed. (This document).

Test Report The collection of documents created when a Test Procedure is run.

Test Review A meeting held before each test begins to discuss test objectives, test methods, safety precautions, and other items that will facilitate testing.

Test Recorder The person designated the distribute test information to participants and to assembly final test documents.

Test Witness A person designated to witness testing and sign off after successful test procedure completion. This person does not sign off individual test steps or resolve test exceptions.

TRU TransUranic Waste

WRAP Waste Receiving And Processing

WLAN WRAP Local Area Network

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4.0 Items to be tested.

All products supplied by the Seller under Specification Sections 13406, 13407, 13461, and 13462 will be covered under this acceptance test plan and are listed below. A seller and Buyer factory acceptance test (SF, BF) along with a seller and Buyer plant acceptance test (SP, BP) will be executed for a test procedure generated for each logical item or group listed.

Hardware Acceptance Tests

HATP #	Equipment Description	Equipment ID
1.	SHIPPING/RECEIVING/NDA/NDE LOCAL CONTROL UNIT	CNR-12-101
2.	LLW PROCESSING LOCAL CONTROL UNIT	CNR-12-102
3.	TRU PROCESSING LOCAL CONTROL UNIT	CNR-12-103
4.	HVAC/UTIL/MONS LOCAL CONTROL UNIT	CNR-12-104
5.	OPERATOR CONTROL STATIONS including:	
	A. NDE OPERATOR CONTROL STATION #1	CNS-12-101
	B. NDE OPERATOR CONTROL STATION #2	CNS-12-102
	C. TRANSPORT/NDA OPERATOR CONTROL STATION	CNS-12-103
	D. TRANSPORT/NDA OPERATOR CONTROL STATION	CNS-12-104
	E. DISPATCH OPERATOR CONTROL STATION (GFE)	CNS-12-105
6.	DMS CENTRAL PROCESSOR including:	CPU-12-109
	A. DMS DISK DRIVE UNIT	DRV-12-109
	B. DMS SYSTEM TERMINAL	TE-12-109
7.	PCS DATABASE SERVER including:	CPU-12-110
	A. PCS SYSTEM TERMINAL	TE-12-110
8.	GLOVEBOX PROCESS WORKSTATIONS	
	A. LLW ENTRY G.B. PROCESS WORKSTATION	OIU-12-103A
	B. LLW SORTING G.B. PROCESS WORKSTATION	OIU-12-103B
	C. LLW EXIT G.B. PROCESS WORKSTATION	OIU-12-103C
	D. TRU ENTRY G.B. PROCESS WORKSTATION	OIU-12-104A
	E. TRU SORTING G.B. PROCESS WORKSTATION	OIU-12-104B
	F. TRU COMPACTED EMPTY DRUM LOADOUT WORKSTATION	OIU-12-104C
	G. TRU LOADOUT GLOVEBOXES	OIU-12-104D
	H. LLW RWM OPERATOR WORKSTATION	OIU-12-105B
	I. TRU RWM OPERATOR WORKSTATION	OIU-12-106B

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HATP #	Equipment Description	Equipment ID
9.	DMS SYSTEM PRINTERS including:	
	A. SAMPLE MANAGEMENT OFFICE PRINTER (GFE)	PR-12-107
	B. SHIPPING/RECEIVING OFFICE PRINTER (GFE)	PR-12-108
	C. DATA MANAGEMENT SYSTEM PRINTER	PR-12-109
	D. PLANT CONTROL SYSTEM PRINTER	PR-12-110
10.	DMS SYSTEM TERMINALS including:	
	A. LLW DMS TERMINAL	TE-12-103
	B. TRU DMS TERMINAL	TE-12-104
	C. SAMPLE MANAGEMENT OFFICE TERMINAL	TE-12-107
	D. SHIPPING/RECEIVING OFFICE TERMINAL	TE-12-108
	E. LLW RWM PROCESSING MONITOR	OIU-12-105A
	F. TRU RWM PROCESSING MONITOR	OIU-12-106A
	G. TRUPACT STATION TERMINAL	TE-12-124
11.	MISCELLANEOUS COMMUNICATIONS EQUIPMENT including:	
	A. COMMUNICATIONS PROCESSORS IN LCU 101, 102, 103, & 104	
	B. TERMINAL SERVERS (MULTIPLEXORS) WITHIN LCU 102 & 103	
	C. LCU SERIAL COMMUNICATIONS CABLING (232, 422, DH-PLUS)	
	D. 10-BASE-T TRANSCEIVERS USED WITHIN THE PCS SYSTEM	
	E. 10-BASE-T CABLING USED WITHIN THE PCS SYSTEM	
	F. CABLETRON MMAC HUB / ROUTER	

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HATP #	Equipment Description	Equipment ID
12.	BAR CODE EQUIPMENT including:	
	A. FIXED BAR CODE INTERFACE MODULE WITHIN LCU 103	
	B. BAR CODE PRINTER at SHIPPING / RECEIVING	BP-12-120
	C. RADIO LINK CONTROLLER in NDE/NDA AREA	12-NY-104
	D. RADIO LINK CONTROLLER in PROCESS AREA	12-NY-306
	E. RADIO LINK CONTROLLER in SHIPPING / RECEIVING AREA	12-NY-105
	F. RF BAR CODE SCANNER / TERMINAL in AS/RS Area	12-NT/NE-101
	G. FIXED BAR CODE SCANNER/TERMINAL at Rcv Drum Scale Cnvyr	12-NT/NE-102
	H. RF BAR CODE SCANNER / TERMINAL at TRUPACT AREA	12-NT/NE-103
	I. RF BAR CODE SCANNER / TERMINAL at TRU Process Glovebox	12-NT/NE-300
	J. FIXED BAR CODE SCANNER / TERMINAL at TRU Process Glovebox	12-NT/NE-301
	K. RF BAR CODE SCANNER / TERMINAL at TRU RWM Glovebox	12-NT/NE-303
	L. FIXED BAR CODE SCANNER / TERMINAL at TRU RWM Glovebox	12-NT/NE-304
	M. FIXED BAR CODE SCANNER / TERMINAL at TRU RWM Glovebox	12-NT/NE-305
	N. RF BAR CODE SCANNER / TERMINAL at LLW Process Glovebox	12-NT/NE-310
	O. FIXED BAR CODE SCANNER/TERMINAL at LLW Process Glovebox	12-NT/NE-311
	P. FIXED BAR CODE SCANNER/TERMINAL at LLW Process Glovebox	12-NT/NE-312
	Q. RF BAR CODE SCANNER / TERMINAL at LLW RWM Glovebox	12-NT/NE-313
	R. FIXED BAR CODE SCANNER / TERMINAL at LLW RWM Glovebox	12-NT/NE-314
	S. FIXED BAR CODE SCANNER / TERMINAL at LLW RWM Glovebox	12-NT/NE-315
	T. FIXED BAR CODE WEDGE / TERMINAL at LLW RWM Glovebox	12-NT/NE-316
	U. FIXED BAR CODE WEDGE / TERMINAL at Sample Mgmt Office	12-NT/NE-317
	V. RF BAR CODE NETWORK CONTROLLER in LCU 101	12-NY-106
13.	ANNUNCIATOR	UA-12-110
14.	MISCELLANEOUS EQUIPMENT AS REQUIRED	

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HATP Notes:

The test procedures for HATP items #5, 6, 7, 8 (Operator Control Stations) will only include equipment supplied by Systems Interface Inc.

The Bar Code System and annunciator systems are not part of specification section 13461/13462 and, technically, not part of the acceptance test requirement. They are included here and will be tested for completeness. The tests performed for these items within this acceptance test will meet the test requirements found in specification sections 13406 and 13407.

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Software Acceptance Tests

SATP #	Software Process / Module Description	Software Detail Design Section
1.	Receiving	7.1
	<u>A. Receiving Dock</u>	7.1.1
	<u>B. Drum Infeed Conveyor A</u>	7.1.2
	<u>C. Drum Scale Conveyor A</u>	7.1.3
	<u>D. Drum Infeed Conveyor B</u>	7.1.6
2.	Shipping	7.1
	<u>A. Drum Scale Conveyor B</u>	7.1.4
	<u>B. Drum Discharge Conveyor</u>	7.1.11
3.	Autostacking / Retrieving System	7.1.5
4.	Shipping/Receiving/NDE/NDA Internal Transport	7.1
	<u>A. Drum Storage Carousel</u>	7.1.7
	<u>B. Airlock & Transfer Conveyors</u>	7.1.8
	<u>C. Background Drum Storage Conveyors</u>	7.1.9
	<u>D. Empty Drum Infeed Conveyor</u>	7.1.10
5.	NDE/NDA Analysis	7.1
	<u>A. Drum NDE</u>	7.1.12
	<u>B. PAN Systems</u>	7.1.13
	<u>C. GEA Systems</u>	7.1.14
	<u>D. BWAS</u>	7.1.15
	<u>E. Box NDE</u>	7.1.16
6.	Shipping / Receiving / NDE / NDA Supervisory Control	7.1.17
7.	Process Area Internal Transport	7.2
	<u>A. Airlock & Transfer Conveyors</u>	7.2.1
	<u>B. RW Drum Carousel</u>	7.2.3
	<u>C. Empty Drum Conveyor</u>	7.2.2
*** 8.	LLW Process Glovebox	7.2
	<u>A. LLW Lift Tables</u>	7.2.2
	<u>B. Entry Glovebox</u>	7.2.4
	<u>C. Sorting Glovebox</u>	7.2.5
	<u>D. SuperCompactor</u>	7.2.6
	<u>E. Exit Glovebox</u>	7.2.7

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SATP #	Software Process / Module Description	Software Detail Design Section
*** 9.	LLW RWM Glovebox	7.2.8
*** 10.	LLW Supervisory Control	7.2.9
*** 11.	TRU Process	7.3
	A. Entry Glovebox	7.3.3
	B. Sorting Glovebox	7.3.4
	C. Empty Drum Compact Glovebox	7.3.5
	D. Empty Drum Load-out Glovebox	7.3.6
	E. Waste Load-out Glovebox	7.3.7
*** 12.	TRURW Glovebox	7.3.8
*** 13.	TRU Supervisory Control	7.3.9
14.	Fixed Bar Code Processing	7.3.10
15.	Utility Systems	7.4
	A. HVAC	7.4.1
	B. HVAC Supervisory Control	7.4.4
	C. Health Physics Monitors	7.4.2
	D. Facilities Miscellaneous	7.4.3
16.	NetCom. on PCS Server, network system communication including:	7.5
	A. Automated Guided Vehicle (AGV)	7.5
	B. Data Management System (DMS)	7.5
	C. AutoStacking / Retrieving System (AS/RS)	7.5
	D. Packet Assay Monitor (PAM)	7.5
	E. Passive Active Neutron Assay Systems (PAN)	7.5
	F. Gamma Energy Assay Systems (GEA)	7.5
17.	RF Telnet (on PCS Server, communication with all RF Barcode Terminals)	7.6
	(including communication to 12-NT/NE-101, 103, 300, 303, 310, 313)	
18.	SerCom1 (Serial Communications Co-processor located within LCU101)	7.7
	A. Drum Scale Weight Transmitters (A & B)	7.7.1
	B. Box Conveyor Scale Weight Transmitter	7.7.1
19.	SerCom2 (Serial Communications Co-processor located within LCU101)	7.8
	A. Drum Transfer Conveyor Weight Transmitters (A & B)	7.8.1
	B. Lift Table Servo Motor Controllers	7.8.2

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SATP #	Software Process / Module Description	Software Detail Design Section
20.	SerCom3 (Serial Communications Co-processor located within LCU101)	7.9
	A. Lift Table Weight Transmitters	7.9.1
	B. Sort Table Servo Motor Controllers	7.9.2
	C. Lift Table Servo Motor Controllers	7.9.3
21.	SerCom4 (Serial Communications Co-processor located within LCU104)	7.10
	A. HVAC Controller	7.10.1
22.	Misc. Diagnostic and Troubleshooting programmed features	Various

SATP Notes:

The software acceptance tests listed above follow the functional requirements of the systems as listed in the specifications and Detail Software Design Submittal. As each module is tested, the associated communications links will also be tested.

*** corresponds to test procedures currently covered under separate "Integrated Testing" (see below)

5.0 Items Not to be Tested

The test procedures for HATP items #5E, 9A, and 9B (Government Furnished Equipment) will be supplied by Systems Interface but execution of the tests along with Exception Resolution will be the responsibility of the Buyer.

Interface to equipment supplied by others (such as the Supercompactor) will be tested to the point of verifying that the data is appropriately received by that equipment and specifically excludes testing the functionality of that equipment. This equipment includes (among others) the Supercompactor, Gloveboxes, BWAS, NDE, GEA, PAN, SIE, DMS software, Weight transmitters, Health Physics monitors, HVAC controller, Pneumatic Valve Manifolds, Bagless Transfer Port Controllers, AGV, Lift and Sort Tables, Conveyors, Drum Storage Carousels, and Packet Assay Monitor equipment. Systems Interface will work with the vendors of this equipment, as much as possible, to help validate their equipment functionality during the plant acceptance test process. Separate integrated testing may occur under a different test plan. Test procedures covered under these integrated tests may replace or supercede those

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covered within this test plan. In those cases, the Software Acceptance Test Procedures called for under this plan will not be created and they will be covered within the integrated test procedures. The glovebox process lines are currently part of separate integrated testing. Software Acceptance Tests #8 through #14 (shown with *** in the SATP table) are currently covered under separate integrated testing. Buyer approval is required for these omissions.

6.0 Test Documents

Several documents are used to record test information. This section describes test documents and how these documents are assembled to record test results.

The documents used to support testing are:

- Test Plan
- Test Procedure
- Test Report
- Test Procedure Cover Sheet
- Test Procedure Data Sheets (when applicable)
- Additional Supporting Documents (when applicable)
- Test Log
- Test Procedure Exception Log
- Master Test Procedure Exception List
- Test Document Package (TDP)

Document requirements and examples of selected test documents are provided in the Appendix "Examples of Test Documents". The primary test documents are described below.

6.1 Test Plan

This document is the test plan and it describes the purpose for testing, the types of test(s) to be performed, and generally, how the test procedures will be performed, witnessed, approved, along with resolution of exceptions.

Each item called out for testing in the specification sections will be tested. The type of test used to verify that specification requirements are met will vary depending on the nature of the item. Many items can be tested via simple inspection. Other items will require detailed, step-by-step test procedures.

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6.2 Test Procedures

Each item, attribute, property, or feature to be tested represents a "Test Case". Test procedures will be created to include all "test cases". Test procedures describe test case objectives, a list of the items to be tested, references, and test procedure steps. Test procedure steps describe in a step-by-step manner the actions taken and the verifications that will be made to complete testing. To reduce paperwork and simplify testing, where appropriate, multiple related "test cases" should be included in a single test procedure.

Each test procedure contains introduction sections describing the techniques used to perform the test(s), the prerequisites required for each test, special equipment required to complete the tests, and indicates the general safety precautions required during testing.

This test plan calls for both Hardware and Software Test Procedures. The Hardware Acceptance Test Procedures involve testing individual components within an assembly to ensure proper operation in accordance with specification requirements. Equipment inspections may also occur during hardware testing to ensure compliance with specifications. This testing can also be called Functional Testing.

The Software Acceptance Test Procedures involve both performance and integrated testing. The performance tests ensure all items of an assembly work together. Integrated testing demonstrate that all subassemblies of a larger assembly (such as an entire glovebox) operate as a system in accordance with specification requirements. Normal operation, interlock, safety, and error recovery features are to be tested in accordance with specification requirements.

All test procedures will include references to a Buyer supplied "traceability matrix". The **traceability matrix** directly associates each test procedure step with the relevant specification section requirement and is used by the Buyer to verify that each contract specification is addressed by a test procedure. Some test procedures will also include a "testing tree". The **testing tree** provides an overview of the testing to be performed. The **testing tree** lists every test procedure that will be run, and the order for running these procedures under the test plan.

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6.3 Test Reports

During testing, a test report will be prepared for each test procedure executed. Test Reports will contain the following items:

Test procedure Cover Sheet

The Test Procedure Cover Sheet is used to record test-procedure specific information during testing. A completed cover sheet is required for each test procedure.

Test Procedure

Each test step requiring verification will be initialed by the cognizant test witness and a copy of the entire test procedure signed by all relevant witnesses will be included in the test report.

Data Sheet

To simplify testing, whenever a test procedure or a portion of a test procedure is repeatedly executed, or executed for different equipment items, an *optional* data sheet may be used. The data sheet lists the specific information required for each test procedure execution.

For example, if a test is conducted for four identical devices, only one test procedure is written and a data sheet is attached referencing the equipment tag numbers and other information for each device.

Test Procedure Supporting Documents.

Test Procedure Specific Supporting documents are *optional* and are used when additional information is required to complete test procedures. Examples of supporting documents would be equipment operator manuals or guides, calibration values, and other similar documents that can be used to support testing. When included in a test report, supporting documents should be

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labeled with the associated test procedure number and each supporting document page should be sequentially numbered.

Test Procedure Exception Log

A Test Procedure Exception Log is used whenever actual output differs substantially from expected output, resulting in test failure.

A test exception occurs when actual output differs substantially from expected output in a way that materially affects test results. For example, a port door not opening on initiation of an "opening sequence" during testing would be a test exception. Every time a test exception occurs, it is recorded on a Test Procedure Exception Log along with the planned resolution initiated by the cognizant test witness.

After testing has been completed, a master list of all unresolved test exceptions is created. The exception list is included in the final test documentation.

Test Log

During testing, a logbook will be prepared to document test results. The test log serves as a repository of general testing information. Typical log entries will include the date and time the log entry is made, the test procedure being performed, and explanatory comments. An entry is made in the log each time testing using a particular test procedure begins. Test exceptions, unusual test results, reasons for canceling or delaying testing, and other similar information is placed in the test log to provide a comprehensive record of testing.

Test Document Package

The final testing document is often called a "Test Document Package" or "TDP" and is an assembly of all testing documents relevant to the test of a particular assembly, such as the LLW Process Glovebox line.

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To produce a TDP, the test plan, the relevant test procedures, all test reports, the test log, and the exception list for a particular type of testing are assembled. A cover sheet, a table of contents, a brief introduction explaining the objectives and results of the test, and any other supporting documents are added to produce the TDP.

Appendix "Examples of Test Documents" lists the suggested contents for each testing document, and provides examples of selected testing documents.

To reduce the number of TDPs created, where appropriate, the test procedures for different levels of testing may be grouped together as separate sections in a single TDP.

7.0 Test Approach

All tests will include sufficient detail to ensure that all parts of the PMS as provided by the seller (Systems Interface) are functional as specified. All tests must be based upon a test plan and use test procedures submitted to the Buyer and approved. The equipment to be tested is to be completely assembled by the seller and have undergone any preliminary inspections.

The Hardware Acceptance Test Procedures (HATP) involve testing individual components within an assembly to ensure proper operation. For the Local Control Units, this includes the point by point testing of all Inputs and Outputs. Additionally, the Hardware Acceptance Tests will verify that the supplied equipment meets specification requirements via a referenced Requirements Matrix. This testing can also be called Functional Testing. Buyer's presence during this phase of testing is optional, at the Buyer's discretion.

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The Software Acceptance Test Procedures (SATP) involve both performance and integrated testing. The performance tests ensure all items of an assembly work together. Integrated testing demonstrate that all subassemblies of a larger assembly (such as an entire glovebox) operate as a system in accordance with specification requirements. Normal operation, interlock, safety, and error recovery features are to be tested in accordance with specification requirements. This testing includes all PCS software and PCS system interfaces including PLC ladder logic modules, PCS Server RTAP, PCS Server RF Telnet, PCS Server NetComm, along with the application software these modules are executing on.

All testing will be executed for both the seller (internal) and Buyer (pre-delivery) at both the seller's Factory and Buyer's Plant Site. Thus, the PCS system will undergo a total of eight tests, Hardware Seller Factory (HSF), Hardware Buyer Factory (HBF), Software Seller Factory (SSF), Software Buyer Factory (SBF), Hardware Seller Plant (HSP), Hardware Buyer Plant (HBP), Software Seller Plant (SSP), and Software Buyer Plant (SBP). The Seller tests are internal "dry-runs" prior to formal witnessing by a Buyer's representative and do not need any approval beyond the usage of a Buyer approved test procedure. These tests will use the same test procedures as for the formal Buyer tests except that witness(es) used for this testing will be seller supplied cognizant engineers and no Buyer approval is necessary. It is possible (and desirable by the seller, SII) for a Buyer's representative to monitor the seller testing and make informal comments in order to expedite approval and execution of the formal Buyer tests. If and when agreed to by the buyer, some Hardware Acceptance Test Procedures may only be performed at the seller's factory.

For the factory tests, simulation software will be obtained from the network host system vendors for integration into this these procedures, when possible. If these simulation packages are unavailable or can not be delivered without affecting test schedules, simulation software will be developed for those network host systems as necessary by the seller (SII) to facilitate communications and control sequence testing. The simulators will only provide verification that interface commands have "reached" system in the proper format and allow for rudimentary control sequencing of responses back. These simulators may consist entirely of a

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communications routine ('C' program) residing on the network monitoring the pre-defined TCP port addresses for commands and / or data, logging the communication and responding to the commands. The simulators will not be formally tested beyond peer reviews and internal factory tests performed by the seller (Systems Interface Inc). Major systems requiring communication simulation software include the AGV, AS/RS, PAM, DMS, PAN, GEA, and SIE. Currently, simulation software will be generated by seller for the PAN and GEA systems. The DMS will have simulation software generated by the Buyer which includes PCS <--> DMS <--> SIE status. The AGV, AS/RS, and PAM system simulation software may be provided by those vendors. The discrete I/O control (such as NDE) simulation will be performed through separate software modules residing in the LCU's (PLC ladder). All simulation source code developed by the Seller (SII) will be provided to the Buyer for functional verification.

Additional test "tools" will be developed by the seller for the PCS server. These tools will facilitate testing by providing easy access to database entries for bar code values read, I/O point status, network communication packets, etc. These tools will be referenced in the Software Acceptance Test Procedures. These tools will become part of the delivered software package for future Buyer maintenance functions.

A test log will be used to provide a chronological record of relevant details about the execution of tests. The test log will identify items being tested with version / revision levels, the attributes of the environment such as memory and resources available, and any anomalous events with information both before and after the unexpected event.

Note that many tests involve working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components.

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8.0 Suspension Criteria and Resumption Requirements

The Test Director needs to be informed **IMMEDIATELY** if problems are encountered with a procedure, safety or otherwise.

If a procedure cannot be performed as written, the test will be stopped, the equipment will be returned to a safe configuration, and the Test Director will be informed that the procedure cannot be performed as written, and revision or retest is required.

The Test Director will make a determination as to whether the problem is Minor or Significant. The Test Director will get approval from the authorized Buyers cognizant witness before classifying a problem as Minor or Significant and possibly continuing testing.

A Minor problem would be anything that can be resolved with as "AS-BUILT" notes in the test procedure and might be such problems as typographical errors, missing steps, or parameters incorrectly set.

Minor problems do not require an exception report to be generated and resumption of the test can occur immediately.

A Significant problem requires an exception report to be generated and the test will be stopped until the change is approved. This does not prevent the running of another portion of the test unaffected by the problem. Changes made to software may require an impact analysis to determine what other software modules and / or test procedures may have to be re-tested to account for possible secondary effects. This analysis (or re-test list) will be approved by the Buyer's authorized representative witnessing and accepting successful test execution before test resumption may occur. The test exception report will contain this information and provide signatures authorizing disposition.

Certain tests need to be completed in their entirety for a successful execution. These tests will be identified as such in the "Safety, Precautions, and Limitations" section of each procedure.. If a test procedure is not labeled "Needs to be completed in full without interruption for a successful test", then the test procedure can be interrupted at any step and restarted at a later time without having any impact on those test steps occurring later.

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9.0 Test Participant Responsibilities**General**

Each company or organization participating in the specified test will designate personnel to assume the responsibilities and duties as defined herein for their respective roles. The personnel shall become familiar with this document and with the details of the specified test to the extent that they can perform their assigned duties.

Test Director

A cognizant engineer supplied by the seller's subcontractor (Systems Interface)

Coordinates testing with all participants and directs testing.

Acts as a liaison between the participants in the testing.

Is responsible for creation of all testing documents.

Distributes the approved testing schedule before start of testing.

Schedules and conducts a pretest kickoff meeting with the test participants before the start of testing when necessary.

Notifies the persons performing and witnessing the test at least fourteen (14) days before the start of pre-shipment and performance testing, seven (7) days in advance for random assembly inspections, and two (2) days advance notice for all other tests.

Schedules a dry run when necessary (the seller tests).

Notifies affected parties when a change is made to the testing schedule.

Requests in writing from the owner those services, materials, or equipment that have been designated as being supplied by others.

Takes necessary action to clear exceptions to the test. This includes consulting with the cognizant witness and receiving concurrence describing test exceptions as minor or significant.

Confirms that field testing and inspection of the system or portion thereof to be tested has been completed.

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Stops any test which, in his judgment, may cause damage to the system or put the safety of people at risk until the problem has been resolved.

After verifying that there is no adverse impact, may alter the sequence in which systems or subsystems are tested.

Ensures that required environmental conditions are maintained.

If a test is suspended for a period of time or is completed, ensures that the system is left in a safe mode.

Before restarting a suspended test, re verifies the test prerequisites.

Initiates any documentation necessary to record required changes to the test which are incorporated into the final TDP.

Reviews recorded data, discrepancies, and exceptions.

With concurrence of the cognizant test witness, obtains information or changes necessary to clear or resolve objections during the performance of the test.

Signs Execution Test and Approval page when test has been performed.

Signs Exception form when an exception has been resolved.

Obtains required signatures on the original documentation prior to reproduction and distribution.

Cognizant Witness

A Cognizant engineer provided by the Buyer.

Witness the tests.

Review the results of testing.

Provides input and expert advice to resolve test exceptions.

Initials each test step of the Test Procedure Field copy as it is completed, or on a data sheet when provided.

Records test instrument identification numbers and calibration expiration dates.

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Authorized by the Buyer to approve:

- 1) starting, stopping, pausing, and resuming test operations as requested by the Test Director.
- 2) initials each test step
- 3) test completion.
- 4) classification of test problems as Minor or Significant as determined by the Test Director.
- 5) planned resolutions of test exception reports.
- 6) final dispositions of test exception reports.

Witness(es), Inspector

Additional Cognizant engineer(s) provided by the Buyer.

Witness the tests.

Review the results of testing.

Provides input and expert advice to assist in the resolution of test exceptions.

Authorized by the Buyer to approve:

- 1) Final test completion.

Recorder (possibly combined with a Witness or Operator)

Verifies that the test procedure used is the current revision.

Prepares a field copy of the relevant test procedures for use in testing.

Records objections and exceptions on the Test Procedure Exception Log.

Creates Final Exception List.

Updates test procedures due to changes made during testing.

Assembles test documents to produce the Test Document Package.

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Submits the completed TDP to the Test Director. The Test Director transmits a copy to the Buyer when the test has been accepted and exceptions closed.

After test is finished, assigns sequential alphanumeric page number to test documents created during testing (i.e. Test Reports, Test Procedure Exception Logs, data print-outs, etc.) Records appropriate TDP page numbers in the Table of Contents.

Checks and dates each test step on the field copy as it is completed. Records test data as directed by the Test Witnesses. The check box at the ar right of the procedure steps indicate that the step has been completed, not that the test was successful or not.

Records comments and any other relevant information in the Test Log as directed by Test Director or Test Witnesses.

Signs Test Procedure indicating the name of the Recorder.

Test Operator (maybe combined with the Test Director)

A cognizant engineer supplied by the seller, Multiple test operators may conduct testing.

Performs the test under the direction of the Test Director.

Provides labor, equipment, and test instruments required for performing tests which have not been designated as being provided by others.

Requests in writing, from various the suppliers, those services, materials, or equipment that have been designated as supplied by others.

Confirms that equipment required for performing test will be available at the start of testing.

Signs the Test Procedure Cover Sheet.

Signs the Test Procedure Exception Log.

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10.0 Change Control

All test documents will be covered under the Configuration Control Plan and Quality Assurance plans to ensure the latest versions are being used for the test procedures. Please reference these documents for further information.

11.0 Test Execution**Occupational Safety and Health**

Individuals shall carry out their assigned work in a safe manner to protect themselves and others from undue hazards and to prevent damage to property and environment. Performance of test activities shall always include safety and health aspects.

Test Process

Testing starts when the test operator and witness(es) sign the Test Execution form and note in the test log that testing for procedure XXX has started. The log is used to keep a record of all testing events for each testing phase. Major events include starting and stopping of each test procedure, success or failure of execution, and Minor problems that are resolved during testing without generating a test exception report.

The test operator proceeds through prerequisites and setup, and witnesses concur that prerequisites have been satisfied and setup is correct.

Operator starts through the test procedure, with only the cognizant witness initialing the success or failure of each test case and the Recorder checking the steps off as they are completed.

If a test fails, the Test Director classifies the failure as a Minor or Significant problem, the Recorder notes this classification in the Test log and the cognizant witness signs the test log authorizing this classification.

A Minor problem would be anything that can be resolved with as "AS-BUILT" notes in the test procedure and might be such problems as typographical errors, missing steps, or parameters incorrectly set. Minor problems do not require an exception report to be generated and resumption of the test can occur immediately if the test procedure allows for it.

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A Significant problem requires an exception report to be generated and the test will be stopped until the change is approved. This does not prevent the running of another portion of the test unaffected by the problem.

Exceptions are processed by SII by indicating a planned resolution of the exception on the Exception Report form. The planned resolution may indicate an error in the procedure (e.g., missing setup requirement), failure of equipment, or possibly an error caused by GFE, or other cause outside control of SII. If the cognizant witness accepts the planned resolution, the cognizant witness signs the Exception Report form authorizing SII to affect repairs. If the cognizant witness disagrees with the planned resolution, the cognizant witness does not sign, and indicates their reason for the disagreement.

Once repairs or other disposition is complete, SII completes the "Action Taken" section on the Exception Report form. SII and the cognizant witness sign the Exception Report accepting disposition of the problem, indicating that the test procedure is ready for retest. The cognizant witness may also indicate on the Exception Report form that regression testing is required. Regression testing is required in cases where modifications have been made that may affect the results of other test procedures. When an exception is completed, the exception entry is closed on the exception master log.

When all Exception Report forms have been signed off, indicating that a test procedure is ready for retest, the test operator and witness(es) sign a new Test Execution form and start the test at the appropriate place, as indicated in the test procedure's resumption requirements section.

When a test procedure has been executed without any exceptions outstanding, all witnesses sign the approval blocks under the "Disposition" section of the test procedure, indicating a successful test completion. All test output (including printouts, notes, or data files) are marked by date, time, procedure step, test execution number, and page number (if necessary) and are attached to the test execution form.

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For the Buyer factory and plant acceptance tests, SII and the cognizant witness sign the Test Execution form under "Test Acceptance" when all exceptions have been closed and the witness(es) have indicated that the test was successfully completed.

12.0 Risks and Contingencies

A major risk to completion of the testing effort would be the classification of **all** problems encountered in the testing effort as Significant, which requires exception reports to be completed. An exception report stops the current section of a test procedure until approval of the report dispositions and actions. This consumes a lengthy period of time and delay testing significantly, especially if the test requires extensive setup and completion without interruption.

The Minor problem classification with "AS-BUILT" corrections to the test procedure is the most expedient way to allow test continuation to occur for these problems. Minor problems will arise and interrupt the test process. If the problem can be fixed or resolved immediately and is insignificant to functionality of the system, it should not create an extensive amount of administrative paper trails. Note that proper documentation of all AS-BUILT corrections will be performed no matter how test problems are classified (Minor or Significant).

Another important requirement to successful completion of testing is a single cognizant witness. Only one person should be authorized to approve each test step and resolve problems. If multiple sign-offs were required for each step or problem, test time would be extended a considerable amount, most likely to the point of affecting the overall test completion schedule.

Additionally, a mechanism needs to be in place to ensure timely resolution of ECNs generated during the test process. Numerous required specification changes will be discovered during the Seller Software Acceptance Tests and the Seller (Systems Interface) needs to be able to generate approvable ECN's quickly without having to traverse the formal RFI process which would delay test completions significantly. This requires a Buyer's representative (cognizant test witness) present during the Seller Tests to provide engineering consultation with determination of specification changes to be made and to approve the ECN's generated during the tests.

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13.0 General Test Prerequisites

In addition to the test pre-requisites listed in the individual test procedures, Inspection of the installation of the system component to be tested is required. The inspection will include as a minimum:

Inspection of all equipment to check for solid installation, secure wiring, safe environments, and possible damage to the equipment during shipping.

The systems to be tested have been inspected for safety.

All reference documents have been verified for the correct revision number and all changes have been noted.

The simulation software associated with the equipment is available, downloaded, and properly executing.

Power is available.

Associated lamps have been tested.

All necessary process elements are available for use and methods of disposal of spent process elements have been approved by the owner.

Voice communications are available between test locations (if witnesses in multiple locations are required to complete a test).

The Buyer may also wish to inspect the equipment for specification compliance via the *traceability matrix*.

14.0 Support Equipment and Facilities

The Seller shall furnish all support equipment, services, and utilities necessary to perform glovebox inspections and testing.

Typically, inspections and functional testing will be performed at Seller's facilities. Software Acceptance Testing will be performed at the Seller's facilities as much as possible (through simulation) and completely on-site at Buyer's facility.

15.0 Appendices

A sample Hardware Acceptance Test Procedure along with test documents are attached.

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TEST LOCATION/TYPE:

	Seller Factory-SF
--	-------------------

	Buyer Factory-BF
--	------------------

	Seller Plant-SP
--	-----------------

	Buyer Plant-BP
--	----------------

PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
Project Number W-026

Prepared By

Systems Interface Inc.

For Westinghouse Hanford Company

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
 HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-1
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TEST PROCEDURE COVER SHEET

Test Procedure ID: _____ Revision Number: _____
 Execution Number: _____ Start Date-Time: _____
 Test Operator: _____ End Date-Time: _____
 Witness: _____ Inspection Only?: ☐ Yes ☐ No

Test Exceptions Recorded? ☐ Yes ☐ No

COMMENTS:

TEST PROCEDURE APPROVAL

TEST ☐ Successful ☐ Unsuccessful

Contractor (Company): Systems Interface Inc.

Contractor Representative: _____ Date: _____

WHC Projects Representative: _____ Date: _____

WHC NFS Representative: _____ Date: _____
 (NFS = New Facility Startup)

CERTIFICATION OF SATISFACTORY EXECUTION

All test cases for this procedure have been tested and all exception sheets for this test have been resolved.

ICF KEH Representative: _____ Date: _____

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1.0 PURPOSE AND SCOPE

This Acceptance Test Procedure has been prepared to demonstrate that the Shipping/Receiving/NDA/NDE Local Control Unit functions as required by project criteria.

2.0 REFERENCES

Vendor information including Allen Bradley Product Data Bulletins:

- "1771 Allen-Bradley Discrete I/O AC Input and Output Modules",
- "1771 Allen-Bradley Discrete I/O Relay Contact Output Modules",
- "1771 Allen-Bradley Analog Input Module".

2.1 DRAWINGS

Obtain and work with the latest revisions of the following drawings:

940823-HWD-A2301	"Control Panel Layout and Bill of Material"
940820-HWD-01301	"PMS System Architecture"
940823-HWD-01301	"PMS System Architecture"
940823-HWD-A4101	"CNR-12-101 Control Power Distribution and Rack Schedule"
940823-HWD-A4301	"CNR-12-101 120 VAC Digital Inputs, Rack 0, Group 6,7"
940823-HWD-A4302	"CNR-12-101 120 VAC Digital Inputs, Rack 1, Group 0,1"
940823-HWD-A4303	"CNR-12-101 120 VAC Digital Inputs, Rack 1, Group 2,3"
940823-HWD-A4304	"CNR-12-101 120 VAC Digital Inputs, Rack 1, Group 4,5"
940823-HWD-A4305	"CNR-12-101 120 VAC Digital Inputs, Rack 1, Group 6,7"
940823-HWD-A4401	"CNR-12-101 Relay Output Card, Rack 2, Group 0"
940823-HWD-A4402	"CNR-12-101 Relay Output Card, Rack 2, Group 1"
940823-HWD-A4403	"CNR-12-101 Relay Output Card, Rack 2, Group 2"
940823-HWD-A4404	"CNR-12-101 Relay Output Card, Rack 2, Group 3"
940823-HWD-A4405	"CNR-12-101 Relay Output Card, Rack 2, Group 4"
940823-HWD-A4501	"CNR-12-101 Analog Input Card, Rack 0, Group 4"

2.2 SPECIFICATIONS

Obtain and work with the most current revisions of the following documents:

- UE&C Specification Section 13461-all sections
- UE&C Specification Section 13462-2.04.B
- Westinghouse Hanford Company Hardware Requirements Matrix

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3.0 EQUIPMENT, MATERIALS AND TOOLS

NOTE

All Measuring and Test Equipment (M&TE) used to collect data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label.
- Be capable of desired range.
- Have an accuracy consistent with state-of-the-art limitations:
 - a. equal to or greater than the input tolerance specified on the Data Sheet.
 - If device being calibrated is not data sheet associated,
 - b. at least four times greater than the specified device tolerance.

120 VAC Jumper (small alligator clips and or "scrap" wire)

Digital Multimeter (DMM)

Laptop computer with Allen-Bradley on-line programming software

4-20 mA current source

Vendor manuals

4.0 SAFETY, PRECAUTIONS, AND LIMITATIONS

- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:

- 1) Turn off the power source.
- 2) Do not approach the victim until the source of the power has been turned off.
- 3) Drag the victim clear, if necessary.
- 4) Administer Artificial Respiration or CPR if necessary.
- 5) Treat for shock
- 6) Check for other injuries and seek Medical help.
- 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.

- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.

- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.

- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

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5.0 PREREQUISITES

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 VERIFY Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 RECORD test equipment name, equipment number, and calibration expiration date on Data Sheet.
- 5.6 VERIFY that all tag numbers are listed on the Data Sheet.

6.0 SETUP

- 6.1 All computer laptop systems are running with the appropriate PLC ladder data table software screen displayed.

7.0 INSTRUCTIONS

7.1 PRE-TEST AND INSPECTION

- 7.1.1 Verify Steps 1 through 14 on Data Sheet 7.1.
- 7.1.2 Verify Steps 15 through end on Data Sheet 7.1, (that the requirements of the PMS Hardware Requirements matrix are met).
- 7.1.3 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

7.2 DIGITAL INPUT TESTING

- 7.2.1 Perform the following steps for each pair of inputs listed on Data Sheet 7.2:
- 7.2.2 Place a jumper across the pair of inputs specified on the Data Sheet.
- 7.2.3 The corresponding input indicator on the card illuminates.
- 7.2.4 The associated data monitoring table on the laptop computer display follows the input status change.
- 7.2.5 Remove the jumper.
- 7.2.6 The input indicator on the card extinguishes.
- 7.2.7 The associated data monitoring table on the laptop computer display reverts to its previous state.
- 7.2.8 For each group of 16 Inputs, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.2.9 Check either "Pass" or "Fail", and initial the Data Sheet.

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7.3 RELAY OUTPUT TESTING

- 7.3.1 Perform the following steps for each pair of outputs listed on Data Sheet 7.3:
- 7.3.2 Check voltage across card outputs specified on the Data Sheet - should be full voltage (120 VAC).
- 7.3.3 Using the laptop programming interface computer, force the output on.
- 7.3.4 The output indicator on the card lights.
- 7.3.5 Check voltage across outputs - should be no voltage.
- 7.3.6 Using the laptop computer, release the output.
- 7.3.7 The output indicator on the card extinguishes.
- 7.3.8 Check voltage across outputs - it should be full voltage.
- 7.3.9 For each group of 16 Outputs, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.3.10 Check either "Pass" or "Fail", and initial the Data Sheet.

7.4 ANALOG INPUT TESTING

- 7.4.1 Perform the following steps for each pair of inputs listed on Data Sheet 7.4:
- 7.4.2 Connect a 4-20 mA source to card inputs specified on the Data sheet.
- 7.4.3 Set current source to 4 mA.
- 7.4.4 Check reading in PLC using laptop computer. Verify reading is within 0.25% of analog input range. If range is 0.00 to 100.00, reading should be between -0.25 and +0.25
- 7.4.5 Set source to 12 mA.
- 7.4.6 Check readings on laptop computer data table display. Verify reading is within 0.25% of analog input range. If range is 0.00 to 100.00, reading should be between 49.75 and 50.25.
- 7.4.7 Set source to 20 mA.
- 7.4.8 Check readings on laptop computer data table display. Verify reading is within 0.25% of analog input range. If range is 0.00 to 100.00, reading should be between 99.75 and 100.25.
- 7.4.9 For each Analog Input, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.4.10 For each Analog Input, check fused loop power supply and neutral for 24 VDC (+/- 10%).
- 7.4.11 Check either "Pass" or "Fail", and initial the Data Sheet.

8.0 RESTORATION

- 8.1 VERIFY test equipment and all jumpers are removed and field wiring reconnected.
- 8.2 RESTORE system to normal configuration.
- 8.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

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- 9.1 The acceptance criteria of all steps contained within Section 7.0 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

Test Director Date Test Recorder Date

Test Operator Date Witness Date

Witness Date Witness Date

Comments:

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DATA SHEET 7.1

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.1. Pre-Test and Inspection

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legend Plates installed; Fuse replacement labels installed			
1.3	PLC hardware installed per schematics and module dip switches set properly			
1.4	Terminal strips labeled and common jumpers installed on panel side			
1.5	Correct fuses (no greater than maximum specified) or Circuit Breakers installed			
1.6	Motor Overloads correct			
1.7	Wire AWG size, labeled, and color correct			
1.8	Door mounted devices installed properly and secure			
1.9	All terminals tight, perform wire pull tests.			
1.10	Check Main grounding lug, grounding integrity, separate grounds			
1.11	Verify ~ infinite resistance between isolated ground bus and chassis ground bus			
1.12	Apply power and check AC control circuits for proper voltage			
1.13	Check DC power circuits; verify correct voltage			
1.14	Check AC outlets and lights; verify correct voltage and operation			
1.15	Verify requirements 5.1, 15.8, and 15.9 as called for in the Hardware Requirements matrix are met by cycling power to the Programmable Logic Controller (PLC). The PLC should have the actual WRAP program loaded with all databases and be in a "Run" condition prior to the power cycle. The PLC should return the the "Run" condition with no errors upon power-up. All data registers should be preserved. Remove the PLC battery (with power applied) and verify that the low battery light illuminates and PLC status register S:10/0 denotes low battery.			
1.16	Verify specification requirement 5.2 as called for in the Hardware Requirements matrix is met by forcing an output on, verifying the closed contact, turning power off, verifying the now open contact, and then restoring power. After restoration of power, enforce the output.			
1.17	Verify specification requirement 15.10 as called for in the Hardware Requirements matrix is met by monitoring processor status words S8 (last scan) and S9 (max scan) for program scan time in milliseconds. The scan time should not exceed 200 milliseconds.			
1.18	Verify specification requirements 15.28 and 15.29 as called for in the Hardware Requirements matrix are met by monitoring the 24 VDC power output on the termination blocks. While monitoring the voltage, disconnect incoming power on one of the two 24 VDC power supplies. The voltage at the termination blocks should not vary outside of +22 VDC to +30 VDC. Additionally, verify the appropriate PLC input (found on the electrical schematics) activates upon failure of this power supply. Perform this procedure for both 24 VDC power supplies.			
1.19	Verify specification requirement 15.37 as called for in the Hardware Requirements matrix is met by accessing random "N" registers within the PLC via the Data Table Access Module (DTAM) mounted on the front of the Local Control Unit. Verify Read and Write operations occur properly though monitoring the data registers on the laptop computer after the read / write. Verify password is required and must be correctly entered before data change accepted.			

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Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.2. 120 VAC Digital Inputs

Step #	TAG ID	Jumper Terminals	Description	Pass	Fall	Check
1.0	Rack 0, Groups 6,7					
1.1	12-RHS-510	FU1	TB2-1	Health Physics NDE/NDA Alpha Hi Alarm		
1.2	12-XS-510	FU2	TB2-2	Health Physics NDE/NDA Alpha Instr Trouble		
1.3	12-RHS-514	FU3	TB2-3	Health Physics NDE/NDA Beta Hi Alarm		
1.4	12-XS-514	FU4	TB2-4	Health Physics NDE/NDA Beta Instr Trouble		
1.5	12-RHS-511	FU5	TB2-5	Health Physics Ship/Rec Alpha Hi Alarm		
1.6	12-XS-511	FU6	TB2-6	Health Physics Ship/Rec Alpha Instr Trouble		
1.7	12-RHS-515	FU7	TB2-7	Health Physics Ship/Rec Beta Hi Alarm		
1.8	12-XS-515	FU8	TB2-8	Health Physics Ship/Rec Beta Instr Trouble		
1.9	HS-201A	FU9	TB2-9	CV-09-101A NDE Drum Xfer Conveyor		
1.10	SPARE	FU10	TB2-10	SPARE		
1.11	XS-201A,B	FU11	TB2-11	CV-09-101A NDE Drum Xfer Conveyor		
1.12	ZS-201C	FU12	TB2-12	CV-09-101A NDE Drum Xfer Conveyor		
1.13	ZS-201D	FU13	TB2-13	CV-09-101A NDE Drum Xfer Conveyor		
1.14	ZS-201A	FU14	TB2-14	CV-09-101A NDE Drum Xfer Conveyor		
1.15	SPARE	FU15	TB2-15	SPARE		
1.16	SPARE	FU16	TB2-16	SPARE		
1.17	HS-202A	FU17	TB2-21	CV-09-101B NDE Drum Xfer Conveyor		
1.18	SPARE	FU18	TB2-22	SPARE		
1.19	XS-202A,B	FU19	TB2-23	CV-09-101B NDE Drum Xfer Conveyor		
1.20	ZS-202C	FU20	TB2-24	CV-09-101B NDE Drum Xfer Conveyor		
1.21	ZS-202D	FU21	TB2-25	CV-09-101B NDE Drum Xfer Conveyor		
1.22	ZS-202A	FU22	TB2-26	CV-09-101B NDE Drum Xfer Conveyor		
1.23	SPARE	FU23	TB2-27	SPARE		
1.24	HS-203A	FU24	TB2-28	CV-09-101C PAN Drum Xfer Conveyor		
1.25	SPARE	FU25	TB2-29	SPARE		
1.26	XS-203A,B	FU26	TB2-30	CV-09-101C PAN Drum Xfer Conveyor		
1.27	ZS-203C	FU27	TB2-31	CV-09-101C PAN Drum Xfer Conveyor		
1.28	ZS-203D	FU28	TB2-32	CV-09-101C PAN Drum Xfer Conveyor		
1.29	ZS-203A	FU29	TB2-33	CV-09-101C PAN Drum Xfer Conveyor		
1.30	SPARE	FU30	TB2-34	SPARE		
1.31	SPARE	FU31	TB2-35	SPARE		
1.32	SPARE	FU32	TB2-36	SPARE		
1.33		IG Bus	TB2-17	Check shield ground resistance (< 0.01 ohms)		
1.34		IG Bus	TB2-37	Check shield ground resistance (< 0.01 ohms)		

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Step #	TAG ID	Jumper Terminals	Description	Pass	Fail	Check
2.0	Rack 1, Groups 0,1					
2.1	HS-204A	FU33	TB241	CV-09-101D PAN Drum xfer Conveyor		
2.2	SPARE	FU34	TB2-44	SPARE		
2.3	XS-204A,B	FU35	TB2-43	CV-09-101D PAN Drum xfer Conveyor		
2.4	ZS-204C	FU36	TB2-44	CV-09-101D PAN Drum xfer Conveyor		
2.5	ZS-204D	FU37	TB2-45	CV-09-101D PAN Drum xfer Conveyor		
2.6	ZS-204A	FU38	TB2-46	CV-09-101D PAN Drum xfer Conveyor		
2.7	SPARE	FU39	TB2-47	SPARE		
2.8	SPARE	FU40	TB2-48	SPARE		
2.9	HS-205A	FU41	TB2-49	CV-09-101E GEA Drum xfer Conveyor		
2.10	SPARE	FU42	TB2-50	SPARE		
2.11	XS-205A,B	FU43	TB2-51	CV-09-101E GEA Drum xfer Conveyor		
2.12	ZS-205C	FU44	TB2-52	CV-09-101E GEA Drum xfer Conveyor		
2.13	ZS-205D	FU45	TB2-53	CV-09-101E GEA Drum xfer Conveyor		
2.14	ZS-205A	FU46	TB2-54	CV-09-101E GEA Drum xfer Conveyor		
2.15	SPARE	FU47	TB2-55	SPARE		
2.16	SPARE	FU48	TB2-56	SPARE		
2.17	HS-207A	FU49	TB2-61	CV-09-101F GEA Drum xfer Conveyor		
2.18	SPARE	FU50	TB2-62	SPARE		
2.19	XS-207A,B	FU51	TB2-63	CV-09-101F GEA Drum xfer Conveyor		
2.20	ZS-207C	FU52	TB2-64	CV-09-101F GEA Drum xfer Conveyor		
2.21	ZS-207D	FU53	TB2-65	CV-09-101F GEA Drum xfer Conveyor		
2.22	ZS-207A	FU54	TB2-66	CV-09-101F GEA Drum xfer Conveyor		
2.23	SPARE	FU55	TB2-67	SPARE		
2.24	SPARE	FU56	TB2-68	SPARE		
2.25	HS-208A	FU57	TB2-69	CV-09-105A NDE Drum Storage Conveyor		
2.26	SPARE	FU58	TB2-70	SPARE		
2.27	XS-208A,B	FU59	TB2-71	CV-09-105A NDE Drum Storage Conveyor		
2.28	ZS-208C	FU60	TB2-72	CV-09-105A NDE Drum Storage Conveyor		
2.29	ZS-208D	FU61	TB2-73	CV-09-105A NDE Drum Storage Conveyor		
2.30	ZS-208A	FU62	TB2-74	CV-09-105A NDE Drum Storage Conveyor		
2.31	SPARE	FU63	TB2-75	SPARE		
2.32	SPARE	FU64	TB2-76	SPARE		
2.33		IG Bus	TB2-57	Check shield ground resistance (< 0.01 ohms)		
2.34		IG Bus	TB2-77	Check shield ground resistance (< 0.01 ohms)		

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
3.0	Rack 1 Groups 2,3						
3.1	HS-210A	FU65	TB2-81	CV-09-105B Drum Storage Conveyor			
3.2	SPARE	FU66	TB2-82	SPARE			
3.3	XS-210A,B	FU67	TB2-83	CV-09-105B Drum Storage Conveyor			
3.4	ZS-210C	FU68	TB2-84	CV-09-105B Drum Storage Conveyor			
3.5	ZS-210D	FU69	TB2-85	CV-09-105B Drum Storage Conveyor			
3.6	ZS-210A	FU70	TB2-86	CV-09-105B Drum Storage Conveyor			
3.7	SPARE	FU71	TB2-87	SPARE			
3.8	SPARE	FU72	TB2-88	SPARE			
3.9	HS-219A	FU73	TB2-89	CV-09-106 Box Conveyor/Scale			
3.10	XS-219A,B	FU74	TB2-90	CV-09-106 Box Conveyor/Scale			
3.11	ZS-219	FU75	TB2-91	CV-09-106 Box Conveyor/Scale			
3.12	SPARE	FU76	TB2-92	SPARE			
3.13	ND-06-104A/AS	FU77	TB2-93	ND-06-104A NDE Controller			
3.14	ND-06-104A/CS	FU78	TB2-94	ND-06-104A NDE Controller			
3.15	ND-06-104A/EC	FU79	TB2-95	ND-06-104A NDE Controller			
3.16	ND-06-104A/DC	FU80	TB2-96	ND-06-104A NDE Controller			
3.17	ND-06-104A/ES	FU81	TB2-101	ND-06-104A NDE Controller			
3.18	ND-06-104A/IF	FU82	TB2-102	ND-06-104A NDE Controller			
3.19	ND-06-104A/PS	FU83	TB2-103	ND-06-104A NDE Controller			
3.20	ND-06-104A/RD	FU84	TB2-104	ND-06-104A NDE Controller			
3.21	ND-06-104B/AS	FU85	TB2-105	ND-06-104B NDE Controller			
3.22	ND-06-104B/CS	FU86	TB2-106	ND-06-104B NDE Controller			
3.23	ND-06-104B/EC	FU87	TB2-107	ND-06-104B NDE Controller			
3.24	ND-06-104B/ES	FU88	TB2-108	ND-06-104B NDE Controller			
3.25	ND-06-104B/IF	FU89	TB2-109	ND-06-104B NDE Controller			
3.26	ND-06-104B/PS	FU90	TB2-110	ND-06-104B NDE Controller			
3.27	ND-06-104B/RD	FU91	TB2-111	ND-06-104B NDE Controller			
3.28	ND-06-104B/DC	FU92	TB2-112	ND-06-104B NDE Controller			
3.29	HS-106A	FU93	TB2-113	CV-05-101A Drum Infeed Conveyor			
3.30	HS-106B/ST	FU94	TB2-114	CV-05-101A Drum Infeed Conveyor			
3.31	HS-106B/SP	FU95	TB2-115	CV-05-101A Drum Infeed Conveyor			
3.32	HS-106C	FU96	TB2-116	CV-05-101A Drum Infeed Conveyor			
3.33		IG	TB2-97	Check shield ground resistance (< 0.01 ohms)			
3.34		IG	TB2-117	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals	Description	Pass	Fail	Check
4.0	Rack 1 Groups 4,5					
4.1	XS-106A	FU97	TB2-121	CV-05-101A Drum Infeed Conv		
4.2	ZS-106	FU98	TB2-122	CV-05-101A Drum Infeed Conv		
4.3	CV-05-101A/S	FU99	TB2-123	CV-05-101A Drum Infeed Conv		
4.4	SPARE	FU100	TB2-124	SPARE		
4.5	HS-108A	FU101	TB2-125	CV-05-101B Drum Infeed Conv		
4.6	HS-108B	FU102	TB2-126	CV-05-101B Drum Infeed Conv		
4.7	XS-108A,B	FU103	TB2-127	CV-05-101B Drum Infeed Conv		
4.8	ZS-108A	FU104	TB2-128	CV-05-101B Drum Infeed Conv		
4.9	ZS-108B	FU105	TB2-129	CV-05-101B Drum Infeed Conv		
4.10	ZS-108C	FU106	TB2-130	CV-05-101B Drum Infeed Conv		
4.11	SPARE	FU107	TB2-131	SPARE		
4.12	CV-05-101B/S	FU108	TB2-132	CV-05-101B Drum Infeed Conv		
4.13	SPARE	FU109	TB2-133	SPARE		
4.14	HS-109A	FU110	TB2-134	CV-05-102 Drum Discharge Conv		
4.15	HS-109B	FU111	TB2-135	CV-05-102 Drum Discharge Conv		
4.16	XS-109A	FU112	TB2-136	CV-05-102 Drum Discharge Conv		
4.17	ZS-109A	FU113	TB2-141	CV-05-102 Drum Discharge Conv		
4.18	ZS-109B	FU114	TB2-142	CV-05-102 Drum Discharge Conv		
4.19	ZS-109C	FU115	TB2-143	CV-05-102 Drum Discharge Conv		
4.20	SPARE	FU116	TB2-144	SPARE		
4.21	CV-05-102/S	FU117	TB2-145	CV-05-102 Drum Discharge Conv		
4.22	SPARE	FU118	TB2-146	SPARE		
4.23	HS-107A	FU119	TB2-147	CV-05-103A Drum Scale/Conv		
4.24	HS-107B	FU120	TB2-148	CV-05-103A Drum Scale/Conv		
4.25	XS-107A,B	FU121	TB2-149	CV-05-103A Drum Scale/Conv		
4.26	ZS-107	FU122	TB2-150	CV-05-103A Drum Scale/Conv		
4.27	CV-05-103A/S	FU123	TB2-151	CV-05-103A Drum Scale/Conv		
4.28	SPARE	FU124	TB2-152	SPARE		
4.29	HS-110A	FU125	TB2-153	CV-05-103A Drum Scale/Conv		
4.30	HS-110B	FU126	TB2-154	CV-05-103A Drum Scale/Conv		
4.31	XS-110A,B	FU127	TB2-155	CV-05-103A Drum Scale/Conv		
4.32	ZS-110B	FU128	TB2-156	CV-05-103A Drum Scale/Conv		
4.33		IG Bus	TB2-137	Check shield ground resistance (< 0.01		
4.34		IG Bus	TB2-157	Check shield ground resistance (< 0.01		

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
5.0	Rack 1 Groups 6,7						
5.1	CV-05-103B/S	FU129	TB2-161	CV-05-103B Drum Scale/Conv			
5.2	SPARE	FU130	TB2-162	SPARE			
5.3	HS-117A	FU131	TB2-163	CV-05-105 Empty Dr Infeed Conv			
5.4	HS-117B	FU132	TB2-164	CV-05-105 Empty Dr Infeed Conv			
5.5	XS-117A,B	FU133	TB2-165	CV-05-105 Empty Dr Infeed Conv			
5.6	ZS-117A	FU134	TB2-166	CV-05-105 Empty Dr Infeed Conv			
5.7	ZS-117B	FU135	TB2-167	CV-05-105 Empty Dr Infeed Conv			
5.8	SPARE	FU136	TB2-168	SPARE			
5.9	CV-05-105/FS	FU137	TB2-169	CV-05-105 Empty Dr Infeed Conv			
5.10	CV-05-105/RS	FU138	TB2-170	CV-05-105 Empty Dr Infeed Conv			
5.11	SPARE	FU139	TB2-171	SPARE			
5.12	HS-117D/FR	FU140	TB2-172	CV-09-204 Empty Dr Stagng Conv			
5.13	HS-117D/SP	FU141	TB2-173	CV-09-204 Empty Dr Stagng Conv			
5.14	HS-117D/ST	FU142	TB2-174	CV-09-204 Empty Dr Stagng Conv			
5.15	SPARE	FU143	TB2-175	SPARE			
5.16	SPARE	FU144	TB2-176	SPARE			
5.17	HS-104	FU145	TB2-181	NDE/NDA Isolation Door			
5.18	ZS-105	FU146	TB2-182	NDE/NDA Isolation Door			
5.19	ZSC-104	FU147	TB2-183	NDE/NDA Isolation Door			
5.20	ZSO-104	FU148	TB2-184	NDE/NDA Isolation Door			
5.21	CRA	FU149	TB2-185	24 VDC Power Supply #1 Failure			
5.22	CRB	FU150	TB2-186	24 VDC Power Supply #2 Failure			
5.23	ND-05-105/CF	FU151	TB2-187	ND-06-105 Box NDE Controller			
5.24	ND-05-105/PS	FU152	TB2-188	ND-06-105 Box NDE Controller			
5.25	ND-05-105/ES	FU153	TB2-189	ND-06-105 Box NDE Controller			
5.26	ND-05-105/AS	FU154	TB2-190	ND-06-105 Box NDE Controller			
5.27	ND-05-105/IF	FU155	TB2-191	ND-06-105 Box NDE Controller			
5.28	ND-05-105/EC	FU156	TB2-192	ND-06-105 Box NDE Controller			
5.29	ND-05-105/RD	FU157	TB2-193	ND-06-105 Box NDE Controller			
5.30	ND-05-105/DC	FU158	TB2-194	ND-06-105 Box NDE Controller			
5.31	SPARE	FU159	TB2-195	SPARE			
5.32	SPARE	FU160	TB2-196	SPARE			
5.33		IG Bus	TB2-177	Check shield ground resistance (< 0.01 ohms)			
5.34		IG Bus	TB2-197	Check shield ground resistance (< 0.01 ohms)			

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Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.3. Relay Outputs

Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
1.0	Rack 2, Group 0						
1.1	PC-12-400/RA	FU161	TB3-1	NDE/NDA Health Physics Monitoring			
1.2	PC-12-120/RA	FU162	TB3-2	Shipping / Receiving Health Physics Monitoring			
1.3	ZY-201A	FU163	TB3-3	CV-09-101A NDE Drum Tr Conv			
1.4	SPARE	FU164	TB3-4	SPARE			
1.5	CV-09-101A/F	FU165	TB3-5	CV-09-101A NDE Drum Tr Conv			
1.6	CV-09-101A/R	FU166	TB3-6	CV-09-101A NDE Drum Tr Conv			
1.7	ZY-202A	FU167	TB3-7	CV-09-101B NDE Drum Tr Conv			
1.8	SPARE	FU168	TB3-8	SPARE			
1.9	CV-09-101B/F	FU169	TB3-9	CV-09-101B NDE Drum Tr Conv			
1.10	CV-09-101B/R	FU170	TB3-10	CV-09-101B NDE Drum Tr Conv			
1.11	ZY-203A	FU171	TB3-11	CV-09-101C PAN Drum Tr Conv			
1.12	SPARE	FU172	TB3-12	SPARE			
1.13	CV-09-101C/F	FU173	TB3-13	CV-09-101C PAN Drum Tr Conv			
1.14	CV-09-101C/R	FU174	TB3-14	CV-09-101C PAN Drum Tr Conv			
1.15	ZY-204A	FU175	TB3-15	CV-09-101D PAN Drum Tr Conv			
1.16	ZY-204B	FU176	TB3-16	CV-09-101D PAN Drum Tr Conv			
		IG Bus	TB3-17	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
2.0	Rack 2 Group 1						
2.1	CV-09-101D/F	FU177	TB3-21	CV-09-101D PAN Drum Tr Conv			
2.2	CV-09-101D/R	FU178	TB3-22	CV-09-101D PAN Drum Tr Conv			
2.3	ZY-205A	FU179	TB3-23	CV-09-101E GEA Drum Tr Conv			
2.4	SPARE	FU180	TB3-24	SPARE			
2.5	CV-09-101E/F	FU181	TB3-25	CV-09-101E GEA Drum Tr Conv			
2.6	CV-09-101E/R	FU182	TB3-26	CV-09-101E GEA Drum Tr Conv			
2.7	ZY-207A	FU183	TB3-27	CV-09-101F GEA Drum Tr Conv			
2.8	SPARE	FU184	TB3-28	SPARE			
2.9	CV-09-101F/F	FU185	TB3-29	CV-09-101F GEA Drum Tr Conv			
2.10	CV-09-101F/R	FU186	TB3-30	CV-09-101F GEA Drum Tr Conv			
2.11	ZY-208A	FU187	TB3-31	CV-09-105A Drum Sto. Conv.			
2.12	SPARE	FU188	TB3-32	SPARE			
2.13	CV-09-105A/F	FU189	TB3-33	CV-09-105A Drum Sto. Conv.			
2.14	CV-09-105A/R	FU190	TB3-34	CV-09-105A Drum Sto. Conv.			
2.15	CV-09-105B/F	FU191	TB3-35	CV-09-105B Drum Sto. Conv			
2.16	ZY-210A	FU192	TB3-36	CV-09-105B Drum Sto. Conv			
		IG Bus	TB3-37	Check shield ground resistance (< 0.01			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
3.0	Rack 2 Group 2						
3.1	SPARE	FU193	TB3-41	SPARE			
3.2	CV-09-105B/R	FU194	TB3-42	CV-09-105B Drum Sto. Conv.			
3.3	ND-06-104A/CE	FU195	TB3-43	ND-06-104A NDE Controller			
3.4	ND-06-104A/PD	FU196	TB3-44	ND-06-104A NDE Controller			
3.5	ND-06-104A/QD	FU197	TB3-45	ND-06-104A NDE Controller			
3.6	ND-06-104A/SP	FU198	TB3-46	ND-06-104A NDE Controller			
3.7	ND-06-104A/ST	FU199	TB3-47	ND-06-104A NDE Controller			
3.8	ND-06-104A/TF	FU200	TB3-48	ND-06-104A NDE Controller			
3.9	ND-06-104B/CE	FU201	TB3-49	ND-06-104B NDE Controller			
3.10	ND-06-104B/PD	FU202	TB3-50	ND-06-104B NDE Controller			
3.11	ND-06-104B/QD	FU203	TB3-51	ND-06-104B NDE Controller			
3.12	ND-06-104B/SP	FU204	TB3-52	ND-06-104B NDE Controller			
3.13	ND-06-104B/ST	FU205	TB3-53	ND-06-104B NDE Controller			
3.14	ND-06-104B/TF	FU206	TB3-54	ND-06-104B NDE Controller			
3.15	ZEV-106	FU207	TB3-55	CV-05-101A Drum Infeed Conv			
3.16	CV-05-101A/F	FU208	TB3-56	CV-05-101A Drum Infeed Conv			
		IG Bus	TB3-57	Check shield ground resistance (< 0.01			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
4.0	Rack 2 Group 3						
4.1	ZEV-108	FU209	TB3-61	CV-05-101B Drum Infeed Conv.			
4.2	ZY-108C	FU210	TB3-62	CV-05-101B Drum Infeed Conv			
4.3	SPARE	FU211	TB3-63	SPARE			
4.4	CV-05-101B/F	FU212	TB3-64	CV-05-101B Drum Infeed Conv			
4.5	ZEV -109	FU213	TB3-65	CV-05-102 Drum Discharge Conv			
4.6	ZY-109C	FU214	TB3-66	CV-05-102 Drum Discharge Conv			
4.7	SPARE	FU215	TB3-67	SPARE			
4.8	CV-05-102/F	FU216	TB3-68	CV-05-102 Drum Discharge Conv			
4.9	XL -107	FU217	TB3-69	CV-05-103A Drum Scale Conv			
4.10	CV-05-103A/F	FU218	TB3-70	CV-05-103A Drum Scale Conv			
4.11	CV-05-103B/F	FU219	TB3-71	CV-05-103B Drum Scale/Conv			
4.12	XL -110	FU220	TB3-72	CV-05-103B Drum Scale/Conv			
4.13	ZEV -117B	FU221	TB3-73	CV-05-105 Empty Dr Infeed Conv			
4.14	ZY-117B	FU222	TB3-74	CV-05-105 Empty Dr Infeed Conv			
4.15	SPARE	FU223	TB3-75	SPARE			
4.16	CV-05-105/F	FU224	TB3-76	CV-05-105 Empty Dr Infeed Conv			
		IG Bus	TB3-77	Check shield ground resistance (< 0.01			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
5.0	Rack 2 Group 4						
5.1	CV-05-105/R	FU225	TB3-81	CV-05-105 Empty Dr Infeed Conv			
5.2	HS-104/	FU226	TB3-82	NDE/NDA Isolation Door			
5.3	HS-104/	FU227	TB3-83	NDE/NDA Isolation Door			
5.4	ND-06-105-/QD	FU228	TB3-84	ND-06-105 Box NDE Controller			
5.5	ND-06-105-/CE	FU229	TB3-85	ND-06-105 Box NDE Controller			
5.6	ND-06-105-/SP	FU230	TB3-86	ND-06-105 Box NDE Controller			
5.7	ND-06-105-/CR	FU231	TB3-87	ND-06-105 Box NDE Controller			
5.8	ND-06-105-/CS	FU232	TB3-88	ND-06-105 Box NDE Controller			
5.9	SPARE	FU233	TB3-89	SPARE			
5.10	SPARE	FU234	TB3-90	SPARE			
5.11	SPARE	FU235	TB3-91	SPARE			
5.12	SPARE	FU236	TB3-92	SPARE			
5.13	SPARE	FU237	TB3-93	SPARE			
5.14	SPARE	FU238	TB3-94	SPARE			
5.15	SPARE	FU239	TB3-95	SPARE			
5.16	SPARE	FU240	TB3-96	SPARE			
5.17		IG	TB3-97	Check shield ground resistance (< 0.01			

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DATA SHEET 7.4

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.4. Analog Inputs

Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
1.0	Rack 0, Group 4						
1.1	RITA-510	TB4-1	TB4-2	Health Physics NDA/NDE Alpha Cam			
1.2	RITA-514	TB4-5	TB4-6	Health Physics NDA/NDE Beta Cam			
1.3	RITA-511	TB4-9	T6-10	Health Physics Shipping / Receiving Alpha Cam			
1.4	RITA-515	TB4-13	TB4-14	Health Physics Shipping / Receiving Beta CAM			
1.5	SPARE	TB4-17	TB4-18	SPARE			
1.6	SPARE	TB4-21	TB4-22	SPARE			
1.7	SPARE	TB4-25	TB4-26	SPARE			
1.8	SPARE	TB4-29	TB4-30	SPARE			
1.9		IG	TB4-3	Check shield ground reistance (< 0.01 ohms)			
1.10		IG	TB4-7	Check shield ground reistance (< 0.01 ohms)			
1.11		IG	TB4-11	Check shield ground reistance (< 0.01 ohms)			
1.12		IG	TB4-15	Check shield ground reistance (< 0.01 ohms)			
1.13		IG	TB4-19	Check shield ground reistance (< 0.01 ohms)			
1.14		IG	TB4-23	Check shield ground reistance (< 0.01 ohms)			
1.15		IG	TB4-27	Check shield ground reistance (< 0.01 ohms)			
1.16		IG	TB4-31	Check shield ground reistance (< 0.01 ohms)			
1.17		FU242	TB4-4	Verify 24 VDC Available (+/- 2 volts)			
1.18		FU243	TB4-8	Verify 24 VDC Available (+/- 2 volts)			
1.19		FU244	TB4-12	Verify 24 VDC Available (+/- 2 volts)			
1.20		FU245	TB4-16	Verify 24 VDC Available (+/- 2 volts)			
1.21		FU246	TB4-20	Verify 24 VDC Available (+/- 2 volts)			
1.22		FU247	TB4-24	Verify 24 VDC Available (+/- 2 volts)			
1.23		FU248	TB4-28	Verify 24 VDC Available (+/- 2 volts)			
1.24		FU249	TB4-32	Verify 24 VDC Available (+/- 2 volts)			

Systems Interface Inc
TEST RESPONSIBILITY MATRIX

WRAP MODULE I TESTING RESPONSIBILITY MATRIX

Test Procedure: _____ Revision #: _____

Execution Number: _____ Date: _____

FACTORY TESTING

	Seller Factory (Dry Run)	Buyer Factory
Test Director		
Test Operator		
Test Recorder		
Cognizant Test Witness		
Quality Assurance		
Other Witnesses		

SITE TESTING

	Seller Site (Dry Run)	Buyer Site
Test Director		
Test Operator		
Test Recorder		
Cognizant Test Witness		
Title III Inspector		
Raytheon Witness		
Quality Assurance		
WHC Project Witness		
WHC N.F.S. Witness		
Other Witnesses		

Systems Interface Inc
TEST PROCEDURE COVER SHEET

TEST PROCEDURE COVER SHEET

Test Procedure ID: _____ Revision Number: _____

Execution Number: _____ Start Date-Time: _____

Test Operator: _____ End Date-Time: _____

Witness: _____ Inspection Only?: ☐ Yes ☐ No

Test Exceptions Recorded? ☐ Yes ☐ No

COMMENTS:

TEST PROCEDURE APPROVAL

TEST ☐ Successful ☐ Unsuccessful

Contractor (Company): Systems Interface Inc.

Contractor Representative: _____ Date: _____

WHC Projects Representative: _____ Date: _____

WHC NFS Representative: _____ Date: _____
 (NFS = New Facility Startup)

CERTIFICATION OF SATISFACTORY EXECUTION

All test cases for this procedure have been tested and all exception sheets for this test have been resolved.

ICF KEH Representative: _____ Date: _____

Systems Interface Inc.
EXCEPTION REPORT MASTER

Test Procedure ID: _____

Revision Number: _____

[illegible]

Systems Interface Inc
EXCEPTION REPORT

Test Procedure ID: _____ Exception Report Number: _____

Test Step Number: _____ Execution Number: _____

Test Operator: _____ Date: _____

Cognizant Witness: _____ Date: _____

Description of the Exception (Expected Result versus Actual Result):

Resolution:

Approval of Resolution:

Contractor (Company):	<u>Systems Interface Inc.</u>	
Contractor Representative: _____		Date: _____
WHC Projects Representative: _____		Date: _____
WHC NFS Representative: _____ (NFS = New Facility Startup)		Date: _____
ICF KEH Representative: _____		Date: _____

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TEST LOCATION/TYPE:

	Seller Factory-SF
--	-------------------

	Buyer Factory-BF
--	------------------

	Seller Plant-SP
--	-----------------

	Buyer Plant-BP
--	----------------

PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
Project Number W-026

Prepared By

Systems Interface Inc.

For Westinghouse Hanford Company

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
 HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-2
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TEST PROCEDURE COVER SHEET

Test Procedure ID: _____ Revision Number: _____
 Execution Number: _____ Start Date-Time: _____
 Test Operator: _____ End Date-Time: _____
 Witness: _____ Inspection Only?: ☐ Yes ☐ No

Test Exceptions Recorded? ☐ Yes ☐ No

COMMENTS:

TEST PROCEDURE APPROVAL

TEST ☐ Successful ☐ Unsuccessful

Contractor (Company): Systems Interface Inc.

Contractor Representative: _____ Date: _____

WHC Projects Representative: _____ Date: _____

WHC NFS Representative: _____ Date: _____
 (NFS = New Facility Startup)

CERTIFICATION OF SATISFACTORY EXECUTION

All test cases for this procedure have been tested and all exception sheets for this test have been resolved.

ICF KEH Representative: _____ Date: _____

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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1.0 PURPOSE AND SCOPE

This Acceptance Test Procedure has been prepared to demonstrate that the Shipping/Receiving/NDA/NDE Local Control Unit functions as required by project criteria.

2.0 REFERENCES

Vendor information including Allen Bradley Product Data Bulletins:

"1771 Allen-Bradley Discrete I/O AC Input and Output Modules",
"1771 Allen-Bradley Discrete I/O Relay Contact Output Modules",
"1771 Allen-Bradley Analog Input Module".

2.1 DRAWINGS

Obtain and work with the latest revisions of the following drawings:

940823-HWD-B2301	"Control Panel Layout and Bill of Material"
940820-HWD-01301	"PMS System Architecture"
940823-HWD-01301	"PMS System Architecture"
940823-HWD-B4101	"CNR-12-102 Control Power Distribution and Rack Schedule"
940823-HWD-B4102	"CNR-12-102 Control Power Distribution and Rack Schedule"
940823-HWD-B4301	"CNR-12-102 120 VAC Digital Inputs, Rack 1, Group 0,1"
940823-HWD-B4302	"CNR-12-102 120 VAC Digital Inputs, Rack 1, Group 2,3"
940823-HWD-B4303	"CNR-12-102 120 VAC Digital Inputs, Rack 1, Group 4,5"
940823-HWD-B4304	"CNR-12-102 120 VAC Digital Inputs, Rack 1, Group 6,7"
940823-HWD-B4305	"CNR-12-102 120 VAC Digital Inputs, Rack 2, Group 0,1"
940823-HWD-B4306	"CNR-12-102 120 VAC Digital Inputs, Rack 2, Group 2,3"
940823-HWD-B4307	"CNR-12-102 120 VAC Digital Inputs, Rack 2, Group 4,5"
940823-HWD-B4308	"CNR-12-102 120 VAC Digital Inputs, Rack 2, Group 6,7"
940823-HWD-B4309	"CNR-12-102 120 VAC Digital Inputs, Rack 3, Group 0,1"
940823-HWD-B4310	"CNR-12-102 120 VAC Digital Inputs, Rack 3, Group 2"
940823-HWD-B4401	"CNR-12-102 Relay Output Card, Rack 4, Group 0"
940823-HWD-B4402	"CNR-12-102 Relay Output Card, Rack 4, Group 1"
940823-HWD-B4403	"CNR-12-102 Relay Output Card, Rack 4, Group 2"
940823-HWD-B4404	"CNR-12-102 Relay Output Card, Rack 4, Group 3"
940823-HWD-B4405	"CNR-12-102 Relay Output Card, Rack 4, Group 4"
940823-HWD-B4406	"CNR-12-102 Relay Output Card, Rack 4, Group 5"
940823-HWD-B4407	"CNR-12-102 Relay Output Card, Rack 4, Group 6"
940823-HWD-B4408	"CNR-12-102 Relay Output Card, Rack 4, Group 7"
940823-HWD-B4409	"CNR-12-102 Relay Output Card, Rack 5, Group 0"
940823-HWD-B4410	"CNR-12-102 Relay Output Card, Rack 5, Group 1"
940823-HWD-B4501	"CNR-12-102 Analog Input Card, Rack 0, Group 6"

2.2 SPECIFICATIONS

Obtain and work with the most current revisions of the following documents:

UE&C Specification Section 13461-all sections
UE&C Specification Section 13462-2.04.B
Westinghouse Hanford Company Hardware Requirements Matrix

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3.0 EQUIPMENT, MATERIALS AND TOOLS

NOTE

All Measuring and Test Equipment (M&TE) used to collect data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label.
- Be capable of desired range.
- Have an accuracy consistent with state-of-the-art limitations:
 - a. equal to or greater than the input tolerance specified on the Data Sheet.
 - If device being calibrated is not data sheet associated,
 - b. at least four times greater than the specified device tolerance.

120 VAC Jumper (small alligator clips and or "scrap" wire)
 Digital Multimeter (DMM)
 Laptop computer with Allen-Bradley on-line programming software
 4-20 mA current source
 Vendor manuals

4.0 SAFETY, PRECAUTIONS, AND LIMITATIONS

- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:
 - 1) Turn off the power source.
 - 2) Do not approach the victim until the source of the power has been turned off.
 - 3) Drag the victim clear, if necessary.
 - 4) Administer Artificial Respiration or CPR if necessary.
 - 5) Treat for shock
 - 6) Check for other injuries and seek Medical help.
 - 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.
- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.
- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.
- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

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PAGE 5 of 31****5.0 PREREQUISITES**

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 VERIFY Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 RECORD test equipment name, equipment number, and calibration expiration date on Data Sheet.
- 5.6 VERIFY that all tag numbers are listed on the Data Sheet.

6.0 SETUP

- 6.1 All computer laptop systems are running with the appropriate PLC ladder data table software screen displayed.

7.0 INSTRUCTIONS**7.1 PRE-TEST AND INSPECTION**

- 7.1.1 Verify Steps 1 through 14 on Data Sheet 7.1.
- 7.1.2 Verify Steps 15 through end on Data Sheet 7.1, (that the requirements of the PMS Hardware Requirements matrix are met).
- 7.1.3 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

7.2 DIGITAL INPUT TESTING

- 7.2.1 Perform the following steps for each pair of inputs listed on Data Sheet 7.2:
- 7.2.2 Place a jumper across the pair of inputs specified on the Data Sheet.
- 7.2.3 The corresponding input indicator on the card illuminates.
- 7.2.4 The associated data monitoring table on the laptop computer display follows the input status change.
- 7.2.5 Remove the jumper.
- 7.2.6 The input indicator on the card extinguishes.
- 7.2.7 The associated data monitoring table on the laptop computer display reverts to its previous state.
- 7.2.8 For each group of 16 Inputs, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.2.9 Check either "Pass" or "Fail", and initial the Data Sheet.

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7.3 RELAY OUTPUT TESTING

- 7.3.1 Perform the following steps for each pair of outputs listed on Data Sheet 7.3:
- 7.3.2 Check voltage across card outputs specified on the Data Sheet - should be full voltage (120 VAC).
- 7.3.3 Using the laptop programming interface computer, force the output on.
- 7.3.4 The output indicator on the card lights.
- 7.3.5 Check voltage across outputs - should be no voltage.
- 7.3.6 Using the laptop computer, release the output.
- 7.3.7 The output indicator on the card extinguishes.
- 7.3.8 Check voltage across outputs - it should be full voltage.
- 7.3.9 For each group of 16 Outputs, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.3.10 Check either "Pass" or "Fail", and initial the Data Sheet.

7.4 ANALOG INPUT TESTING

- 7.4.1 Perform the following steps for each pair of inputs listed on Data Sheet 7.4:
- 7.4.2 Connect a 4-20 mA source to card inputs specified on the Data sheet.
- 7.4.3 Set current source to 4 mA.
- 7.4.4 Check reading in PLC using laptop computer.
- 7.4.5 Set source to 12 mA.
- 7.4.6 Check readings on laptop computer data table display. Verify reading is within 0.25% of analog input range. If range is 0.00 to 100.00, reading should be between 49.75 and 50.25.
- 7.4.7 Set source to 20 mA.
- 7.4.8 Check readings on laptop computer data table display. Verify reading is within 0.25% of analog input range. If range is 0.00 to 100.00, reading should be between 99.75 and 100.25.
- 7.4.9 For each Analog Input, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.4.10 For each Analog Input, check fused loop power supply and neutral for 24 VDC (+/- 10%).
- 7.4.11 Check either "Pass" or "Fail", and initial the Data Sheet.

8.0 RESTORATION

- 8.1 VERIFY test equipment and all jumpers are removed and field wiring reconnected.
- 8.2 RESTORE system to normal configuration.
- 8.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

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9.0 DISPOSITION

- 9.1 The acceptance criteria of all steps contained within Section 7.0 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

 Test Director Date Test Recorder Date

 Test Operator Date Witness Date

 Witness Date Witness Date

Comments:

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DATA SHEET 7.1

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.1. Pre-Test and Inspection

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legend Plates installed; Fuse replacement labels installed			
1.3	PLC hardware installed per schematics and module dip switches set properly			
1.4	Terminal strips labeled and common jumpers installed on panel side			
1.5	Correct fuses (no greater than maximum specified) or Circuit Breakers installed			
1.6	Motor Overloads correct			
1.7	Wire AWG size, labeled, and color correct			
1.8	Door mounted devices installed properly and secure			
1.9	All terminals tight, perform wire pull tests.			
1.10	Check Main grounding lug, grounding integrity, separate grounds			
1.11	Verify - infinite resistance between isolated ground bus and chassis ground bus			
1.12	Apply power and check AC control circuits for proper voltage			
1.13	Check DC power circuits; verify correct voltage			
1.14	Check AC outlets and lights, verify correct voltage and operation			
1.15	Verify requirements 5.1, 15.8, and 15.9 as called for in the Hardware Requirements matrix are met by cycling power to the Programmable Logic Controller (PLC). The PLC should have the actual WRAP program loaded with all databases and be in a "Run" condition prior to the power cycle. The PLC should return the "Run" condition with no errors upon power-up. All data registers should be preserved. Remove the PLC battery (with power applied) and verify that the low battery light illuminates and PLC status register S:10/0 denotes low battery.			
1.16	Verify specification requirement 5.2 as called for in the Hardware Requirements matrix is met by forcing an output on, verifying the closed contact, turning power off, verifying the now open contact, and then restoring power. After restoration of power, unforce the output.			
1.17	Verify specification requirement 15.10 as called for in the Hardware Requirements matrix is met by monitoring processor status words S8 (last scan) and S9 (max scan) for program scan time in milliseconds. The scan time should not exceed 200 milliseconds.			
1.18	Verify specification requirements 25.38 and 15.29 as called for in the Hardware Requirements matrix are met by monitoring the 24 VDC power output on the termination blocks. While monitoring the voltage, disconnect incoming power on one of the two 24 VDC power supplies. The voltage at the termination blocks should not vary outside of +22 VDC to +30 VDC. Additionally, verify the appropriate PLC input (found on the electrical schematics) activates upon failure of this power supply. Perform this procedure for both 24 VDC power supplies.			
1.19	Verify specification requirement 15.37 as called for in the Hardware Requirements matrix is met by accessing random "N" registers within the PLC via the Data Table Access Module (DTAM) mounted on the front of the Local Control Unit. Verify Read and Write operations occur properly though monitoring the data registers on the laptop computer after the read / write. Verify password is required and must be correctly entered before data change accepted.			

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DATA SHEET 7.2

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.2. 120 VAC Digital Inputs

Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
1.0	Rack 1, Groups 0,1						
1.1	09-HS-211A	FU1	TB2-1	CV-09-103A DRUM TRANSF CONV			
1.2	09-XS-211A	FU2	TB2-2	CV-09-103A DRUM TRANSF CONV			
1.3	09-ZS-211A	FU3	TB2-3	CV-09-103A DRUM TRANSF CONV			
1.4	SPARE	FU4	TB2-4	SPARE			
1.5	09-ZS-211C	FU5	TB2-5	CV-09-103A Drum Transf Conv			
1.6	09-ZS-211D	FU6	TB2-6	CV-09-103A Drum Transf Conv			
1.7	09-HS-212A	FU7	TB2-7	CV-09-103B Drum Transf Conv			
1.8	09-XS-212A	FU8	TB2-8	CV-09-103B Drum Transf Conv			
1.9	09-ZS-212A	FU9	TB2-9	CV-09-103B Drum Transf Conv			
1.10	SPARE	FU10	TB2-10	SPARE			
1.11	09-ZS-212C	FU11	TB2-11	CV-09-103B Drum Transf Conv			
1.12	09-ZS-212D	FU12	TB2-12	CV-09-103B Drum Transf Conv			
1.13	09-HS-213A	FU13	TB2-13	CV-09-104A Drum Airlock Conv			
1.14	09-XS-213A	FU14	TB2-14	CV-09-104A Drum Airlock Conv			
1.15	09-ZS-213A	FU15	TB2-15	CV-09-104A Drum Airlock Conv			
1.16	09-ZS-213B	FU16	TB2-16	CV-09-104A Drum Airlock Conv.			
1.17	09-HS-214A	FU17	TB2-21	CV-09-104B Drum Airlock Conv			
1.18	09-XS-214A	FU18	TB2-22	CV-09-104B Drum Airlock Conv			
1.19	09-ZS-214A	FU19	TB2-23	CV-09-104A Drum Airlock Conv.			
1.20	09-ZS-214B	FU20	TB2-24	CV-09-104B Drum Airlock Conv			
1.21	09-HS-215A	FU21	TB2-25	CV-09-201A Drum Transf Conv			
1.22	09-XS-215A	FU22	TB2-26	CV-09-201A Drum Transf Conv			
1.23	09-ZS-215A	FU23	TB2-27	CV-09-201A Drum Transf Conv			
1.24	SPARE	FU24	TB2-28	SPARE			
1.25	09-ZS-215C	FU25	TB2-29	CV-09-201A Drum Transf Conv			
1.26	09-ZS-215D	FU26	TB2-30	CV-09-201A Drum Transf Conv			
1.27	09-HS-216A	FU27	TB2-31	CV-09-201B Drum Transf Conv			
1.28	09-XS-216A	FU28	TB2-32	CV-09-201B Drum Transf Conv			
1.29	09-ZS-216A	FU29	TB2-33	CV-09-201B Drum Transf Conv			
1.30	SPARE	FU30	TB2-34	SPARE			
1.31	09-ZS-216C	FU31	TB2-35	CV-09-201B Drum Transf Conv			
1.32	09-ZS-216D	FU32	TB2-36	CV-09-201B Drum Transf Conv			
1.33		IG Bus	TB2-17	Check shield ground resistance (< 0.01 ohms)			
1.34		IG Bus	TB2-37	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals	Description	Pass	Fail	Check
2.0	Rack 1, Groups 2,3					
2.1	09-HS-217A	FU33 TB241	NDE/NDA Airlock Inlet Door 1			
2.2	09-ZS-217	FU34 TB2-44	NDE/NDA Airlock Inlet Door 1			
2.3	09-ZSC-217	FU35 TB2-43	NDE/NDA Airlock Inlet Door 1			
2.4	09-ZSO-217	FU36 TB2-44	NDE/NDA Airlock Inlet Door 1			
2.5	09-HS-251A	FU37 TB2-45	NDE/NDA Airlock Outlet Door 2			
2.6	09-ZS-251	FU38 TB2-46	NDE/NDA Airlock Outlet Door 2			
2.7	09-ZSC-251	FU39 TB2-47	NDE/NDA Airlock Outlet Door 2			
2.8	09-ZSO-251	FU40 TB2-48	NDE/NDA Airlock Outlet Door 2			
2.9	09-HS-252A	FU41 TB2-49	Process Airlock Inlet Door 2			
2.10	09-ZS-252	FU42 TB2-50	Process Airlock Inlet Door 2			
2.11	09-ZSC-252	FU43 TB2-51	Process Airlock Inlet Door 2			
2.12	09-ZSO-252	FU44 TB2-52	Process Airlock Inlet Door 2			
2.13	09-HS-218A	FU45 TB2-53	Process Airlock Outlet Door 1			
2.14	09-ZS-218	FU46 TB2-54	Process Airlock Outlet Door 1			
2.15	09-ZSC-218	FU47 TB2-55	Process Airlock Outlet Door 1			
2.16	09-ZSO-218	FU48 TB2-56	Process Airlock Outlet Door 1			
2.17	09-ZS-225A	FU49 TB2-61	LT-09-201A RWM TRU Lift Table			
2.18	09-HS-227A	FU50 TB2-62	LT-09-201D RWM LLW Lift Table			
2.19	09-HS-227B	FU51 TB2-63	LT-09-201D RWM LLW Lift Table			
2.20	09-HS-227B	FU52 TB2-64	LT-09-201D RWM LLW Lift Table			
2.21	09-HS-227C	FU53 TB2-65	LT-09-201D RWM LLW Lift Table			
2.22	09-HS-227C	FU54 TB2-66	LT-09-201D RWM LLW Lift Table			
2.23	09-HS-227D	FU55 TB2-67	LT-09-201D RWM LLW Lift Table			
2.24	09-ZS-227A	FU56 TB2-68	LT-09-201D RWM LLW Lift Table			
2.25	09-XS-227A	FU57 TB2-69	LT-09-201D RWM LLW Lift Table			
2.26	SPARE	FU58 TB2-70	SPARE			
2.27	09-ZS-227C	FU59 TB2-71	LT-09-201D RWM LLW Lift Table			
2.28	09-ZS-227D	FU60 TB2-72	LT-09-201D RWM LLW Lift Table			
2.29	09-ZS-227E	FU61 TB2-73	LT-09-201D RWM LLW Lift Table			
2.30	09-ZS-227F	FU62 TB2-74	LT-09-201D RWM LLW Lift Table			
2.31	09-ZS-227G	FU63 TB2-75	LT-09-201D RWM LLW Lift Table			
2.32	SPARE	FU64 TB2-76	SPARE			
2.33		IG Bus TB2-57				
2.34		IG Bus TB2-77				

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
3.0	Rack 1 Groups 4,5						
3.1	SPARE	FU65	TB2-81	SPARE			
3.2	09-HS-229A	FU66	TB2-82	LT-09-201E RWM LLW Lift Table			
3.3	09-HS-229B	FU67	TB2-83	LT-09-201E RWM LLW Lift Table			
3.4	09-HS-229B	FU68	TB2-84	LT-09-201E RWM LLW Lift Table			
3.5	09-HS-229C	FU69	TB2-85	LT-09-201E RWM LLW Lift Table			
3.6	09-HS-229C	FU70	TB2-86	LT-09-201E RWM LLW Lift Table			
3.7	09-HS-229D	FU71	TB2-87	LT-09-201E RWM LLW Lift Table			
3.8	09-XS-229A	FU72	TB2-88	LT-09-201E RWM LLW Lift Table			
3.9	09-ZS-229A	FU73	TB2-89	LT-09-201E RWM LLW Lift Table			
3.10	SPARE	FU74	TB2-90	SPARE			
3.11	09-ZS-229C	FU75	TB2-91	LT-09-201E RWM LLW Lift Table			
3.12	09-ZS-229D	FU76	TB2-92	LT-09-201E RWM LLW Lift Table			
3.13	09-ZS-229E	FU77	TB2-93	LT-09-201E RWM LLW Lift Table			
3.14	09-ZS-229F	FU78	TB2-94	LT-09-201E RWM LLW Lift Table			
3.15	09-ZS-229G	FU79	TB2-95	LT-09-201E RWM LLW Lift Table			
3.16	SPARE	FU80	TB2-96	SPARE			
3.17	SPARE	FU81	TB2-101	SPARE			
3.18	09-HS-231A	FU82	TB2-102	LT-09-201F RWM LLW Lift Table			
3.19	09-HS-231B	FU83	TB2-103	LT-09-201F RWM LLW Lift Table			
3.20	09-HS-231B	FU84	TB2-104	LT-09-201F RWM LLW Lift Table			
3.21	09-HS-231C	FU85	TB2-105	LT-09-201F RWM LLW Lift Table			
3.22	09-HS-231C	FU86	TB2-106	LT-09-201F RWM LLW Lift Table			
3.23	09-HS-231D	FU87	TB2-107	LT-09-201F RWM LLW Lift Table			
3.24	09-XS-231A	FU88	TB2-108	LT-09-201F RWM LLW Lift Table			
3.25	09-ZS-231A	FU89	TB2-109	LT-09-201F RWM LLW Lift Table			
3.26	SPARE	FU90	TB2-110	SPARE			
3.27	09-ZS-231C	FU91	TB2-111	LT-09-201F RWM LLW Lift Table			
3.28	09-ZS-231D	FU92	TB2-112	LT-09-201F RWM LLW Lift Table			
3.29	09-ZS-231E	FU93	TB2-113	LT-09-201F RWM LLW Lift Table			
3.30	09-ZS-231F	FU94	TB2-114	LT-09-201F RWM LLW Lift Table			
3.31	09-ZS-231G	FU95	TB2-115	LT-09-201F RWM LLW Lift Table			
3.32	SPARE	FU96	TB2-116	SPARE			
3.33		IG	TB2-97	Check shield ground resistance (< 0.01 ohms)			
3.34		IG	TB2-117	Check shield ground resistance (< 0.01 ohms)			

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4.0	Rack 1 Groups 6,7					
4.1	SPARE	FU97	TB2-121	SPARE		
4.2	09-HS-233A	FU98	TB2-122	LT-09-202A Proc LLW Lift Table		
4.3	DO-07-105/CS	FU99	TB2-123	DO-07-105 LLW Sort. Bagless Xfer Port		
4.4	DO-07-105/OS	FU100	TB2-124	DO-07-105 LLW Sort. Bagless Xfer Port		
4.5	DO-07-201/CS	FU101	TB2-125	DO-07-201 LLW RWM Bagless Xfer Port		
4.6	DO-07-202/OS	FU102	TB2-126	DO-07-201 LLW RWM Bagless Xfer Port		
4.7	SPARE	FU103	TB2-127	SPARE		
4.8	09-XS-233A	FU104	TB2-128	LT-09-202A Proc LLW Lift Table		
4.9	09-ZS-233A	FU105	TB2-129	LT-09-202A Proc LLW Lift Table		
4.10	SPARE	FU106	TB2-130	SPARE		
4.11	09-ZS-233C	FU107	TB2-131	LT-09-202A Proc LLW Lift Table		
4.12	09-ZS-233D	FU108	TB2-132	LT-09-202A Proc LLW Lift Table		
4.13	09-ZS-233E	FU109	TB2-133	LT-09-202A Proc LLW Lift Table		
4.14	09-ZS-233F	FU110	TB2-134	LT-09-202A Proc LLW Lift Table		
4.15	09-ZS-233G	FU111	TB2-135	LT-09-202A Proc LLW Lift Table		
4.16	SPARE	FU112	TB2-136	SPARE		
4.17	SPARE	FU113	TB2-141	SPARE		
4.18	09-HS-237A	FU114	TB2-142	LT-09-202C Proc TRU Lift Table		
4.19	SPARE	FU115	TB2-143	SPARE		
4.20	SPARE	FU116	TB2-144	SPARE		
4.21	SPARE	FU117	TB2-145	SPARE		
4.22	SPARE	FU118	TB2-146	SPARE		
4.23	SPARE	FU119	TB2-147	SPARE		
4.24	09-XS-237A	FU120	TB2-148	LT-09-202C Proc TRU Lift Table		
4.25	09-ZS-237A	FU121	TB2-149	LT-09-202C Proc TRU Lift Table		
4.26	SPARE	FU122	TB2-150	SPARE		
4.27	09-ZS-237C	FU123	TB2-151	LT-09-202C Proc TRU Lift Table		
4.28	09-ZS-237D	FU124	TB2-152	LT-09-202C Proc TRU Lift Table		
4.29	09-ZS-237E	FU125	TB2-153	LT-09-202C Proc TRU Lift Table		
4.30	09-ZS-237F	FU126	TB2-154	LT-09-202C Proc TRU Lift Table		
4.31	09-ZS-237G	FU127	TB2-155	LT-09-202C Proc TRU Lift Table		
4.32	SPARE	FU128	TB2-156	SPARE		
4.33		IG Bus	TB2-137	Check shield ground resistance (< 0.01		
4.34		IG Bus	TB2-157	Check shield ground resistance (< 0.01		

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
5.0	Rack 2 Groups 0.1						
5.1	SPARE	FU129	TB2-161	SPARE			
5.2	09-HS-241A	FU130	TB2-162	LT-09-203A Proc LLW Lift Table			
5.3	PC-07-001/C	FU131	TB2-163	DH-07-101 Drum Lifter			
5.4	PC-07-001/O	FU132	TB2-164	DH-07-101 Drum Lifter			
5.5	SPARE	FU133	TB2-165	SPARE			
5.6	CRA	FU134	TB2-166	CNR-12-102 - Local Control Panel			
5.7	CRB	FU135	TB2-167	CNR-12-102 - Local Control Panel			
5.8	09-XS-241A	FU136	TB2-168	LT-09-203A Proc LLW Lift Table			
5.9	09-ZS-241A	FU137	TB2-169	LT-09-203A Proc LLW Lift Table			
5.10	SPARE	FU138	TB2-170	SPARE			
5.11	09-ZS-241C	FU139	TB2-171	LT-09-203A Proc LLW Lift Table			
5.12	09-ZS-241D	FU140	TB2-172	LT-09-203A Proc LLW Lift Table			
5.13	09-ZS-241E	FU141	TB2-173	LT-09-203A Proc LLW Lift Table			
5.14	09-ZS-241F	FU142	TB2-174	LT-09-203A Proc LLW Lift Table			
5.15	09-ZS-241G	FU143	TB2-175	LT-09-203A Proc LLW Lift Table			
5.16	SPARE	FU144	TB2-176	SPARE			
5.17	09-XA-303	FU145	TB2-181	HU-07-303 Compt Hydr Pwr Unit			
5.18	09-ZS-702A	FU146	TB2-182	CR-07-101A Monorail Hoist			
5.19	09-ZS-702B	FU147	TB2-183	CR-07-101A Monorail Hoist			
5.20	09-ZS-702C	FU148	TB2-184	CR-07-101A Monorail Hoist			
5.21	PC-07-001/D	FU149	TB2-185	CR-07-101A Monorail Hoist			
5.22	PC-07-001/F2S	FU150	TB2-186	CR-07-101A Monorail Hoist			
5.23	PC-07-001/F3S	FU151	TB2-187	CR-07-101A Monorail Hoist			
5.24	PC-07-001/F4S	FU152	TB2-188	CR-07-101A Monorail Hoist			
5.25	PC-07-001/F5S	FU153	TB2-189	CR-07-101A Monorail Hoist			
5.26	PC-07-001/FLS	FU154	TB2-190	CR-07-101A Monorail Hoist			
5.27	PC-07-001/R2S	FU155	TB2-191	CR-07-101A Monorail Hoist			
5.28	PC-07-001/R3S	FU156	TB2-192	CR-07-101A Monorail Hoist			
5.29	PC-07-001/R4S	FU157	TB2-193	CR-07-101A Monorail Hoist			
5.30	PC-07-001/R5S	FU158	TB2-194	CR-07-101A Monorail Hoist			
5.31	PC-07-001/RLS	FU159	TB2-195	CR-07-101A Monorail Hoist			
5.32	PC-07-001/U	FU160	TB2-196	CR-07-101A Monorail Hoist			
5.33		IG Bus	TB2-177	Check shield ground resistance (< 0.01 ohms)			
5.34		IG Bus	TB2-197	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
6.0	Rack 2 Groups 2,3						
6.1	ZSC-704	FU161	TB2-201	DH-07-101 Drum Lifter			
6.2	ZSO-704	FU162	TB2-202	DH-07-101 Drum Lifter			
6.3	ZS-331	FU163	TB2-203	DH-07-102 Drum Transfer Assembly			
6.4	PS-703	FU164	TB2-204	DO-07-101 Drum Entry/Exit Port			
6.5	ZS-703A	FU165	TB2-205	DO-07-101 Drum Entry/Exit Port			
6.6	ZS-703B	FU166	TB2-206	DO-07-101 Drum Entry/Exit Port			
6.7	ZS-703C	FU167	TB2-207	DO-07-101 Drum Entry/Exit Port			
6.8	ZS-711	FU168	TB2-208	DO-07-101 Drum Entry/Exit Port			
6.9	ZSC-700A	FU169	TB2-209	DO-07-101 Drum Entry/Exit Port			
6.10	ZSC-700B	FU170	TB2-210	DO-07-101 Drum Entry/Exit Port			
6.11	ZSC-701	FU171	TB2-211	DO-07-101 Drum Entry/Exit Port			
6.12	ZSO-701	FU172	TB2-212	DO-07-101 Drum Entry/Exit Port			
6.13	PSL-700	FU173	TB2-213	DO-07-102 Sphincter Entry Port			
6.14	PSLL-701	FU174	TB2-214	DO-07-102 Sphincter Entry Port			
6.15	ZSC-705	FU175	TB2-215	DO-07-102 Sphincter Entry Port			
6.16	ZSO-705	FU176	TB2-216	DO-07-102 Sphincter Entry Port			
6.17	PDISL-333	FU177	TB2-221	GB-07-101 LLW Entry G.B.			
6.18	XS-302A	FU178	TB2-222	GB-07-101 LLW Entry G.B.			
6.19	XS-302B	FU179	TB2-223	GB-07-101 LLW Entry G.B.			
6.20	XA-302	FU180	TB2-224	HU-07-101 Hydr Power Unit			
6.21	ZS-710	FU181	TB2-225	TC-07-101 Drum Transfer Car			
6.22	HS-316	FU182	TB2-226	TE-12-103 Suite DMS Pedestal			
6.23	ZS-763A	FU183	TB2-227	CR-07-101D GB Monorail Hoist			
6.24	ZS-763B	FU184	TB2-228	CR-07-101D GB Monorail Hoist			
6.25	ZS-763C	FU185	TB2-229	CR-07-101D GB Monorail Hoist			
6.26	ZS-763D	FU186	TB2-230	CR-07-101D GB Monorail Hoist			
6.27	PC-07-004/D	FU187	TB2-231	CR-07-101D GB Monorail Hoist			
6.28	PC-07-004/F2S	FU188	TB2-232	CR-07-101D GB Monorail Hoist			
6.29	PC-07-004/F3S	FU189	TB2-233	CR-07-101D GB Monorail Hoist			
6.30	PC-07-004/F4S	FU190	TB2-234	CR-07-101D GB Monorail Hoist			
6.31	PC-07-004/F5S	FU191	TB2-235	CR-07-101D GB Monorail Hoist			
6.32	PC-07-004/FLS	FU192	TB2-236	CR-07-101D GB Monorail Hoist			
6.33		IG Bus	TB3-17	Check Shield ground Resistance (<0.01 ohms)			
6.34		IG Bus	TB3-37	Check Shield ground Resistance (<0.01 ohms)			

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7.0	Rack 2 Groups 4,5						
7.1	PC-07-004/R2S	FU193	TB2-241	CR-07-101D Monorail Hoist			
7.2	PC-07-004/R3S	FU194	TB2-242	CR-07-101D Monorail Hoist			
7.3	PC-07-004/R4S	FU195	TB2-243	CR-07-101D Monorail Hoist			
7.4	PC-07-004/R5S	FU196	TB2-244	CR-07-101D Monorail Hoist			
7.5	PC-07-004/RLS	FU197	TB2-245	CR-07-101D Monorail Hoist			
7.6	PC-07-004/U	FU198	TB2-246	CR-07-101D Monorail Hoist			
7.7	ZS-762	FU199	TB2-247	CV-07-101 Compact Conveyor			
7.8	ZSC-766	FU200	TB2-248	DH-07-104 Comp Drum Lifter			
7.9	ZSO-766	FU201	TB2-249	DH-07-104 Comp Drum Lifter			
7.10	ZS-761A	FU202	TB2-250	DO-07-106 Drum Entry/Exit Port			
7.11	ZS-761B	FU203	TB2-251	DO-07-106 Drum Entry/Exit Port			
7.12	ZS-761C	FU204	TB2-252	DO-07-106 Drum Entry/Exit Port			
7.13	ZSC-760	FU205	TB2-253	DO-07-106 Drum Entry/Exit Port			
7.14	PS-704	FU206	TB2-254	DO-07-106 Drum Entry/Exit Port			
7.15	ZS-764	FU207	TB2-255	DO-07-106 Drum Entry/Exit Port			
7.16	ZSC-765A	FU208	TB2-256	DO-07-106 Drum Entry/Exit Port			
7.17	ZSC-765B	FU209	TB2-261	DO-07-106 Drum Entry/Exit Port			
7.18	ZSO-760	FU210	TB2-262	DO-07-106 Drum Entry/Exit Port			
7.19	XS-313A	FU211	TB2-263	GB-07-105 Glovebox			
7.20	XS-313B	FU212	TB2-264	GB-07-105 Glovebox			
7.21	PDISL-353	FU213	TB2-265	GB-07-105 LLW Exit GB			
7.22	HS-318	FU214	TB2-266	TE-12-103 Suite DMS Pedestal			
7.23	HS-315	FU215	TB2-267	TE-12-103 Suite DMS Pedestal			
7.24	ZS-332A	FU216	TB2-268	DH-07-103 Drum Tipper			
7.25	ZS-332B	FU217	TB2-269	DH-07-103 Drum Tipper			
7.26	ZS-333	FU218	TB2-270	DH-07-103 Drum Tipper			
7.27	ZS-720A	FU219	TB2-271	DH-07-103 Drum Tipper			
7.28	ZS-720B	FU220	TB2-272	DH-07-103 Drum Tipper			
7.29	ZS-335	FU221	TB2-273	DH-07-103/M1 Hyd. Power Pack			
7.30	ZS-334A	FU222	TB2-274	DO-07-103 X-ray Door			
7.31	ZS-334B	FU223	TB2-275	DO-07-103 X-ray Door			
7.32	ZS-715A	FU224	TB2-276	EM-07-101 Waste Manipulator			
7.33		IG Bus	TB3-57	Check shield ground resistance (<0.01 ohms)			
7.34		IG Bus	TB3-57	Check shield ground resistance (<0.01 ohms)			

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8.0	Rack 2 Groups 6,7						
8.1	ZS-715B	FU225	TB2-281	EM-07-101 Waste Manipulator			
8.2	ZS-715C	FU226	TB2-282	EM-07-101 Waste Manipulator			
8.3	ZS-715D	FU227	TB2-283	EM-07-101 Waste Manipulator			
8.4	PDISL-341	FU228	TB2-284	GB-07-102 LLW Sorting Glovebox			
8.5	XS-314	FU229	TB2-285	GB-07-102 LLW Sorting Glovebox			
8.6	XS-315A	FU230	TB2-286	GB-07-102 LLW Sorting Glovebox			
8.7	XS-315B	FU231	TB2-287	GB-07-102 LLW Sorting Glovebox			
8.8	ZS-724A	FU232	TB2-288	RT-07-101 Dr Delid/Relid Assembly			
8.9	ZS-724B	FU233	TB2-289	RT-07-101 Dr Delid/Relid Assembly			
8.10	ZS-726A	FU234	TB2-290	RT-07-101 Dr Delid/Relid Assembly			
8.11	ZS-726B	FU235	TB2-291	RT-07-101 Dr Delid/Relid Assembly			
8.12	ZS-727A	FU236	TB2-292	RT-07-101 Dr Delid/Relid Assembly			
8.13	ZS-727B	FU237	TB2-293	RT-07-101 Dr Delid/Relid Assembly			
8.14	ZS-728A	FU238	TB2-294	RT-07-101 Dr Delid/Relid Assembly			
8.15	ZS-728B	FU239	TB2-295	RT-07-101 Dr Delid/Relid Assembly			
8.16	ZS-719A	FU240	TB2-296	RT-07-101 Dr Delid/Relid Assembly			
8.17	ZS-719B	FU241	TB2-301	RT-07-101 Dr Delid/Relid Assembly			
8.18	ZS-721	FU242	TB2-302	RT-07-101 Dr Delid/Relid Assembly			
8.19	FSL-378	FU243	TB2-303	RT-07-101 Dr Delid/Relid Assembly			
8.20	PSL-378	FU244	TB2-304	RT-07-101 Dr Delid/Relid Assembly			
8.21	ZS-716A	FU245	TB2-305	ST-07-101 Sorting Table			
8.22	ZS-716B	FU246	TB2-306	ST-07-101 Sorting Table			
8.23	ZS-717A	FU247	TB2-307	ST-07-101 Sorting Table			
8.24	ZS-717B	FU248	TB2-308	ST-07-101 Sorting Table			
8.25	ZS-717C	FU249	TB2-309	ST-07-101 Sorting Table			
8.26	ZS-729A	FU250	TB2-310	ST-07-101 Sorting Table			
8.27	ZS-729B	FU251	TB2-311	ST-07-101 Sorting Table			
8.28	ZS-718A	FU252	TB2-312	ST-07-101 Sorting Table			
8.29	ZS-718B	FU253	TB2-313	ST-07-101 Sorting Table			
8.30	ZS-725A	FU254	TB2-314	TC-07-101 Transfer Car			
8.31	ZS-725B	FU255	TB2-315	TC-07-101 Transfer Car			
8.32	ZS-725C	FU256	TB2-316	TC-07-101 Transfer Car			
8.33		IG Bus	TB2-297	Check shield ground resistance (<0.01 ohms)			
8.34		IG Bus	TB2-317	Check shield ground resistance (<0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
9.0	Rack 3 Groups 0,1						
9.1	HS-317	FU257	TB2-321	TE-12-103 Suite DMS Pedestal			
9.2	ZS-906A	FU258	TB2-322	CR-07-201 Monorail Hoist			
9.3	ZS-906B	FU259	TB2-323	CR-07-201 Monorail Hoist			
9.4	ZS-906C	FU260	TB2-324	CR-07-201 Monorail Hoist			
9.5	ZS-900A	FU261	TB2-325	DO-07-202 LLW RWM Drum Entry/Exit Port			
9.6	ZSC-909	FU262	TB2-326	DO-07-202 LLW RWM Drum Entry/Exit Port			
9.7	ZSC-908B	FU263	TB2-327	DO-07-202 LLW RWM Drum Entry/Exit Port			
9.8	ZSC-910B	FU264	TB2-328	DO-07-202 LLW RWM Drum Entry/Exit Port			
9.9	PS-900	FU265	TB2-329	DO-07-202 LLW RWM Drum Entry/Exit Port			
9.10	ZS-907	FU266	TB2-330	DO-07-202 LLW RWM Drum Entry/Exit Port			
9.11	ZSC-908A	FU267	TB2-331	DO-07-202 LLW RWM Drum Entry/Exit Port			
9.12	ZSO-909	FU268	TB2-332	DO-07-202 LLW RWM Drum Entry/Exit Port			
9.13	PS-901	FU269	TB2-333	DO-07-202 LLW RWM Drum Entry/Exit Port			
9.14	ZS-913	FU270	TB2-334	DO-07-203 LLW RWM Drum Entry/Exit Port			
9.15	ZSC-910A	FU271	TB2-335	DO-07-203 LLW RWM Drum Entry/Exit Port			
9.16	ZSO-911	FU272	TB2-336	DO-07-203 LLW RWM Drum Entry/Exit Port			
9.17	ZS-912A	FU273	TB2-341	DO-07-203 LLW RWM Drum Entry/Exit Port			
9.18	ZS-912B	FU274	TB2-342	DO-07-203 LLW RWM Drum Entry/Exit Port			
9.19	ZS-912C	FU275	TB2-343	DO-07-203 LLW RWM Drum Entry/Exit Port			
9.20	ZSC-911	FU276	TB2-344	DO-07-203 LLW RWM Drum Entry/Exit Port			
9.21	ZS-920A	FU277	TB2-345	EM-07-201 Waste Manipulator			
9.22	ZS-920B	FU278	TB2-346	EM-07-201 Waste Manipulator			
9.23	ZS-920C	FU279	TB2-347	EM-07-201 Waste Manipulator			
9.24	ZS-920D	FU280	TB2-348	EM-07-201 Waste Manipulator			
9.25	XS-305A	FU281	TB2-349	GB-07-201 LLW RWM Glovebox			
9.26	XS-305B	FU282	TB2-350	GB-07-201 LLW RWM Glovebox			
9.27	SPARE	FU283	TB2-351	SPARE			
9.28	SPARE	FU284	TB2-352	SPARE			
9.29	ZS-900B	FU285	TB2-353	DO-07-202 LLW RWM Drum Entry/Exit Port			
9.30	ZS-900C	FU286	TB2-354	DO-07-202 LLW RWM Drum Entry/Exit Port			
9.31	PDISL-393	FU287	TB2-355	GB-07-201 LLW RWM Glovebox			
9.32	SPARE	FU288	TB2-356	SPARE			
9.33		IG Bus	TB2-337	Check shield ground resistance (< 0.01 ohms)			
9.34		IG Bus	TB2-357	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
10.0	Rack 3 Groups 2						
10.1	ZS-730A	FU465	TB2-361	CR-07-101C Trolley Hoist			
10.2	ZS-730B	FU466	TB2-362	CR-07-101C Trolley Hoist			
10.3	ZS-730C	FU467	TB2-363	CR-07-101C Trolley Hoist			
10.4	PEV-716	FU468	TB2-364	Vacuum Isolation Solenoid Valve			
10.5	ZSO-767A	FU469	TB2-365	DO-07-106 LLW Entry/Exit Port			
10.6	ZSO-767B	FU470	TB2-366	DO-07-106 LLW Entry/Exit Port			
10.7	PS-768	FU471	TB2-367	DO-07-106 LLW Entry/Exit Port			
10.8	ZSO-914	FU472	TB2-368	DO-07-202 LLW RWM Entry/Exit Port			
10.9	PS-916	FU473	TB2-369	DO-07-202 LLW RWM Entry/Exit Port			
10.10	ZSO-915	FU474	TB2-370	DO-07-202 LLW RWM Entry/Exit Port			
10.11	PS-917	FU475	TB2-371	DO-07-202 LLW RWM Entry/Exit Port			
10.12	SPARE	FU476	TB2-372	SPARE			
10.13	SPARE	FU477	TB2-373	SPARE			
10.14	SPARE	FU478	TB2-374	SPARE			
10.15	SPARE	FU479	TB2-375	SPARE			
10.16	SPARE	FU480	TB2-376	SPARE			
10.17	SPARE	IG Bus	TB2-377	Check shield ground resistance (< 0.01 ohms)			

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DATA SHEET 7.3

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.3. Relay Outputs							
Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
1.0	Rack 4, Group 0						
1.1	CV-09-103A/R	FU289	TB3-1	CV-09-103A Drum Transfer Conv.			
1.2	CV-09-103A/F	FU290	TB3-2	CV-09-103A Drum Transfer Conv.			
1.3	ZY-211A	FU291	TB3-3	CV-09-103A Drum Transfer Conv.			
1.4	SPARE	FU292	TB3-4	SPARE			
1.5	CV-09-103B/R	FU293	TB3-5	CV-09-103B Drum Transfer Conv.			
1.6	CV-09-103B/F	FU294	TB3-6	CV-09-103B Drum Transfer Conv.			
1.7	ZY-212A	FU295	TB3-7	CV-09-103B Drum Transfer Conv.			
1.8	SPARE	FU296	TB3-8	SPARE			
1.9	CV-09-104A/R	FU297	TB3-9	CV-09-104A Drum Airlock Conv.			
1.10	CV-09-104A/F	FU298	TB3-10	CV-09-104A Drum Airlock Conv.			
1.11	CV-09-104B/R	FU299	TB3-11	CV-09-104B Drum Airlock Conv.			
1.12	CV-09-104B/F	FU300	TB3-12	CV-09-104B Drum Airlock Conv.			
1.13	CV-09-201A/R	FU301	TB3-13	CV-09-201A Drum Transfer Conv.			
1.14	CV-09-201A/F	FU302	TB3-14	CV-09-201A Drum Transfer Conv.			
1.15	ZY-215A	FU303	TB3-15	CV-09-201A Drum Transfer Conv.			
1.16	SPARE	FU304	TB3-16	SPARE			
1.17		IG Bus	TB3-17	Check shield ground resistance (< 0.01)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
2.0	Rack 4 Group 1						
2.1	CV-09-201B/R	FU305	TB3-21	CV-09-201B Drum Transfer Conv.			
2.2	CV-09-201B/F	FU306	TB3-22	CV-09-201B Drum Transfer Conv.			
2.3	ZY-216A	FU307	TB3-23	CV-09-201B Drum Transfer Conv.			
2.4	SPARE	FU308	TB3-24	SPARE			
2.5	HS-217B	FU309	TB3-25	NDE/NDA Airlock Inlet Door 1			
2.6	HS-217B	FU310	TB3-26	NDE/NDA Airlock Inlet Door 1			
2.7	HS-251B	FU311	TB3-27	NDE/NDA Airlock Outlet Door 2			
2.8	HS-251B	FU312	TB3-28	NDE/NDA Airlock Outlet Door 2			
2.9	HS-252B	FU313	TB3-29	Process Airlock Inlet Door 2			
2.10	HS-252B	FU314	TB3-30	Process Airlock Inlet Door 2			
2.11	HS-218B	FU315	TB3-31	Process Airlock Outlet Door 1			
2.12	HS-218B	FU316	TB3-32	Process Airlock Outlet Door 1			
2.13	SPARE	FU317	TB3-33	SPARE			
2.14	ZY-227A	FU318	TB3-34	LT-09-201D RWM LLW Lift Table			
2.15	SPARE	FU319	TB3-35	SPARE			
2.16	LT-09-201D/R	FU320	TB3-36	LT-09-201D RWM LLW Lift Table			
		IG Bus	TB3-37	Check shield ground resistance (<0/01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
3.0	Rack 4 Group 2						
3.1	LT-09-201D/F	FU321	TB3-41	LT-09-201D RWM LLW Lift Table			
3.2	ZL-227C	FU322	TB3-42	LT-09-201D RWM LLW Lift Table			
3.3	LT-09-201E/F	FU323	TB3-43	LT-09-201E RWM LLW Lift Table			
3.4	ZY-229A	FU324	TB3-44	LT-09-201E RWM LLW Lift Table			
3.5	SPARE	FU325	TB3-45	SPARE			
3.6	LT-09-201E/R	FU326	TB3-46	LT-09-201E RWM LLW Lift Table			
3.7	ZL-229C	FU327	TB3-47	LT-09-201E RWM LLW Lift Table			
3.8	LT-09-201F/R	FU328	TB3-48	LT-09-201F RWM LLW Lift Table			
3.9	ZY-231A	FU329	TB3-49	LT-09-201F RWM LLW Lift Table			
3.10	SPARE	FU330	TB3-50	SPARE			
3.11	LT-09-201F/F	FU331	TB3-51	LT-09-201F RWM LLW Lift Table			
3.12	LT-09-201F/U	FU332	TB3-52	LT-09-201F RWM LLW Lift Table			
3.13	LT-09-201F/D	FU333	TB3-53	LT-09-201F RWM LLW Lift Table			
3.14	LT-09-202A/F	FU334	TB3-54	LT-09-202A Proc LLW Lift Table			
3.15	ZY-233A	FU335	TB3-55	LT-09-202A Proc LLW Lift Table			
3.16	SPARE	FU336	TB3-56	SPARE			
3.17		IG Bus	TB3-57	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
4.0	Rack 4 Group 3						
4.1	LT-09-202A/R	FU337	TB3-61	LT-09-202A Proc LLW Lift Table			
4.2	ZL-233C	FU338	TB3-62	LT-09-202A Proc LLW Lift Table			
4.3	LT-09-202C/F	FU339	TB3-63	LT-09-202C Proc TRU Lift Table			
4.4	ZY-237A	FU340	TB3-64	LT-09-202C Proc TRU Lift Table			
4.5	FEV-305	FU341	TB3-65	DO-07-106 LLW Entry/Exit Port			
4.6	LT-09-202C/R	FU342	TB3-66	LT-09-202C Proc TRU Lift Table			
4.7	ZY-241A	FU343	TB3-67	LT-09-203A Proc LLW Lift Table			
4.8	SPARE	FU344	TB3-68	SPARE			
4.9	LT-09-203A/U	FU345	TB3-69	LT-09-203A Proc LLW Lift Table			
4.10	LT-09-203A/D	FU346	TB3-70	LT-09-203A Proc LLW Lift Table			
4.11	LT-09-203A/R	FU347	TB3-71	LT-09-203A Proc LLW Lift Table			
4.12	LT-09-203A/F	FU348	TB3-72	LT-09-203A Proc LLW Lift Table			
4.13	PC-07-001/S2	FU349	TB3-73	CR-07-101A Monorail Hoist			
4.14	PC-07-001/S3	FU350	TB3-74	CR-07-101A Monorail Hoist			
4.15	PC-07-001/S4	FU351	TB3-75	CR-07-101A Monorail Hoist			
4.16	PC-07-001/S5	FU352	TB3-76	CR-07-101A Monorail Hoist			
4.17		IG Bus	TB3-77	Check shield ground resistance (< 0.01			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
5.0	Rack 4 Group 4						
5.1	PC-07-001/SD	FU353	TB3-81	CR-07-101A Monorail Hoist			
5.2	PC-07-001/SF	FU354	TB3-82	CR-07-101A Monorail Hoist			
5.3	PC-07-001/SR	FU355	TB3-83	CR-07-101A Monorail Hoist			
5.4	PC-07-001/SU	FU356	TB3-84	CR-07-101A Monorail Hoist			
5.5	PC-07-001/ES	FU357	TB3-85	CR-07-101A Monorail Hoist			
5.6	PC-07-001/P1	FU358	TB3-86	CR-07-101A Monorail Hoist			
5.7	PC-07-001/P2	FU359	TB3-87	CR-07-101A Monorail Hoist			
5.8	PC-07-001/P3	FU360	TB3-88	CR-07-101A Monorail Hoist			
5.9	PC-07-001/US	FU361	TB3-89	CR-07-101A Monorail Hoist			
5.10	SPARE	FU362	TB3-90	SPARE			
5.11	SPARE	FU363	TB3-91	SPARE			
5.12	PC-07-001/CS	FU364	TB3-92	DH-07-101 Drum Lifter			
5.13	PC-07-001/OS	FU365	TB3-93	DH-07-101 Drum Lifter			
5.14	FEV-303	FU366	TB3-94	DO-07-101 Drum Entry/Exit Port			
5.15	FEV-701A	FU367	TB3-95	DO-07-101 Drum Entry/Exit Port			
5.16	FEV-701B	FU368	TB3-96	DO-07-101 Drum Entry/Exit Port			
5.17		IG Bus	TB3-97	Check shield ground resistance (< 0.01)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
6.0	Rack 4 Group 5						
6.1	PDA-333	FU369	TB3-101	GB-07-101 LLW Entry G.B.			
6.2	FEV-375B	FU370	TB3-102	Pneum Valve Mani - 20 PSI			
6.3	FEV-375A	FU371	TB3-103	Pneum Valve Mani - 80 PSI			
6.4	FEV-701	FU372	TB3-104	SP-07-102 Pneu Valve Manifold			
6.5	PC-07-004/S2	FU373	TB3-105	CR-07-101D Monorail Hoist			
6.6	PC-07-004/S3	FU374	TB3-106	CR-07-101D Monorail Hoist			
6.7	PC-07-004/S4	FU375	TB3-107	CR-07-101D Monorail Hoist			
6.8	PC-07-004/S5	FU376	TB3-108	CR-07-101D Monorail Hoist			
6.9	PC-07-004/SD	FU377	TB3-109	CR-07-101D Monorail Hoist			
6.10	PC-07-004/SF	FU378	TB3-110	CR-07-101D Monorail Hoist			
6.11	PC-07-004/SR	FU379	TB3-111	CR-07-101D Monorail Hoist			
6.12	PC-07-004/SU	FU380	TB3-112	CR-07-101D Monorail Hoist			
6.13	PC-07-004/ES	FU381	TB3-113	CR-07-101D Monorail Hoist			
6.14	PC-07-004/P1	FU382	TB3-114	CR-07-101D Monorail Hoist			
6.15	PC-07-004/P2	FU383	TB3-115	CR-07-101D Monorail Hoist			
6.16	PC-07-001/P3	FU384	TB3-116	CR-07-101D Monorail Hoist			
6.17		IG Bus	TB3-117	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Chec k
7.0	Rack 4 Group 6						
7.1	PC-07-004/P4	FU385	TB3-121	CR-07-101D Monorail Hoist			
7.2	PC-07-004/P5	FU386	TB3-122	CR-07-101D Monorail Hoist			
7.3	PC-07-004/US	FU387	TB3-123	CR-07-101D Monorail Hoist			
7.4	CV-07-101/M1	FU388	TB3-124	CV-07-101M1 Compact Conveyor			
7.5	SPARE	FU389	TB3-125	SPARE			
7.6	PC-07-004/O	FU390	TB3-126	DH-07-104 Drum Lifter			
7.7	PC-07-004/C	FU391	TB3-127	DH-07-104 Drum Lifter			
7.8	FEV-304	FU392	TB3-128	DO-07-106 Drum Entry/Exit Port			
7.9	FEV-762A	FU393	TB3-129	DO-07-106 Drum Entry/Exit Port			
7.10	FEV-762B	FU394	TB3-130	DO-07-106 Drum Entry/Exit Port			
7.11	PDA-353	FU395	TB3-131	GB-07-105 LLW Exit GB			
7.12	FEV-301	FU396	TB3-132	Pneu Valve Manifold			
7.13	FEV-770	FU397	TB3-133	Bagless Xfer Port Controller			
7.14	DH-07-103M1/SD	FU398	TB3-134	DH-07-101 Drum Tipper			
7.15	DH-07-103M1/SU	FU399	TB3-135	DH-07-101 Drum Tipper			
7.16	FEV-396C	FU400	TB3-136	DH-07-101 Drum Tipper			
7.17		IG Bus	TB3-137	Check shield ground resistance (< 0.01)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
8.0	Rack 4 Group 7						
8.1	FEV-396C	FU401	TB3-141	DH-07-103 Drum Tipper			
8.2	FEV-396D	FU402	TB3-142	DH-07-103 Drum Tipper			
8.3	FEV-396E	FU403	TB3-143	DH-07-103 Drum Tipper			
8.4	FEV-396E	FU404	TB3-144	DH-07-103 Drum Tipper			
8.5	FEV-396F	FU405	TB3-145	DH-07-103 Drum Tipper			
8.6	FEV-396F	FU406	TB3-146	DH-07-103 Drum Tipper			
8.7	PDA-341	FU407	TB3-147	GB-07-102 LLW Sorting G.B.			
8.8	FEV-321	FU408	TB3-148	HU-07-102 Manip. HPU 80 PSIG			
8.9	FEV-376B	FU409	TB3-149	Pneu. Valve Manifold 20 PSI			
8.10	FEV-376A	FU410	TB3-150	Pneu. Valve Manifold 80 PSI			
8.11	FEV-378A	FU411	TB3-151	RT-07-101 Drum Lid/Delid Assem.			
8.12	FEV-378B	FU412	TB3-152	RT-07-101 Drum Lid/Delid Assem.			
8.13	TC-07-101/ST	FU413	TB3-153	RT-07-101 Drum Lid/Delid Assem.			
8.14	FEV-324A	FU414	TB3-154	DO-07-202 Drum Entry/Exit Port			
8.15	FEV-913A	FU415	TB3-155	DO-07-202 Drum Entry/Exit Port			
8.16	FEV-913B	FU416	TB3-156	DO-07-202 Drum Entry/Exit Port			
8.17		IG Bus	TB3-157	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
9.0	Rack 5 Group 0						
9.1	FEV-324B	FU417	TB3-161	DO-07-203 Drum Entry/Exit Port			
9.2	FEV-913C	FU418	TB3-162	DO-07-203 Drum Entry/Exit Port			
9.3	FEV-913D	FU419	TB3-163	DO-07-203 Drum Entry/Exit Port			
9.4	PDA-393	FU420	TB3-164	GB-07-201 LLW RWM Glovebox			
9.5	FEV-323	FU421	TB3-165	Pneumatic Valve Manifold - 80 PSI			
9.6	FEV-325A	FU422	TB3-166	DO-07-202 RWM Entry/Exit Port			
9.7	FEV-325B	FU423	TB3-167	DO-07-203 RWM Entry/Exit Port			
9.8	SPARE	FU424	TB3-168	SPARE			
9.9	DO-07-105/C	FU425	TB3-169	DO-07-105 LLW Sort. Bagless Xfer Port			
9.10	DO-07-105/O	FU426	TB3-170	DO-07-105 LLW Sort. Bagless Xfer Port			
9.11	DO-07-201/C	FU427	TB3-171	DO-07-201 RWM Bagless Xfer Port			
9.12	DO-07-201/O	FU428	TB3-172	DO-07-201 RWM Bagless Xfer Port			
9.13	SPARE	FU429	TB3-173	SPARE			
9.14	SPARE	FU430	TB3-174	SPARE			
9.15	SPARE	FU431	TB3-175	SPARE			
9.16	SPARE	FU432	TB3-176	SPARE			
9.17		IG Bar	TB3-177	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
10.0	Rack 5 Group 1						
10.1	SPARE	FU433	TB3-181	SPARE			
10.2	SPARE	FU434	TB3-182	SPARE			
10.3	SPARE	FU435	TB3-183	SPARE			
10.4	SPARE	FU436	TB3-184	SPARE			
10.5	SPARE	FU437	TB3-185	SPARE			
10.6	SPARE	FU438	TB3-186	SPARE			
10.7	SPARE	FU439	TB3-187	SPARE			
10.8	SPARE	FU440	TB3-188	SPARE			
10.9	SPARE	FU441	TB3-189	SPARE			
10.10	SPARE	FU442	TB3-190	SPARE			
10.11	SPARE	FU443	TB3-191	SPARE			
10.12	SPARE	FU444	TB3-192	SPARE			
10.13	SPARE	FU445	TB3-193	SPARE			
10.14	SPARE	FU446	TB3-194	SPARE			
10.15	SPARE	FU447	TB3-195	SPARE			
10.16	SPARE	FU448	TB3-196	SPARE			
10.17		IG Bar	TB3-197	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
11.0	Rack 5 Group 2						
11.1	SPARE	FU449	TB3-201	SPARE			
11.2	SPARE	FU450	TB3-202	SPARE			
11.3	SPARE	FU451	TB3-203	SPARE			
11.4	SPARE	FU452	TB3-204	SPARE			
11.5	SPARE	FU453	TB3-205	SPARE			
11.6	SPARE	FU454	TB3-206	SPARE			
11.7	SPARE	FU455	TB3-207	SPARE			
11.8	SPARE	FU456	TB3-208	SPARE			
11.9	SPARE	FU457	TB3-209	SPARE			
11.10	SPARE	FU458	TB3-210	SPARE			
11.11	SPARE	FU459	TB3-211	SPARE			
11.12	SPARE	FU460	TB3-212	SPARE			
11.13	SPARE	FU461	TB3-213	SPARE			
11.14	SPARE	FU462	TB3-214	SPARE			
11.15	SPARE	FU463	TB3-215	SPARE			
11.16	SPARE	FU464	TB3-216	SPARE			
11.17		IG Bar	TB3-217	Check shield ground resistance (< 0.01 ohms)			

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DATA SHEET 7.4

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.4. Analog Inputs							
Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
1.0	Rack 0, Group 4						
1.1	12-RITA-503	TB4-1	TB4-2	LLW Process G.B. Vent Duct Beta CAM Xmitr			
1.2	12-RITA-501	TB4-5	TB4-6	LLW Process G.B. Vent Duct Beta Cam Xmitr			
1.3	12-WT-761	TB4-9	T6-10	DH-07-104 Comp Drum Lifter - Weight Xmitter			
1.4	SPARE	TB4-	TB4-14				
1.5	SPARE	TB4-	TB4-18				
1.6	SPARE	TB4-	TB4-22				
1.7	SPARE	TB4-	TB4-26				
1.8	SPARE	TB4-	TB4-30				
1.9		IG	TB4-3	Check shield ground reistance (< 0.01 ohms)			
1.10		IG	TB4-7	Check shield ground reistance (< 0.01 ohms)			
1.11		IG	TB4-11	Check shield ground reistance (< 0.01 ohms)			
1.12		IG	TB4-15	Check shield ground reistance (< 0.01 ohms)			
1.13		IG	TB4-19	Check shield ground reistance (< 0.01 ohms)			
1.14		IG	TB4-23	Check shield ground reistance (< 0.01 ohms)			
1.15		IG	TB4-27	Check shield ground reistance (< 0.01 ohms)			
1.16		IG	TB4-31	Check shield ground reistance (< 0.01 ohms)			

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TEST LOCATION/TYPE:

	Seller Factory-SF
--	--------------------------

	Buyer Factory-BF
--	-------------------------

	Seller Plant-SP
--	------------------------

	Buyer Plant-BP
--	-----------------------

PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
Project Number W-026

Prepared By
Systems Interface Inc.

For Westinghouse Hanford Company

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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TEST PROCEDURE COVER SHEET

Test Procedure ID: _____ Revision Number: _____
 Execution Number: _____ Start Date-Time: _____
 Test Operator: _____ End Date-Time: _____
 Witness: _____ Inspection Only?: ☐ Yes ☐ No

Test Exceptions Recorded? ☐ Yes ☐ No

COMMENTS:

TEST PROCEDURE APPROVAL

TEST ☐ Successful ☐ Unsuccessful

Contractor (Company): Systems Interface Inc.

Contractor Representative: _____ Date: _____

WHC Projects Representative: _____ Date: _____

WHC NFS Representative: _____ Date: _____
 (NFS = New Facility Startup)

CERTIFICATION OF SATISFACTORY EXECUTION

All test cases for this procedure have been tested and all exception sheets for this test have been resolved.

ICF KEH Representative: _____ Date: _____

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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1.0 PURPOSE AND SCOPE

This Acceptance Test Procedure has been prepared to demonstrate that the Shipping/Receiving/NDA/NDE Local Control Unit functions as required by project criteria.

2.0 REFERENCES

Vendor information including Allen Bradley Product Data Bulletins:

- "1771 Allen-Bradley Discrete I/O AC Input and Output Modules",
- "1771 Allen-Bradley Discrete I/O Relay Contact Output Modules",
- "1771 Allen-Bradley Analog Input Module".

2.1 DRAWINGS

Obtain and work with the latest revisions of the following drawings:

940823-HWD-C2301	"Control Panel Layout and Bill of Material"
940820-HWD-01301	"PMS System Architecture"
940823-HWD-01301	"PMS System Architecture"
940823-HWD-C4101	"CNR-12-103 Control Power Distribution and Rack Schedule"
940823-HWD-C4102	"CNR-12-103 Control Power Distribution and Rack Schedule"
940823-HWD-C4301	"CNR-12-103 120 VAC Digital Inputs, Rack 1, Group 0,1"
940823-HWD-C4302	"CNR-12-103 120 VAC Digital Inputs, Rack 1, Group 2,3"
940823-HWD-C4303	"CNR-12-103 120 VAC Digital Inputs, Rack 1, Group 4,5"
940823-HWD-C4304	"CNR-12-103 120 VAC Digital Inputs, Rack 1, Group 6,7"
940823-HWD-C4305	"CNR-12-103 120 VAC Digital Inputs, Rack 2, Group 0,1"
940823-HWD-C4306	"CNR-12-103 120 VAC Digital Inputs, Rack 2, Group 2,3"
940823-HWD-C4307	"CNR-12-103 120 VAC Digital Inputs, Rack 2, Group 4,5"
940823-HWD-C4308	"CNR-12-103 120 VAC Digital Inputs, Rack 2, Group 6,7"
940823-HWD-C4309	"CNR-12-103 120 VAC Digital Inputs, Rack 3, Group 0,1"
940823-HWD-C4401	"CNR-12-103 Relay Output Card, Rack 4, Group 0"
940823-HWD-C4402	"CNR-12-103 Relay Output Card, Rack 4, Group 1"
940823-HWD-C4403	"CNR-12-103 Relay Output Card, Rack 4, Group 2"
940823-HWD-C4404	"CNR-12-103 Relay Output Card, Rack 4, Group 3"
940823-HWD-C4405	"CNR-12-103 Relay Output Card, Rack 4, Group 4"
940823-HWD-C4406	"CNR-12-103 Relay Output Card, Rack 4, Group 5"
940823-HWD-C4407	"CNR-12-103 Relay Output Card, Rack 4, Group 6"
940823-HWD-C4408	"CNR-12-103 Relay Output Card, Rack 4, Group 7"
940823-HWD-C4409	"CNR-12-103 Relay Output Card, Rack 5, Group 0"
940823-HWD-c4501	"CNR-12-103 Analog Input Card, Rack 0, Group 6"

2.2 SPECIFICATIONS

Obtain and work with the most current revisions of the following documents:

- UE&C Specification Section 13461-all sections
- UE&C Specification Section 13462-2.04.B
- Westinghouse Hanford Company Hardware Requirements Matrix

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3.0 EQUIPMENT, MATERIALS AND TOOLS

NOTE

All Measuring and Test Equipment (M&TE) used to collect data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label.
- Be capable of desired range.
- Have an accuracy consistent with state-of-the-art limitations:
 - a. equal to or greater than the input tolerance specified on the Data Sheet.
 - If device being calibrated is not data sheet associated,
 - b. at least four times greater than the specified device tolerance.

120 VAC Jumper (small alligator clips and or "scrap" wire)

Digital Multimeter (DMM)

Laptop computer with Allen-Bradley on-line programming software

4-20 mA current source

Vendor manuals

4.0 SAFETY, PRECAUTIONS, AND LIMITATIONS

- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:

- 1) Turn off the power source.
- 2) Do not approach the victim until the source of the power has been turned off.
- 3) Drag the victim clear, if necessary.
- 4) Administer Artificial Respiration or CPR if necessary.
- 5) Treat for shock
- 6) Check for other injuries and seek Medical help.
- 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.

- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.

- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.

- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

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PAGE 5 of 27****5.0 PREREQUISITES**

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 VERIFY Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 RECORD test equipment name, equipment number, and calibration expiration date on Data Sheet.
- 5.6 VERIFY that all tag numbers are listed on the Data Sheet.

6.0 SETUP

- 6.1 All computer laptop systems are running with the appropriate PLC ladder data table software screen displayed.

7.0 INSTRUCTIONS**7.1 PRE-TEST AND INSPECTION**

- 7.1.1 Verify Steps 1 through 14 on Data Sheet 7.1.
- 7.1.2 Verify Steps 15 through end on Data Sheet 7.1, (that the requirements of the PMS Hardware Requirements matrix are met).
- 7.1.3 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

7.2 DIGITAL INPUT TESTING

- 7.2.1 Perform the following steps for each pair of inputs listed on Data Sheet 7.2:
- 7.2.2 Place a jumper across the pair of inputs specified on the Data Sheet.
- 7.2.3 The corresponding input indicator on the card illuminates.
- 7.2.4 The associated data monitoring table on the laptop computer display follows the input status change.
- 7.2.5 Remove the jumper.
- 7.2.6 The input indicator on the card extinguishes.
- 7.2.7 The associated data monitoring table on the laptop computer display reverts to its previous state.
- 7.2.8 For each group of 16 Inputs, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.2.9 Check either "Pass" or "Fail", and initial the Data Sheet.

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7.3 RELAY OUTPUT TESTING

- 7.3.1 Perform the following steps for each pair of outputs listed on Data Sheet 7.3:
- 7.3.2 Check voltage across card outputs specified on the Data Sheet - should be full voltage (120 VAC).
- 7.3.3 Using the laptop programming interface computer, force the output on.
- 7.3.4 The output indicator on the card lights.
- 7.3.5 Check voltage across outputs - should be no voltage.
- 7.3.6 Using the laptop computer, release the output.
- 7.3.7 The output indicator on the card extinguishes.
- 7.3.8 Check voltage across outputs - it should be full voltage.
- 7.3.9 For each group of 16 Outputs, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.3.10 Check either "Pass" or "Fail", and initial the Data Sheet.

7.4 ANALOG INPUT TESTING

- 7.4.1 Perform the following steps for each pair of inputs listed on Data Sheet 7.4:
- 7.4.2 Connect a 4-20 mA source to card inputs specified on the Data sheet.
- 7.4.3 Set current source to 4 mA.
- 7.4.4 Check reading in PLC using laptop computer.
- 7.4.5 Set source to 12 mA.
- 7.4.6 Check readings on laptop computer data table display. Verify reading is within 0.25% of analog input range. If range is 0.00 to 100.00, reading should be between 49.75 and 50.25.
- 7.4.7 Set source to 20 mA.
- 7.4.8 Check readings on laptop computer data table display. Verify reading is within 0.25% of analog input range. If range is 0.00 to 100.00, reading should be between 99.75 and 100.25.
- 7.4.9 For each Analog Input, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.4.10 For each Analog Input, check fused loop power supply and neutral for 24 VDC (+/- 10%).
- 7.4.11 Check either "Pass" or "Fail", and initial the Data Sheet.

8.0 RESTORATION

- 8.1 VERIFY test equipment and all jumpers are removed and field wiring reconnected.
- 8.2 RESTORE system to normal configuration.
- 8.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

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9.0 DISPOSITION

- 9.1 The acceptance criteria of all steps contained within Section 7.0 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

_____	_____	_____	_____
Test Director	Date	Test Recorder	Date

_____	_____	_____	_____
Test Operator	Date	Witness	Date

_____	_____	_____	_____
Witness	Date	Witness	Date

Comments:

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DATA SHEET 7.1

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.1. Pre-Test and Inspection

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legend Plates installed; Fuse replacement labels installed			
1.3	PLC hardware installed per schematics and module dip switches set properly			
1.4	Terminal strips labeled and common jumpers installed on panel side			
1.5	Correct fuses (no greater than maximum specified) or Circuit Breakers installed			
1.6	Motor Overloads correct			
1.7	Wire AWG size, labeled, and color correct			
1.8	Door mounted devices installed properly and secure			
1.9	All terminals tight, perform wire pull tests.			
1.10	Check Main grounding lug, grounding integrity, separate grounds			
1.11	Verify ~ infinite resistance between isolated ground bus and chassis ground bus			
1.12	Apply power and check AC control circuits for proper voltage			
1.13	Check DC power circuits; verify correct voltage			
1.14	Check AC outlets and lights; verify correct voltage and operation			
1.15	Verify requirements 5.1, 15.8, and 15.9 as called for in the Hardware Requirements matrix are met by cycling power to the Programmable Logic Controller (PLC). The PLC should have the actual WRAP program loaded with all databases and be in a "Run" condition prior to the power cycle. The PLC should return the the "Run" condition with no errors upon power-up. All data registers should be preserved. Remove the PLC battery (with power applied) and verify that the low battery light illuminates and PLC status register S:10/0 denotes low battery.			
1.16	Verify specification requirement 5.2 as called for in the Hardware Requirements matrix is met by forcing an output on, verifying the closed contact, turning power off, verifying the now open contact, and then restoring power. After restoration of power, unforce the output.			
1.17	Verify specification requirement 15.10 as called for in the Hardware Requirements matrix is met by monitoring processor status words S8 (last scan) and S9 (max scan) for program scan time in milliseconds. The scan time should not exceed 200 milliseconds.			
1.18	Verify specification requirements 25.38 and 15.29 as called for in the Hardware Requirements matrix are met by monitoring the 24 VDC power output on the termination blocks. While monitoring the voltage, disconnect incoming power on one of the two 24 VDC power supplies. The voltage at the termination blocks should not vary outside of +22 VDC to +30 VDC. Additionally, verify the appropriate PLC input (found on the electrical schematics) activates upon failure of this power supply. Perform this procedure for both 24 VDC power supplies.			
1.19	Verify specification requirement 15.37 as called for in the Hardware Requirements matrix is met by accessing random "N" registers within the PLC via the Data Table Access Module (DTAM) mounted on the front of the Local Control Unit. Verify Read and Write operations occur properly though monitoring the data registers on the laptop computer after the read / write. Verify password is required and must be correctly entered before data change accepted.			

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DATA SHEET 7.2

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.2. 120 VAC Digital Inputs

Step #	TAG ID	Jumper Terminals	Description	Pass	Fail	Check
1.0	Rack 1, Groups 0.1					
1.1	09-HS-222A	FU1 TB2-1	CV-09-203 Empty Dr Staging Conv			
1.2	SPARE	FU2 TB2-2	SPARE			
1.3	09-XS-222A	FU3 TB2-3	CV-09-203 Empty Dr Staging Conv			
1.4	09-ZS-222A	FU4 TB2-4	CV-09-203 Empty Dr Staging Conv			
1.5	09-ZS-222B	FU5 TB2-5	CV-09-203 Empty Dr Staging Conv			
1.6	09-ZS-222C	FU6 TB2-6	CV-09-203 Empty Dr Staging Conv			
1.7	09-ZS-222D	FU7 TB2-7	CV-09-203 Empty Dr Staging Conv			
1.8	CV-09-203/FS	FU8 TB2-8	CV-09-203 Empty Dr Staging Conv			
1.9	CV-09-203/RS	FU9 TB2-9	CV-09-203 Empty Dr Staging Conv			
1.10	09-HS-224A	FU10 TB2-10	CV-09-204 Empty Dr Staging Conv			
1.11	SPARE	FU11 TB2-11	SPARE			
1.12	09-XS-224A	FU12 TB2-12	CV-09-204 Empty Dr Staging Conv			
1.13	09-ZS-224A	FU13 TB2-13	CV-09-204 Empty Dr Staging Conv			
1.14	09-ZS-224B	FU14 TB2-14	CV-09-204 Empty Dr Staging Conv			
1.15	09-ZS-224C	FU15 TB2-15	CV-09-204 Empty Dr Staging Conv			
1.16	09-ZS-224D	FU16 TB2-16	CV-09-204 Empty Dr Staging Conv			
1.17	CV-09-204/FS	FU17 TB2-21	CV-09-204 Empty Dr Staging Conv			
1.18	CV-09-204/RS	FU18 TB2-22	CV-09-204 Empty Dr Staging Conv			
1.19	09-ZS-221A	FU19 TB2-23	LT-09-201A RWM TRU Lift Table			
1.20	SPARE	FU20 TB2-24	SPARE			
1.21	09-ZS-221E	FU21 TB2-25	LT-09-201A RWM TRU Lift Table			
1.22	09-ZS-221D	FU22 TB2-26	LT-09-201A RWM TRU Lift Table			
1.23	09-ZS-221C	FU23 TB2-27	LT-09-201A RWM TRU Lift Table			
1.24	09-HS-221C	FU24 TB2-28	LT-09-201A RWM TRU Lift Table			
1.25	09-HS-221C	FU25 TB2-29	LT-09-201A RWM TRU Lift Table			
1.26	09-HS-221A	FU26 TB2-30	LT-09-201A RWM TRU Lift Table			
1.27	09-ZS-221G	FU27 TB2-31	LT-09-201A RWM TRU Lift Table			
1.28	09-ZS-221F	FU28 TB2-32	LT-09-201A RWM TRU Lift Table			
1.29	09-HS-221B	FU29 TB2-33	LT-09-201A RWM TRU Lift Table			
1.30	09-HS-221B	FU30 TB2-34	LT-09-201A RWM TRU Lift Table			
1.31	09-HS-221D	FU31 TB2-35	LT-09-201A RWM TRU Lift Table			
1.32	09-XS-221A	FU32 TB2-36	LT-09-201A RWM TRU Lift Table			
1.33		IG Bus TB2-17	Check shield ground resistance (< 0.01 ohms)			
1.34		IG Bus TB2-37	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
2.0	Rack 1, Groups 2,3						
2.1	09-ZS-223A	FU33	TB2-41	LT-09-201B RWM TRU Lift Table			
2.2	SPARE	FU34	TB2-42	SPARE			
2.3	09-HS-223D	FU35	TB2-43	LT-09-201B RWM TRU Lift Table			
2.4	09-HS-223A	FU36	TB2-44	LT-09-201B RWM TRU Lift Table			
2.5	09-ZS-223D	FU37	TB2-45	LT-09-201B RWM TRU Lift Table			
2.6	09-ZS-223E	FU38	TB2-46	LT-09-201B RWM TRU Lift Table			
2.7	09-HS-223C	FU39	TB2-47	LT-09-201B RWM TRU Lift Table			
2.8	09-HS-223C	FU40	TB2-48	LT-09-201B RWM TRU Lift Table			
2.9	09-ZS-223G	FU41	TB2-49	LT-09-201B RWM TRU Lift Table			
2.10	09-HS-223B	FU42	TB2-50	LT-09-201B RWM TRU Lift Table			
2.11	09-HS-223B	FU43	TB2-51	LT-09-201B RWM TRU Lift Table			
2.12	09-ZS-223F	FU44	TB2-52	LT-09-201B RWM TRU Lift Table			
2.13	09-ZS-223C	FU45	TB2-53	LT-09-201B RWM TRU Lift Table			
2.14	09-XS-223A	FU46	TB2-54	LT-09-201B RWM TRU Lift Table			
2.15	09-HS-225B	FU47	TB2-55	LT-09-201C RWM TRU Lift Table			
2.16	09-HS-225B	FU48	TB2-56	LT-09-201C RWM TRU Lift Table			
2.17	09-ZS-225G	FU49	TB2-61	LT-09-201C RWM TRU Lift Table			
2.18	09-ZS-225F	FU50	TB2-62	LT-09-201C RWM TRU Lift Table			
2.19	09-HS-225A	FU51	TB2-63	LT-09-201C RWM TRU Lift Table			
2.20	09-HS-225C	FU52	TB2-64	LT-09-201C RWM TRU Lift Table			
2.21	09-HS-225C	FU53	TB2-65	LT-09-201C RWM TRU Lift Table			
2.22	09-ZS-225C	FU54	TB2-66	LT-09-201C RWM TRU Lift Table			
2.23	09-ZS-225D	FU55	TB2-67	LT-09-201C RWM TRU Lift Table			
2.24	09-ZS-225E	FU56	TB2-68	LT-09-201C RWM TRU Lift Table			
2.25	SPARE	FU57	TB2-69	SPARE			
2.26	SPARE	FU58	TB2-70	SPARE			
2.27	09-XS-225A	FU59	TB2-71	LT-09-201C RWM TRU Lift Table			
2.28	09-HS-225D	FU60	TB2-72	LT-09-201C RWM TRU Lift Table			
2.29	09-ZS-235C	FU61	TB2-73	LT-09-202B Proc LLW Lift Table			
2.30	09-ZS-235F	FU62	TB2-74	LT-09-202B Proc LLW Lift Table			
2.31	09-ZS-235G	FU63	TB2-75	LT-09-202B Proc LLW Lift Table			
2.32	SPARE	FU64	TB2-76	SPARE			
2.33		IG Bus	TB2-57				
2.34		IG Bus	TB2-77				

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Step #	TAG ID	Jumper Terminals	Description	Pass	Fail	Check
3.0	Rack 1 Groups 4,5					
3.1	09-ZS-235E	FU65 TB2-81	LT-09-202B Proc LLW Lift Table			
3.2	09-ZS-235D	FU66 TB2-82	LT-09-202B Proc LLW Lift Table			
3.3	09-ZS-235A	FU67 TB2-83	LT-09-202B Proc LLW Lift Table			
3.4	09-XS-235A	FU68 TB2-84	LT-09-202B Proc LLW Lift Table			
3.5	09-HS-235A	FU69 TB2-85	LT-09-202B Proc LLW Lift Table			
3.6	09-ZS-239A	FU70 TB2-86	LT-09-202D Proc TRU Lift Table			
3.7	09-ZS-239E	FU71 TB2-87	LT-09-202D Proc TRU Lift Table			
3.8	09-ZS-239C	FU72 TB2-88	LT-09-202D Proc TRU Lift Table			
3.9	09-ZS-239F	FU73 TB2-89	LT-09-202D Proc TRU Lift Table			
3.10	09-ZS-239D	FU74 TB2-90	LT-09-202D Proc TRU Lift Table			
3.11	09-HS-239A	FU75 TB2-91	LT-09-202D Proc TRU Lift Table			
3.12	09-ZS-239G	FU76 TB2-92	LT-09-202D Proc TRU Lift Table			
3.13	SPARE	FU77 TB2-93	SPARE			
3.14	09-XS-239A	FU78 TB2-94	LT-09-202D Proc TRU Lift Table			
3.15	09-ZS-247A	FU79 TB2-95	LT-09-202E Proc TRU Lift Table			
3.16	SPARE	FU80 TB2-96	SPARE			
3.17	09-ZS-247C	FU81 TB2-101	LT-09-202E Proc TRU Lift Table			
3.18	09-ZS-247D	FU82 TB2-102	LT-09-202E Proc TRU Lift Table			
3.19	09-ZS-247E	FU83 TB2-103	LT-09-202E Proc TRU Lift Table			
3.20	09-ZS-247F	FU84 TB2-104	LT-09-202E Proc TRU Lift Table			
3.21	09-ZS-247G	FU85 TB2-105	LT-09-202E Proc TRU Lift Table			
3.22	09-XS-247A	FU86 TB2-106	LT-09-202E Proc TRU Lift Table			
3.23	09-HS-247A	FU87 TB2-107	LT-09-202E Proc TRU Lift Table			
3.24	09-ZS-243E	FU88 TB2-108	LT-09-203B Proc TRU Lift Table			
3.25	09-ZS-243D	FU89 TB2-109	LT-09-203B Proc TRU Lift Table			
3.26	09-ZS-243C	FU90 TB2-110	LT-09-203B Proc TRU Lift Table			
3.27	09-HS-243A	FU91 TB2-111	LT-09-203B Proc TRU Lift Table			
3.28	09-ZS-243F	FU92 TB2-112	LT-09-203B Proc TRU Lift Table			
3.29	09-ZS-243G	FU93 TB2-113	LT-09-203B Proc TRU Lift Table			
3.30	09-ZS-243A	FU94 TB2-114	LT-09-203B Proc TRU Lift Table			
3.31	SPARE	FU95 TB2-115	SPARE			
3.32	09-XS-243A	FU96 TB2-116	LT-09-203B Proc TRU Lift Table			
3.33		IG TB2-97				
3.34		IG TB2-117				

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Step #	TAG ID	Jumper Terminals	Description	Pass	Fail	Check
4.0	Rack 1 Groups 6,7					
4.1	09-ZS-245A	FU97 TB2-121	LT-09-203C Proc TRU Lift Table			
4.2	SPARE	FU98 TB2-122	SPARE			
4.3	09-ZS-245C	FU99 TB2-123	LT-09-203C Proc TRU Lift Table			
4.4	09-ZS-245D	FU100 TB2-124	LT-09-203C Proc TRU Lift Table			
4.5	09-ZS-245E	FU101 TB2-125	LT-09-203C Proc TRU Lift Table			
4.6	09-ZS-245F	FU102 TB2-126	LT-09-203C Proc TRU Lift Table			
4.7	09-ZS-245G	FU103 TB2-127	LT-09-203C Proc TRU Lift Table			
4.8	09-XS-245A	FU104 TB2-128	LT-09-203C Proc TRU Lift Table			
4.9	09-HS-245A	FU105 TB2-129	LT-09-203C Proc TRU Lift Table			
4.10	-XA-307	FU106 TB2-130	HU-07-304 Compt Hydr Pwr Unit			
4.11	-ZS-818	FU107 TB2-131	TC-07-301 Drum Transfer Car			
4.12	-ZSC-823	FU108 TB2-132	DH-07-305 Comp Drum Lifter			
4.13	-ZSO-823	FU109 TB2-133	DH-07-305 Comp Drum Lifter			
4.14	-ZS-816	FU110 TB2-134	TC-07-301 Drum Transfer Car			
4.15	-ZS-802A	FU111 TB2-135	CR-07-301A Monorail Hoist			
4.16	-ZS-802B	FU112 TB2-136	CR-07-301A Monorail Hoist			
4.17	-ZS-802C	FU113 TB2-141	CR-07-301A Monorail Hoist			
4.18	PC-07-006/D	FU114 TB2-142	CR-07-301A Monorail Hoist			
4.19	PC-07-006/F2S	FU115 TB2-143	CR-07-301A Monorail Hoist			
4.20	PC-07-006/F3S	FU116 TB2-144	CR-07-301A Monorail Hoist			
4.21	PC-07-006/F4S	FU117 TB2-145	CR-07-301A Monorail Hoist			
4.22	PC-07-006/F5S	FU118 TB2-146	CR-07-301A Monorail Hoist			
4.23	PC-07-006/FLS	FU119 TB2-147	CR-07-301A Monorail Hoist			
4.24	PC-07-006/R2S	FU120 TB2-148	CR-07-301A Monorail Hoist			
4.25	PC-07-006/R3S	FU121 TB2-149	CR-07-301A Monorail Hoist			
4.26	PC-07-006/R4S	FU122 TB2-150	CR-07-301A Monorail Hoist			
4.27	PC-07-006/R5S	FU123 TB2-151	CR-07-301A Monorail Hoist			
4.28	PC-07-006/RLS	FU124 TB2-152	CR-07-301A Monorail Hoist			
4.29	PC-07-006/U	FU125 TB2-153	CR-07-301A Monorail Hoist			
4.30	-ZSC-804	FU126 TB2-154	DH-07-301 Drum Lifter			
4.31	-ZSO-804	FU127 TB2-155	DH-07-301 Drum Lifter			
4.32	-PS-395A	FU128 TB2-156	DH-07-302 Drum Transfer Assbly			
4.33		IG Bus TB2-137				
4.34		IG Bus TB2-157				

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
5.0	Rack 2 Groups 0,1						
5.1	-PS-395B	FU129	TB2-161	DH-07-302 Drum Transfer Assbly			
5.2	-ZS-305	FU130	TB2-162	DH-07-302 Drum Transfer Assbly			
5.3	-ZS-807A	FU131	TB2-163	DH-07-302 Drum Transfer Assbly			
5.4	-ZS-807B	FU132	TB2-164	DH-07-302 Drum Transfer Assbly			
5.5	-ZS-807C	FU133	TB2-165	DH-07-302 Drum Transfer Assbly			
5.6	-ZS-807D	FU134	TB2-166	DH-07-302 Drum Transfer Assbly			
5.7	-ZS-808A	FU135	TB2-167	DH-07-302 Drum Transfer Assbly			
5.8	-ZS-808B	FU136	TB2-168	DH-07-302 Drum Transfer Assbly			
5.9	-ZS-808C	FU137	TB2-169	DH-07-302 Drum Transfer Assbly			
5.10	-ZSC-806	FU138	TB2-170	DH-07-302 Drum Transfer Assbly			
5.11	-ZSC-809	FU139	TB2-171	DH-07-302 Drum Transfer Assbly			
5.12	-ZSO-806A	FU140	TB2-172	DH-07-302 Drum Transfer Assbly			
5.13	-ZSO-806B	FU141	TB2-173	DH-07-302 Drum Transfer Assbly			
5.14	-ZSO-809A	FU142	TB2-174	DH-07-302 Drum Transfer Assbly			
5.15	-ZSO-809B	FU143	TB2-175	DH-07-302 Drum Transfer Assbly			
5.16	-ZS-302	FU144	TB2-176	DH-07-302/M1 Drum Transfer Ass			
5.17	-ZS-303	FU145	TB2-181	DH-07-302/M2 Drum Transfer Ass			
5.18	-PS-803	FU146	TB2-182	DO-07-301 Drum Entry/Exit Port			
5.19	-ZS-811	FU147	TB2-183	DO-07-301 Drum Entry/Exit Port			
5.20	-ZSC-800A	FU148	TB2-184	DO-07-301 Drum Entry/Exit Port			
5.21	-ZSO-801	FU149	TB2-185	DO-07-301 Drum Entry/Exit Port			
5.22	-ZS-803A	FU150	TB2-186	DO-07-301 Drum Entry/Exit Port			
5.23	-ZS-803B	FU151	TB2-187	DO-07-301 Drum Entry/Exit Port			
5.24	-ZS-803C	FU152	TB2-188	DO-07-301 Drum Entry/Exit Port			
5.25	-ZSC-800B	FU153	TB2-189	DO-07-301 Drum Entry/Exit Port			
5.26	-ZSC-801	FU154	TB2-190	DO-07-301 Drum Entry/Exit Port			
5.27	-PSL-800	FU155	TB2-191	DO-07-302 Sphincter Entry Port			
5.28	-PSLL-801	FU156	TB2-192	DO-07-302 Sphincter Entry Port			
5.29	-ZSC-805	FU157	TB2-193	DO-07-302 Sphincter Entry Port			
5.30	-ZSO-805	FU158	TB2-194	DO-07-302 Sphincter Entry Port			
5.31	-PDISL-303	FU159	TB2-195	GB-07-301 TRU Entry G.B.			
5.32	-XS-301A	FU160	TB2-196	GB-07-301 TRU Entry G.B.			
5.33		IG Bus	TB2-177	Check shield ground resistance (< 0.01 ohms)			
5.34		IG Bus	TB2-197	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
6.0	Rack 2 Groups 2,3						
6.1	XS-301B	FU161	TB2-201	GB-07-301 TRU Entry G.B.			
6.2	XA-301	FU162	TB2-202	HU-07-301 Hydr Power Unit			
6.3	XA-300	FU163	TB2-203	HU-07-302 Manip Hydr Pwr Unit			
6.4	ZS-810	FU164	TB2-204	TC-07-301 Drum Transfer Car			
6.5	HS-306	FU165	TB2-205	TE-12-104 Suite DMS Pedestal			
6.6	HS-305	FU166	TB2-206	TE-12-104 Suite DMS Pedestal			
6.7	ZS-328A	FU167	TB2-207	DH-07-303 Drum Tipper			
6.8	ZS-328B	FU168	TB2-208	DH-07-303 Drum Tipper			
6.9	ZS-329	FU169	TB2-209	DH-07-303 Drum Tipper			
6.10	ZS-820A	FU170	TB2-210	DH-07-303 Drum Tipper			
6.11	ZS-820B	FU171	TB2-211	DH-07-303 Drum Tipper			
6.12	ZS-317	FU172	TB2-212	DH-07-303/M1 Hyd. Power Pack			
6.13	ZS-327A	FU173	TB2-213	DO-07-303 X-ray Door			
6.14	ZS-327B	FU174	TB2-214	DO-07-303 X-ray Door			
6.15	ZS-823A	FU175	TB2-215	EM-07-301 Waste Manipulator			
6.16	ZS-823B	FU176	TB2-216	EM-07-301 Waste Manipulator			
6.17	ZS-823C	FU177	TB2-221	EM-07-301 Waste Manipulator			
6.18	ZS-823D	FU178	TB2-222	EM-07-301 Waste Manipulator			
6.19	PDISL-318	FU179	TB2-223	GB-07-302 Tru Sorting Glovebox			
6.20	XS-312A	FU180	TB2-224	GB-07-302 Tru Sorting Glovebox			
6.21	XS-312B	FU181	TB2-225	GB-07-302 Tru Sorting Glovebox			
6.22	XS-311	FU182	TB2-226	GB-07-302 Tru Sorting Glovebox			
6.23	ZS-824A	FU183	TB2-227	RT-07-301 Drum Delid/Relid Assembly			
6.24	ZS-824B	FU184	TB2-228	RT-07-301 Drum Delid/Relid Assembly			
6.25	ZS-826A	FU185	TB2-229	RT-07-301 Drum Delid/Relid Assembly			
6.26	ZS-826B	FU186	TB2-230	RT-07-301 Drum Delid/Relid Assembly			
6.27	ZS-827A	FU187	TB2-231	RT-07-301 Drum Delid/Relid Assembly			
6.28	ZS-827B	FU188	TB2-232	RT-07-301 Drum Delid/Relid Assembly			
6.29	ZS-828A	FU189	TB2-233	RT-07-301 Drum Delid/Relid Assembly			
6.30	ZS-828B	FU190	TB2-234	RT-07-301 Drum Delid/Relid Assembly			
6.31	ZS-819A	FU191	TB2-235	RT-07-301 Drum Delid/Relid Assembly			
6.32	ZS-819B	FU192	TB2-236	RT-07-301 Drum Delid/Relid Assembly			
6.33		IG Bus	TB2-217	Check shield ground resistance (< 0.01 ohms)			
6.34		IG Bus	TB2-237	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
7.0	Rack 2 Groups 4,5						
7.1	ZS-821	FU193	TB2-241	RT-07-301 Dr Delid/Relid Asmb.			
7.2	PSL-332	FU194	TB2-242	RT-07-301 Dr Delid/Relid Fixtr.			
7.3	FSL-332	FU195	TB2-243	RT-07-301 Dr Delid/Relid Fixtr.			
7.4	ZS-825B	FU196	TB2-244	TC-07-301 Transfer Car			
7.5	ZS-825C	FU197	TB2-245	TC-07-301 Transfer Car			
7.6	HS-307	FU198	TB2-246	TE-12-104 Suite DMS Pedestal			
7.7	ZSC-952A	FU199	TB2-247	DO-07-402A One Trip Drum Exit Port			
7.8	ZS-966C	FU200	TB2-248	DO-07-402A One Trip Drum Exit Port			
7.9	ZS-966D	FU201	TB2-249	DO-07-402A One Trip Drum Exit Port			
7.10	ZSO-968	FU202	TB2-250	DO-07-402A One Trip Drum Exit Port			
7.11	ZSC-952B	FU203	TB2-251	DO-07-402A One Trip Drum Exit Port			
7.12	ZS-966A	FU204	TB2-252	DO-07-402A One Trip Drum Exit Port			
7.13	ZS-966B	FU205	TB2-253	DO-07-402A One Trip Drum Exit Port			
7.14	PS-960A	FU206	TB2-254	DO-07-402A One Trip Drum Exit Port			
7.15	ZSO-950	FU207	TB2-255	DO-07-402B One Trip Drum Exit Port			
7.16	ZS-951C	FU208	TB2-256	DO-07-402B One Trip Drum Exit Port			
7.17	ZS-951D	FU209	TB2-261	DO-07-402B One Trip Drum Exit Port			
7.18	ZS-951A	FU210	TB2-262	DO-07-402B One Trip Drum Exit Port			
7.19	PS-960B	FU211	TB2-263	DO-07-402B One Trip Drum Exit Port			
7.20	ZS-970A	FU212	TB2-264	EM-07-401 Waste Manipulator			
7.21	ZS-970B	FU213	TB2-265	EM-07-401 Waste Manipulator			
7.22	ZS-970C	FU214	TB2-266	EM-07-401 Waste Manipulator			
7.23	XS-304A	FU215	TB2-267	GB-07-401 TRU RWM Glovebox			
7.24	XS-304B	FU216	TB2-268	GB-07-401 TRU RWM Glovebox			
7.25	PDISL-375	FU217	TB2-269	GB-07-401 TRU RWM Glovebox			
7.26	ZSC-969A	FU218	TB2-270	DO-07-402B One Trip Drum Exit Port			
7.27	ZSC-969B	FU219	TB2-271	DO-07-402B One Trip Drum Exit Port			
7.28	ZSC-868A	FU220	TB2-272	DO-07-309 One Trip Drum Exit Port			
7.29	ZSC-868B	FU221	TB2-273	DO-07-309 One Trip Drum Exit Port			
7.30	ZSO-867	FU222	TB2-274	DO-07-309 One Trip Drum Exit Port			
7.31	ZS-865A	FU223	TB2-275	DO-07-309 One Trip Drum Exit Port			
7.32	ZS-865B	FU224	TB2-276	DO-07-309 One Trip Drum Exit Port			
7.33		IG Bus	TB2-257	Check shield ground resistance (< 0.01 ohms)			
7.34		IG Bus	TB2-277	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
8.0	Rack 2 Groups 6,7						
8.1	ZS-865C	FU225	TB2-281	DO-07-309 One Trip Drum Exit Port			
8.2	ZS-865D	FU226	TB2-282	DO-07-309 One Trip Drum Exit Port			
8.3	PS-860	FU227	TB2-283	DO-07-309 One Trip Drum Exit Port			
8.4	ZSC-878A	FU228	TB2-284	DO-07-310 One Trip Drum Exit Port			
8.5	ZSC-878B	FU229	TB2-285	DO-07-310 One Trip Drum Exit Port			
8.6	ZSO-877	FU230	TB2-286	DO-07-310 One Trip Drum Exit Port			
8.7	ZS-875A	FU231	TB2-287	DO-07-310 One Trip Drum Exit Port			
8.8	ZS-875B	FU232	TB2-288	DO-07-310 One Trip Drum Exit Port			
8.9	ZS-875C	FU233	TB2-289	DO-07-310 One Trip Drum Exit Port			
8.10	ZS-875D	FU234	TB2-290	DO-07-310 One Trip Drum Exit Port			
8.11	PS-870	FU235	TB2-291	DO-07-310 One Trip Drum Exit Port			
8.12	PDISL-309	FU236	TB2-292	GB-07-309 TRU Waste Loadout G.B.			
8.13	XS-306	FU237	TB2-293	GB-07-310 TRU Waste Loadout G.B.			
8.14	HS-308	FU238	TB2-294	TE-12-104 Suite DMS Pedestal			
8.15	HS-309	FU239	TB2-295	TE-12-104 Suite DMS Pedestal			
8.16	ZS-340A	FU240	TB2-296	XX-07-302 Waste Chute			
8.17	ZS-340B	FU241	TB2-301	XX-07-302 Waste Chute			
8.18	ZS-341B	FU242	TB2-302	XX-07-303 Waste Chute			
8.19	ZS-341A	FU243	TB2-303	XX-07-303 Waste Chute			
8.20	ZS-951B	FU244	TB2-304	DO-07-402B One Trip Drum Exit Port			
8.21	ZS-970D	FU245	TB2-305	EM-07-401 Waste Manipulator			
8.22	CRA	FU246	TB2-306	CNR-12-103 - Local Control Panel			
8.23	CRB	FU247	TB2-307	CNR-12-103 - Local Control Panel			
8.24	DO-07-305/CS	FU248	TB2-308	DO-07-305 TRU Sort Bagless Transfer Port			
8.25	DO-07-305/OS	FU249	TB2-309	DO-07-305 TRU Sort Bagless Transfer Port			
8.26	DO-07-308/CS	FU250	TB2-310	DO-07-308 Emp Dr Ldout Bagless Xfer Port			
8.27	DO-07-308/OS	FU251	TB2-311	DO-07-308 Emp Dr Ldout Bagless Xfer Port			
8.28	DO-07-401/CS	FU252	TB2-312	DO-07-401 TRU RWM Bagless Xfer Port			
8.29	DO-07-401/OS	FU253	TB2-313	DO-07-401 TRU RWM Bagless Xfer Port			
8.30	SPARE	FU254	TB2-314	SPARE			
8.31	SPARE	FU255	TB2-315	SPARE			
8.32	SPARE	FU256	TB2-316	SPARE			
8.33		IG Bus	TB2-297	Check shield ground resistance (< 0.02 ohms)			
8.34		IG Bus	TB2-317	Check shield ground resistance (< 0.02 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
9.0	Rack 3 Groups 0.1						
9.1	SPARE	FU257	TB2-321	SPARE			
9.2	SPARE	FU258	TB2-322	SPARE			
9.3	SPARE	FU259	TB2-323	SPARE			
9.4	SPARE	FU260	TB2-324	SPARE			
9.5	SPARE	FU261	TB2-325	SPARE			
9.6	SPARE	FU262	TB2-326	SPARE			
9.7	SPARE	FU263	TB2-327	SPARE			
9.8	SPARE	FU264	TB2-328	SPARE			
9.9	SPARE	FU265	TB2-329	SPARE			
9.10	SPARE	FU266	TB2-330	SPARE			
9.11	SPARE	FU267	TB2-331	SPARE			
9.12	SPARE	FU268	TB2-332	SPARE			
9.13	SPARE	FU269	TB2-333	SPARE			
9.14	SPARE	FU270	TB2-334	SPARE			
9.15	SPARE	FU271	TB2-335	SPARE			
9.16	SPARE	FU272	TB2-336	SPARE			
9.17	SPARE	FU417	TB2-338	SPARE			
9.18	SPARE	FU418	TB2-339	SPARE			
9.19	SPARE	FU419	TB2-340	SPARE			
9.20	SPARE	FU420	TB2-341	SPARE			
9.21	SPARE	FU421	TB2-342	SPARE			
9.22	SPARE	FU422	TB2-343	SPARE			
9.23	SPARE	FU423	TB2-344	SPARE			
9.24	SPARE	FU424	TB2-345	SPARE			
9.25	SPARE	FU425	TB2-346	SPARE			
9.26	SPARE	FU426	TB2-347	SPARE			
9.27	SPARE	FU427	TB2-348	SPARE			
9.28	SPARE	FU428	TB2-349	SPARE			
9.29	SPARE	FU429	TB2-350	SPARE			
9.30	SPARE	FU430	TB2-351	SPARE			
9.31	SPARE	FU431	TB2-352	SPARE			
9.32	SPARE	FU432	TB2-353	SPARE			
9.33		IG Bar	TB2-337	Check shield ground resistance (< 0.01 ohms)			
9.34		IG Bar	TB2-354	Check shield ground resistance (< 0.01 ohms)			

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DATA SHEET 7.3

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.3. Relay Outputs

Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
1.0	Rack 4 Group 0						
1.1	FEV-305	FU273	TB3-1	TRU Process Entry GB Exhaust			
1.2	ZS-222E	FU274	TB3-2	Indexing Photo Sensors			
1.3	ZY-222C	FU275	TB3-3	CV-09-203 Empty Drum Staging Conv.			
1.4	SPARE	FU276	TB3-4	SPARE			
1.5	CV-09-203/F	FU277	TB3-5	CV-09-203 Empty Drum Staging Conv.			
1.6	CV-09-203/R	FU278	TB3-6	CV-09-203 Empty Drum Staging Conv.			
1.7	ZS-224E	FU279	TB3-7	CV-09-204 Empty Drum Staging Conv.			
1.8	SPARE	FU280	TB3-8	SPARE			
1.9	ZY-224C	FU281	TB3-9	CV-09-204 Empty Drum Staging Conv.			
1.10	CV-09-204/R	FU282	TB3-10	CV-09-204 Empty Drum Staging Conv.			
1.11	CV-09-204/F	FU283	TB3-11	CV-09-204 Empty Drum Staging Conv.			
1.12	LT-09-201A/F	FU284	TB3-12	LT-09-201A RWM TRU Lift Table			
1.13	LT-09-201A/R	FU285	TB3-13	LT-09-201A RWM TRU Lift Table			
1.14	ZY-221A	FU286	TB3-14	LT-09-201A RWM TRU Lift Table			
1.15	SPARE	FU287	TB3-15	SPARE			
1.16	LT-09-201A/U	FU288	TB3-16	LT-09-201A RWM TRU Lift Table			
1.17		IG Bus	TB3-17	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Chec k
2.0	Rack 4, Group 1						
2.1	LT-09-201A/D	FU289	TB3-21	LT-09-201A RWM TRU Lift Table			
2.2	LT-09-201B/R	FU290	TB3-22	LT-09-201B RWM TRU Lift Table			
2.3	ZY-223A	FU291	TB3-23	LT-09-201B RWM TRU Lift Table			
2.4	LT-09-201B/U	FU292	TB3-24	LT-09-201B RWM TRU Lift Table			
2.5	LT-09-201B/F	FU293	TB3-25	LT-09-201B RWM TRU Lift Table			
2.6	LT-09-201B/D	FU294	TB3-26	LT-09-201B RWM TRU Lift Table			
2.7	LT-09-201C/F	FU295	TB3-27	LT-09-201C RWM TRU Lift Table			
2.8	LT-09-201C/R	FU296	TB3-28	LT-09-201C RWM TRU Lift Table			
2.9	ZY-225A	FU297	TB3-29	LT-09-201C RWM TRU Lift Table			
2.10	LT-09-201C/U	FU298	TB3-30	LT-09-201C RWM TRU Lift Table			
2.11	SPARE	FU399	TB3-31	SPARE			
2.12	LT-09-201C/D	FU300	TB3-32	LT-09-201C RWM TRU Lift Table			
2.13	LT-09-202B/F	FU301	TB3-33	LT-09-202B Proc LLW Lift Table			
2.14	ZY-235A	FU302	TB3-34	LT-09-202B Proc LLW Lift Table			
2.15	SPARE	FU303	TB3-35	SPARE			
2.16	LT-09-202B/R	FU304	TB3-36	LT-09-202B Proc LLW Lift Table			
		IG Bus	TB3-37	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
3.0	Rack 4, Group 2						
3.1	ZL-235C	FU305	TB3-41	LT-09-202B Proc TRU Lift Table			
3.2	ZL-237C	FU306	TB3-42	LT-09-202C Proc TRU Lift Table			
3.3	LT-09-202D/F	FU307	TB3-43	LT-09-202D Proc TRU Lift Table			
3.4	ZY-239A	FU308	TB3-44	LT-09-202D Proc TRU Lift Table			
3.5	SPARE	FU309	TB3-45	SPARE			
3.6	LT-09-202D/U	FU310	TB3-46	LT-09-202D Proc TRU Lift Table			
3.7	LT-09-202D/D	FU311	TB3-47	LT-09-202D Proc TRU Lift Table			
3.8	LT-09-202D/R	FU312	TB3-48	LT-09-202D Proc TRU Lift Table			
3.9	ZY-247A	FU313	TB3-49	LT-09-202E Proc TRU Lift Table			
3.10	SPARE	FU314	TB3-50	SPARE			
3.11	LT-09-202E/F	FU315	TB3-51	LT-09-202E Proc TRU Lift Table			
3.12	LT-09-202E/R	FU316	TB3-52	LT-09-202E Proc TRU Lift Table			
3.13	LT-09-202E/U	FU317	TB3-53	LT-09-202E Proc TRU Lift Table			
3.14	LT-09-202E/D	FU318	TB3-54	LT-09-202E Proc TRU Lift Table			
3.15	ZY-243A	FU319	TB3-55	LT-09-203B Proc TRU Lift Table			
3.16	SPARE	FU320	TB3-56	SPARE			
		IG Bus	TB3-57	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
4.0	Rack 4 Group 3						
4.1	LT-09-203B/R	FU321	TB3-61	LT-09-203B Proc TRU Lift Table			
4.2	LT-09-203B/U	FU322	TB3-62	LT-09-203B Proc TRU Lift Table			
4.3	LT-09-203B/D	FU323	TB3-63	LT-09-203B Proc TRU Lift Table			
4.4	LT-09-203B/F	FU324	TB3-64	LT-09-203B Proc TRU Lift Table			
4.5	ZY-245A	FU325	TB3-65	LT-09-203C Proc TRU Lift Table			
4.6	SPARE	FU326	TB3-66	SPARE			
4.7	LT-09-203C/F	FU327	TB3-67	LT-09-203C Proc TRU Lift Table			
4.8	LT-09-203C/R	FU328	TB3-68	LT-09-203C Proc TRU Lift Table			
4.9	LT-09-203C/U	FU329	TB3-69	LT-09-203C Proc TRU Lift Table			
4.10	LT-09-203C/D	FU330	TB3-70	LT-09-203C Proc TRU Lift Table			
4.11	WSH-221	FU331	TB3-71	LT-09-201A Drum Lift Table			
4.12	WSH-223	FU332	TB3-72	LT-09-201B Drum Lift Table			
4.13	WSH-239	FU333	TB3-73	LT-09-202D Drum Lift Table			
4.14	WSH-247	FU334	TB3-74	LT-09-202E Drum Lift Table			
4.15	FEV-306	FU335	TB3-75	Bagless Transfer Port Controller			
4.16	PC-07-006/S2	FU336	TB3-76	CR-07-301A Monorail Hoist			
		IG Bus	TB3-77	Check shield ground resistance (< 0.01			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
5.0	Rack 4 Group 4						
5.1	PC-07-006/S3	FU337	TB3-81	CR-07-301A Monorail Hoist			
5.2	PC-07-006/S4	FU338	TB3-82	CR-07-301A Monorail Hoist			
5.3	PC-07-006/S5	FU339	TB3-83	CR-07-301A Monorail Hoist			
5.4	PC-07-006/SD	FU340	TB3-84	CR-07-301A Monorail Hoist			
5.5	PC-07-006/SF	FU341	TB3-85	CR-07-301A Monorail Hoist			
5.6	PC-07-006/SR	FU342	TB3-86	CR-07-301A Monorail Hoist			
5.7	PC-07-006/SU	FU343	TB3-87	CR-07-301A Monorail Hoist			
5.8	PC-07-006/ES	FU344	TB3-88	CR-07-301A Monorail Hoist			
5.9	PC-07-006/P1	FU345	TB3-89	CR-07-301A Monorail Hoist			
5.10	PC-07-006/P2	FU346	TB3-90	CR-07-301A Monorail Hoist			
5.11	PC-07-006/P3	FU347	TB3-91	CR-07-301A Monorail Hoist			
5.12	PC-07-006/US	FU348	TB3-92	CR-07-301A Monorail Hoist			
5.13	PC-07-006/C	FU349	TB3-93	DH-07-301 Drum Lifter			
5.14	PC-07-006/O	FU350	TB3-94	DH-07-301 Drum Lifter			
5.15	PC-07-006/CS	FU351	TB3-95	DH-07-301 Drum Lifter			
5.16	PC-07-006/OS	FU352	TB3-96	DH-07-301 Drum Lifter			
5.17		IG	TB3-97	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
6.0	Rack 4 Group 5						
6.1	FEV-395A	FU353	TB3-101	DH-07-302 Drum Transfer Assembly			
6.2	FEV-395A	FU354	TB3-102	DH-07-302 Drum Transfer Assembly			
6.3	FEV-395B	FU355	TB3-103	DH-07-302 Drum Transfer Assembly			
6.4	FEV-395B	FU356	TB3-104	DH-07-302 Drum Transfer Assembly			
6.5	DH-07-302M1/L	FU357	TB3-105	DH-07-302M1 Drum Transfer Assembly			
6.6	DH-07-302M1/R	FU358	TB3-106	DH-07-302M1 Drum Transfer Assembly			
6.7	DH-07-302M2/R	FU359	TB3-107	DH-07-302M1 Drum Transfer Assembly			
6.8	DH-07-302M2/R	FU360	TB3-108	DH-07-302M1 Drum Transfer Assembly			
6.9	FEV-302	FU361	TB3-109	DO-07-301 Drum Entry/Exit Port			
6.10	FEV-801A	FU362	TB3-110	DO-07-301 Drum Entry/Exit Port			
6.11	FEV-801B	FU363	TB3-111	DO-07-301 Drum Entry/Exit Port			
6.12	PDA-303	FU364	TB3-112	GB-07-301 TRU Entry G.B.			
6.13	FEV-394B	FU365	TB3-113	Pneumatic Valve Manifold - 20 PSI			
6.14	FEV-394A	FU366	TB3-114	Pneumatic Valve Manifold - 80 PSI			
6.15	FEV-801	FU367	TB3-115	SP-07-302 Pneumatic Valve Manifold			
6.16	CV-07-301M1/F	FU368	TB3-116	CV-07-301 Comp Drum Conveyor			
6.17		IG	TB3-117	Check shield ground resistance (< 0.01			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
7.0	Rack 4 Group 6						
7.1	CV-07-301M1/R	FU369	TB3-121	CV-07-301 Comp Drum Conveyor			
7.2	FEV-330	FU370	TB3-122	Bagless Transfer Port Controller			
7.3	FEV-395C	FU371	TB3-123	DH-07-303 Drum Tipper			
7.4	FEV-395C	FU372	TB3-124	DH-07-303 Drum Tipper			
7.5	FEV-395D	FU373	TB3-125	DH-07-303 Drum Tipper			
7.6	FEV-395E	FU374	TB3-126	DH-07-303 Drum Tipper			
7.7	FEV-395E	FU375	TB3-127	DH-07-303 Drum Tipper			
7.8	FEV-395F	FU376	TB3-128	DH-07-303 Drum Tipper			
7.9	FEV-395F	FU377	TB3-129	DH-07-303 Drum Tipper			
7.10	DH-07-303M1/SD	FU378	TB3-130	DH-07-303 Drum Tipper			
7.11	DH-07-303M1/SU	FU379	TB3-131	DH-07-303 Drum Tipper			
7.12	PDA-318	FU380	TB3-132	GB-07-302 TRU Sorting G.B.			
7.13	FEV-331	FU381	TB3-133	HU-07-302 Manip HPU 80 PSIG			
7.14	FEV-318B	FU382	TB3-134	Pneumatic Valve Manifold - 20 PSI			
7.15	FEV-318A	FU383	TB3-135	Pneumatic Valve Manifold - 80 PSI			
7.16	FEV-332A	FU384	TB3-136	RT-07-301 Drum Lid/Delid Fixture			
7.17		IG	TB3-137	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
8.0	Rack 4 Group 7						
8.1	FEV-332B	FU385	TB3-161	RT-07-301 Drum Lid/Delid Fixture			
8.2	PDA-375	FU386	TB3-162	GB-07-401 TRU RWM Glovebox			
8.3	FEV-374A	FU387	TB3-163	Pneumatic Valve Manifold - 80 PSI			
8.4	FEV-308	FU388	TB3-164	GB-07-308 Pneumatic Valve Manifold			
8.5	FEV-309	FU389	TB3-165	GB-07-309 Pneumatic Valve Manifold			
8.6	PDA-309	FU390	TB3-166	GB-07-309 TRU Waste Loadout GB			
8.7	XX-07-302/U	FU391	TB3-167	XX-07-302/M1 Waste Chute Motor			
8.8	XX-07-302/D	FU392	TB3-168	XX-07-302/M1 Waste Chute Motor			
8.9	XX-07-303/U	FU393	TB3-169	XX-07-303/M1 Waste Chute Motor			
8.10	XX-07-303/D	FU394	TB3-170	XX-07-303/M1 Waste Chute Motor			
8.11	DO-07-305/C	FU395	TB3-171	DO-07-305 TRU Sort Bagless Xfer Por			
8.12	DO-07-305/O	FU396	TB3-172	DO-07-305 TRU Sort Bagless Xfer Por			
8.13	DO-07-308/C	FU397	TB3-173	DO-07-308 Emp Dr Ldout Bagless Xfer Port			
8.14	DO-07-308/O	FU398	TB3-174	DO-07-308 Emp Dr Ldout Bagless Xfer Port			
8.15	DO-07-401/C	FU399	TB3-175	DO-07-401 TRU RWM Bagless Xfer Port			
8.16	DO-07-401/O	FU400	TB3-176	DO-07-401 TRU RWM Bagless Xfer Port			
8.17		IG	TB3-177	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
9.0	Rack 5 Group 0						
9.1	SPARE	FU401	TB3-161	SPARE			
9.2	SPARE	FU402	TB3-162	SPARE			
9.3	SPARE	FU403	TB3-163	SPARE			
9.4	SPARE	FU404	TB3-164	SPARE			
9.5	SPARE	FU405	TB3-165	SPARE			
9.6	SPARE	FU406	TB3-166	SPARE			
9.7	SPARE	FU407	TB3-167	SPARE			
9.8	SPARE	FU408	TB3-168	SPARE			
9.9	SPARE	FU409	TB3-169	SPARE			
9.10	SPARE	FU410	TB3-170	SPARE			
9.11	SPARE	FU411	TB3-171	SPARE			
9.12	SPARE	FU412	TB3-172	SPARE			
9.13	SPARE	FU413	TB3-173	SPARE			
9.14	SPARE	FU414	TB3-174	SPARE			
9.15	SPARE	FU415	TB3-175	SPARE			
9.16	SPARE	FU416	TB3-176	SPARE			
9.17		IG	TB3-177	Check shield ground resistance (< 0.01 ohms)			

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DATA SHEET 7.4

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.4. Analog Inputs							
Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
1.0	Rack 0, Group 4						
1.1	11-FIT-305	TB4-1	TB4-2	TRU Process G.B. Exhaust Flow Transmitter			
1.2	11-WT-822	TB4-5	TB4-6	DH-07-305 Comp Drum Lifter - Weight Xmitter			
1.3	SPARE	TB4-9	T6-10	SPARE			
1.4	SPARE	TB4-13	TB4-14	SPARE			
1.5	SPARE	TB4-17	TB4-18	SPARE			
1.6	SPARE	TB4-21	TB4-22	SPARE			
1.7	SPARE	TB4-25	TB4-26	SPARE			
1.8	SPARE	TB4-29	TB4-30	SPARE			
1.9		IG	TB4-3	Check shield ground resistance (< 0.01 ohms)			
1.10		IG	TB4-7	Check shield ground resistance (< 0.01 ohms)			
1.11		IG	TB4-11	Check shield ground resistance (< 0.01 ohms)			
1.12		IG	TB4-15	Check shield ground resistance (< 0.01 ohms)			
1.13		IG	TB4-19	Check shield ground resistance (< 0.01 ohms)			
1.14		IG	TB4-23	Check shield ground resistance (< 0.01 ohms)			
1.15		IG	TB4-27	Check shield ground resistance (< 0.01 ohms)			
1.16		IG	TB4-31	Check shield ground resistance (< 0.01 ohms)			

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TEST LOCATION/TYPE:

	Seller Factory-SF
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	Buyer Factory-BF
--	------------------

	Seller Plant-SP
--	-----------------

	Buyer Plant-BP
--	----------------

PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
Project Number W-026

Prepared By

Systems Interface Inc.

For Westinghouse Hanford Company

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
 HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-4
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TEST PROCEDURE COVER SHEET

Test Procedure ID: _____ Revision Number: _____
 Execution Number: _____ Start Date-Time: _____
 Test Operator: _____ End Date-Time: _____
 Witness: _____ Inspection Only?: ☐ Yes ☐ No

Test Exceptions Recorded? ☐ Yes ☐ No

COMMENTS:

TEST PROCEDURE APPROVAL

TEST ☐ Successful ☐ Unsuccessful

Contractor (Company): Systems Interface Inc.

Contractor Representative: _____ Date: _____

WHC Projects Representative: _____ Date: _____

WHC NFS Representative: _____ Date: _____
 (NFS = New Facility Startup)

CERTIFICATION OF SATISFACTORY EXECUTION

All test cases for this procedure have been tested and all exception sheets for this test have been resolved.

ICF KEH Representative: _____ Date: _____

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-4
LOCAL CONTROL UNIT 104-CNR-12-104**

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1.0 PURPOSE AND SCOPE

This Acceptance Test Procedure has been prepared to demonstrate that the Shipping/Receiving/NDA/NDE Local Control Unit functions as required by project criteria.

2.0 REFERENCES

Vendor information including Allen Bradley Product Data Bulletins:

- "1771 Allen-Bradley Discrete I/O AC Input and Output Modules",
- "1771 Allen-Bradley Discrete I/O Relay Contact Output Modules",
- "1771 Allen-Bradley Analog Input Module".

2.1 DRAWINGS

Obtain and work with the latest revisions of the following drawings:

940823-HWD-D2301	"Control Panel Layout and Bill of Material"
940820-HWD-01301	"PMS System Architecture"
940823-HWD-01301	"PMS System Architecture"
940823-HWD-D4101	"CNR-12-104 Control Power Distribution and Rack Schedule"
940823-HWD-D4301	"CNR-12-104 120 VAC Digital Inputs, Rack 1, Group 0,1"
940823-HWD-D4302	"CNR-12-104 120 VAC Digital Inputs, Rack 1, Group 2,3"
940823-HWD-D4303	"CNR-12-104 120 VAC Digital Inputs, Rack 1, Group 4,5"
940823-HWD-D4401	"CNR-12-104 Relay Output Card, Rack 1, Group 6"
940823-HWD-D4501	"CNR-12-104 Analog Input Card, Rack 0, Group 2"
940823-HWD-D4502	"CNR-12-104 Analog Input Card, Rack 0, Group 3"
940823-HWD-D4503	"CNR-12-104 Analog Input Card, Rack 0, Group 4"
940823-HWD-D4504	"CNR-12-104 Analog Input Card, Rack 0, Group 5"
940823-HWD-D4505	"CNR-12-104 Analog Input Card, Rack 0, Group 6"

2.2 SPECIFICATIONS

Obtain and work with the most current revisions of the following documents:

- UE&C Specification Section 13461-all sections
- UE&C Specification Section 13462-2.04.B
- Westinghouse Hanford Company Hardware Requirements Matrix

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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3.0 EQUIPMENT, MATERIALS AND TOOLS

NOTE

All Measuring and Test Equipment (M&TE) used to collect data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label.
- Be capable of desired range.
- Have an accuracy consistent with state-of-the-art limitations:
 - a. equal to or greater than the input tolerance specified on the Data Sheet.
If device being calibrated is not data sheet associated,
 - b. at least four times greater than the specified device tolerance.

120 VAC Jumper (small alligator clips and or "scrap" wire)

Digital Multimeter (DMM)

Laptop computer with Allen-Bradley on-line programming software

4-20 mA current source

Vendor manuals

4.0 SAFETY, PRECAUTIONS, AND LIMITATIONS

- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:
 - 1) Turn off the power source.
 - 2) Do not approach the victim until the source of the power has been turned off.
 - 3) Drag the victim clear, if necessary.
 - 4) Administer Artificial Respiration or CPR if necessary.
 - 5) Treat for shock
 - 6) Check for other injuries and seek Medical help.
 - 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.
- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.
- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.
- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

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PAGE 5 of 17****5.0 PREREQUISITES**

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 VERIFY Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 RECORD test equipment name, equipment number, and calibration expiration date on Data Sheet.
- 5.6 VERIFY that all tag numbers are listed on the Data Sheet.

6.0 SETUP

- 6.1 All computer laptop systems are running with the appropriate PLC ladder data table software screen displayed.

7.0 INSTRUCTIONS**7.1 PRE-TEST AND INSPECTION**

- 7.1.1 Verify Steps 1 through 14 on Data Sheet 7.1.
- 7.1.2 Verify Steps 15 through end on Data Sheet 7.1, (that the requirements of the PMS Hardware Requirements matrix are met).
- 7.1.3 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

7.2 DIGITAL INPUT TESTING

- 7.2.1 Perform the following steps for each pair of inputs listed on Data Sheet 7.2:
- 7.2.2 Place a jumper across the pair of inputs specified on the Data Sheet.
- 7.2.3 The corresponding input indicator on the card illuminates.
- 7.2.4 The associated data monitoring table on the laptop computer display follows the input status change.
- 7.2.5 Remove the jumper.
- 7.2.6 The input indicator on the card extinguishes.
- 7.2.7 The associated data monitoring table on the laptop computer display reverts to its previous state.
- 7.2.8 For each group of 16 Inputs, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.2.9 Check either "Pass" or "Fail", and initial the Data Sheet.

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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7.3 RELAY OUTPUT TESTING

- 7.3.1 Perform the following steps for each pair of outputs listed on Data Sheet 7.3:
- 7.3.2 Check voltage across card outputs specified on the Data Sheet - should be full voltage (120 VAC).
- 7.3.3 Using the laptop programming interface computer, force the output on.
- 7.3.4 The output indicator on the card lights.
- 7.3.5 Check voltage across outputs - should be no voltage.
- 7.3.6 Using the laptop computer, release the output.
- 7.3.7 The output indicator on the card extinguishes.
- 7.3.8 Check voltage across outputs - it should be full voltage.
- 7.3.9 For each group of 16 Outputs, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.3.10 Check either "Pass" or "Fail", and initial the Data Sheet.

7.4 ANALOG INPUT TESTING

- 7.4.1 Perform the following steps for each pair of inputs listed on Data Sheet 7.4:
- 7.4.2 Connect a 4-20 mA source to card inputs specified on the Data sheet.
- 7.4.3 Set current source to 4 mA.
- 7.4.4 Check reading in PLC using laptop computer.
- 7.4.5 Set source to 12 mA.
- 7.4.6 Check readings on laptop computer data table display. Verify reading is within 0.25% of analog input range. If range is 0.00 to 100.00, reading should be between 49.75 and 50.25.
- 7.4.7 Set source to 20 mA.
- 7.4.8 Check readings on laptop computer data table display. Verify reading is within 0.25% of analog input range. If range is 0.00 to 100.00, reading should be between 99.75 and 100.25.
- 7.4.9 For each Analog Input, check shield connection resistance for less than 0.01 ohms to instrument (isolated) ground.
- 7.4.10 For each Analog Input, check fused loop power supply and neutral for 24 VDC (+/- 10%).
- 7.4.11 Check either "Pass" or "Fail", and initial the Data Sheet.

8.0 RESTORATION

- 8.1 VERIFY test equipment and all jumpers are removed and field wiring reconnected.
- 8.2 RESTORE system to normal configuration.
- 8.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

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9.0 DISPOSITION

- 9.1 The acceptance criteria of all steps contained within Section 7.0 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

Test Director

Date

Test Recorder

Date

Test Operator

Date

Witness

Date

Witness

Date

Witness

Date

Comments:

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DATA SHEET 7.1

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.1. Pre-Test and Inspection

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legend Plates installed; Fuse replacement labels installed			
1.3	PLC hardware installed per schematics and module dip switches set properly			
1.4	Terminal strips labeled and common jumpers installed on panel side			
1.5	Correct fuses (no greater than maximum specified) or Circuit Breakers installed			
1.6	Motor Overloads correct			
1.7	Wire AWG size, labeled, and color correct			
1.8	Door mounted devices installed properly and secure			
1.9	All terminals tight, perform wire pull tests.			
1.10	Check Main grounding lug, grounding integrity, separate grounds			
1.11	Verify ~ infinite resistance between isolated ground bus and chassis ground bus			
1.12	Apply power and check AC control circuits for proper voltage			
1.13	Check DC power circuits; verify correct voltage			
1.14	Check AC outlets and lights; verify correct voltage and operation			
1.15	Verify requirements 5.1, 15.8, and 15.9 as called for in the Hardware Requirements matrix are met by cycling power to the Programmable Logic Controller (PLC). The PLC should have the actual WRAP program loaded with all databases and be in a "Run" condition prior to the power cycle. The PLC should return the the "Run" condition with no errors upon power-up. All data registers should be preserved. Remove the PLC battery (with power applied) and verify that the low battery light illuminates and PLC status register S:10/0 denotes low battery.			
1.16	Verify specification requirement 5.2 as called for in the Hardware Requirements matrix is met by forcing an output on, verifying the closed contact, turning power off, verifying the now open contact, and then restoring power. After restoration of power, unforce the output.			
1.17	Verify specification requirement 15.10 as called for in the Hardware Requirements matrix is met by monitoring processor status words S8 (last scan) and S9 (max scan) for program scan time in milliseconds. The scan time should not exceed 200 milliseconds.			
1.18	Verify specification requirements 25.38 and 15.29 as called for in the Hardware Requirements matrix are met by monitoring the 24 VDC power output on the termination blocks. While monitoring the voltage, disconnect incoming power on one of the two 24 VDC power supplies. The voltage at the termination blocks should not vary outside of +22 VDC to +30 VDC. Additionally, verify the appropriate PLC input (found on the electrical schematics) activates upon failure of this power supply. Perform this procedure for both 24 VDC power supplies.			
1.19	Verify specification requirement 15.37 as called for in the Hardware Requirements matrix is met by accessing random "N" registers within the PLC via the Data Table Access Module (DTAM) mounted on the front of the Local Control Unit. Verify Read and Write operations occur properly though monitoring the data registers on the laptop computer after the read / write. Verify password is required and must be correctly entered before data change accepted.			

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DATA SHEET 7.2

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.2. 120 VAC Digital Inputs						
Step #	TAG ID	Jumper Terminals	Description	Pass	Fail	Check
1.0	Rack 1, Groups 0,1					
1.1	12-RSH-517	FU1 TB2-1	Process Area			
1.2	12-XS-517A	FU2 TB2-2	Process Area			
1.3	12-XS-517B	FU3 TB2-3	Process Area			
1.4	12-XS-517C	FU4 TB2-4	Process Area			
1.5	11-XA-641	FU5 TB2-5	C-11-401 AHU Controller			
1.6	11-XA-661	FU6 TB2-6	C-11-301 AHU Controller			
1.7	11-XA-651	FU7 TB2-7	118-C-11-101 NCU Controller			
1.8	SPARE	FU8 TB2-8	SPARE			
1.9	11-XA-631A	FU9 TB2-9	C-11-501A AHU Controller			
1.10	11-XA-631B	FU10 TB2-10	C-11-501B AHU Controller			
1.11	11-XA-611A	FU11 TB2-11	C-11-201A Filter Train Cntrl			
1.12	11-XA-611B	FU12 TB2-12	C-11-201B Filter Train Cntrl			
1.13	11-XA-612A	FU13 TB2-13	C-11-202A Filter Train Cntrl			
1.14	11-XA-612B	FU14 TB2-14	C-11-202B Filter Train Cntrl			
1.15	11-XA-601A	FU15 TB2-15	C-11-201A AHU Controller			
1.16	SPARE	FU16 TB2-16	SPARE			
1.17	11-XA-601B	FU17 TB2-21	C-11-201B AHU Controller			
1.18	11-ZSC-604	FU18 TB2-22	DP-11-202C Isolation Damper			
1.19	11-ZSO-604	FU19 TB2-23	DP-11-202C Isolation Damper			
1.20	11-XA-621	FU20 TB2-24	C-11-101 AHU Controller			
1.21	12-RSH-508	FU21 TB2-25	High Radiation Alarm			
1.22	12-RSH-509	FU22 TB2-26	High Radiation Alarm			
1.23	12-XS-503	FU23 TB2-27	LLW Proc GB Vent Duct			
1.24	SPARE	FU24 TB2-28	SPARE			
1.25	12-RSH-503	FU25 TB2-29	LLW Process GB Vent Duct			
1.26	12-RSH-501	FU26 TB2-30	LLW RWM GB Vent Duct			
1.27	12-XS-501	FU27 TB2-31	LLW RWM GB Vent Duct			
1.28	12-RSH-506	FU28 TB2-32	NDE/NDA Area			
1.29	12-RSH-505	FU29 TB2-33	Process Area			
1.30	12-RSH-513	FU30 TB2-34	Process Area			
1.31	12-RSH-544	FU31 TB2-35	Process Area			
1.32	SPARE	FU32 TB2-36	SPARE			
1.33		IG Bus TB2-17	Check shield ground resistance (< 0.01 ohms)			
1.34		IG Bus TB2-37	Check shield ground resistance (< 0.01 ohms)			

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
2.0	Rack 1, Groups 2,3						
2.1	12-RSH-545	FU33	TB2-41	Process Area			
2.2	12-XS-505	FU34	TB2-42	Process Area			
2.3	12-XS-506	FU35	TB2-43	Process Area			
2.4	12-XS-507	FU36	TB2-44	Process Area			
2.5	12-XS-508	FU37	TB2-45	Process Area			
2.6	12-XS-509	FU38	TB2-46	Process Area			
2.7	12-XS-513	FU39	TB2-47	Process Area			
2.8	SPARE	FU40	TB2-48	SPARE			
2.9	12-XS-544	FU41	TB2-49	Process Area			
2.10	12-XS-545	FU42	TB2-50	Process Area			
2.11	12-RSH-512	FU43	TB2-51	Process HVAC Area			
2.12	12-RSH-516	FU44	TB2-52	Process HVAC Area			
2.13	12-XS-512	FU45	TB2-53	Process HVAC Area			
2.14	12-XS-516	FU46	TB2-54	Process HVAC Area			
2.15	12-XS-504	FU47	TB2-55	TRU Proc GB Vent Duct			
2.16	SPARE	FU48	TB2-56	SPARE			
2.17	12-RSH-504	FU49	TB2-61	TRU Process GB Vent Duct			
2.18	12-RSH-502	FU50	TB2-62	TRU RWM GB Vent Duct			
2.19	12-XS-502	FU51	TB2-63	TRU RWM GB Vent Duct			
2.20	12-RSH-507	FU52	TB2-64	shipping/Receiving			
2.21	12-RSH-551	FU53	TB2-65	Stack Effluent Alpha Sampler			
2.22	12-XS-551	FU54	TB2-66	Stack Effluent Alpha Sampler			
2.23	12-RSH-552	FU55	TB2-67	Stack Effluent Beta Sampler			
2.24	SPARE	FU56	TB2-68	SPARE			
2.25	12-XS-552	FU57	TB2-69	Stack Effluent Beta Sampler			
2.26	12-FSL-551	FU58	TB2-70	Stack Effluent Alpha Sampler			
2.27	12-FSL-552	FU59	TB2-71	Stack Effluent Beta Sampler			
2.28	12-FSL-550	FU60	TB2-72	Stack Effluent Record Sampler			
2.29	13-XS-011	FU61	TB2-73	C-13-101A Air Compressor			
2.30	13-ZS-011	FU62	TB2-74	C-13-101A Air Compressor			
2.31	13-XS-012	FU63	TB2-75	C-13-101B Air Compressor			
2.32	SPARE	FU64	TB2-76	SPARE			
2.33		IG Bus	TB2-57				
2.34		IG Bus	TB2-77				

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Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
3.0	Rack 1 Groups 4,5						
3.1	13-ZS-012	FU65	TB2-81	C-13-101B Air Compressor			
3.2	13-XS-07-015	FU66	TB2-82	DR-13-105A Air Dryer			
3.3	13-ESL-031	FU67	TB2-83	BD-13-101 Electrical Bus Duct			
3.4	13-ESL-032	FU68	TB2-84	BD-13-102 Electrical Bus Duct			
3.5	13-XS-031	FU69	TB2-85	T-13-101 Transformer			
3.6	13-XS-032	FU70	TB2-86	T-13-102 Transformer			
3.7	13-XS-033	FU71	TB2-87	Uninterruptible Power Supply			
3.8	SPARE	FU72	TB2-88	SPARE			
3.9	13-XS-581A	FU73	TB2-89	Fire Protection System			
3.10	13-XS-581B	FU74	TB2-90	Fire Protection System			
3.11	SPARE	FU75	TB2-91	SPARE			
3.12	CRA	FU76	TB2-92	CNR-12-104 - Local Control Panel			
3.13	CRB	FU77	TB2-93	CNR-12-104 - Local Control Panel			
3.14	SPARE	FU78	TB2-94	SPARE			
3.15	SPARE	FU79	TB2-95	SPARE			
3.16	SPARE	FU80	TB2-96	SPARE			
3.17		IG Bus	TB2-97	Check shield ground resistance (< 0.01 ohms)			

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DATA SHEET 7.3

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.3. Relay Outputs							
Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
1.0	Rack 1, Group 6						
1.1	AH-11-101/SD	FU81	TB3-1	AHU Controller Radiation Shutdown			
1.2	UA-12-110/RA	FU82	TB3-2	Control Room Annunciator			
1.3	UA-12-110/RT	FU83	TB3-3	Control Room Annunciator			
1.4	12-XS-W26/R	FU84	TB3-4	Facility Radiation Alarm to CASS			
1.5	PC-12-300/RA	FU85	TB3-5	Process Area and Entrance Alarm Relay			
1.6	PC-12-600/RA	FU86	TB3-6	Process HVAC Area and Entrance Alarm Relay			
1.7	13-XS-W26/P	FU87	TB3-7	Facility Power Loss Alarm to CASS			
1.8	13-XS-W26/F	FU88	TB3-8	Facility Fire Alarm to CASS			
1.9	UA-12-110/CT	FU89	TB3-9	Control Room Annunciator			
1.10	SPARE	FU90	TB3-10	SPARE			
1.11	SPARE	FU91	TB3-11	SPARE			
1.12	SPARE	FU92	TB3-12	SPARE			
1.13	SPARE	FU93	TB3-13	SPARE			
1.14	SPARE	FU94	TB3-14	SPARE			
1.15	SPARE	FU95	TB3-15	SPARE			
1.16	SPARE	FU96	TB3-16	SPARE			
		IG Bus	TB3-17	Check shield ground resistance (< 0.01 ohms)			

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DATA SHEET 7.4

Test Equipment Name	Test Equipment No.	Cal. Expir. Date	Test Equipment Name	Test Equipment Number	Cal. Expir. Date

7.4. Analog Inputs							
Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
1.0	Rack 0, Group 2						
1.1	12-RIT-517A	TB4-1	TB4-2	Process Area CIM Health Phys Readout			
1.2	12-RIT-517B	TB4-5	TB4-6	Process Area CIM Health Phys Readout			
1.3	12-RIT-517C	TB4-9	T6-10	Process Area CIM Health Phys Readout			
1.4	11-TIT-652	TB4-13	TB4-14	CH-11-101 Glycol Chiller Discharge Temp.			
1.5	11-PDIT-607	TB4-17	TB4-18	Atmosphere/Zone II Differential Pressure			
1.6	11-PDIT-601	TB4-21	TB4-22	Non-Conf/Zone II Process HVAC Diff. Pres.			
1.7	11-PDIT-602	TB4-25	TB4-26	Non-Conf/Zone II Process HVAC Diff. Pres.			
1.8	11-PDIT-603	TB4-29	TB4-30	Zone II Process HVAC/ZII Proc Diff. Pres.			
1.9		IG	TB4-3	Check shield ground resistance (< 0.01 ohms)			
1.10		IG	TB4-7	Check shield ground resistance (< 0.01 ohms)			
1.11		IG	TB4-11	Check shield ground resistance (< 0.01 ohms)			
1.12		IG	TB4-15	Check shield ground resistance (< 0.01 ohms)			
1.13		IG	TB4-19	Check shield ground resistance (< 0.01 ohms)			
1.14		IG	TB4-23	Check shield ground resistance (< 0.01 ohms)			
1.15		IG	TB4-27	Check shield ground resistance (< 0.01 ohms)			
1.16		IG	TB4-31	Check shield ground resistance (< 0.01 ohms)			

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7.4. Analog Inputs							
Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
2.0	Rack 0, Group 3						
2.1	12-RIT-505	TB4-33	TB4-34	Process Area Gamma Rad Health Phys Readout			
2.2	12-RIT-508	TB4-37	TB4-38	Process Area Gamma Rad Health Phys Readout			
2.3	12-RITA-509	TB4-41	TB4-42	Process Area Alpha CAM Transmitter			
2.4	12-RITA-513	TB4-45	TB4-46	Process Area Beta CAM Transmitter			
2.5	12-RITA-544	TB4-49	TB4-50	Process Area Beta CAM Transmitter			
2.6	12-RITA-545	TB4-53	TB4-54	Process Area Alpha CAM Transmitter			
2.7	12-RITA-512	TB4-57	TB4-58	Process HVAC Area Alpha CAM Transmitter			
2.8	12-RITA-516	TB4-61	TB4-62	Process HVAC Area Beta CAM Transmitter			
2.9		IG	TB4-35	Check shield ground resistance (< 0.01 ohms)			
2.10		IG	TB4-39	Check shield ground resistance (< 0.01 ohms)			
2.11		IG	TB4-43	Check shield ground resistance (< 0.01 ohms)			
2.12		IG	TB4-47	Check shield ground resistance (< 0.01 ohms)			
2.13		IG	TB4-51	Check shield ground resistance (< 0.01 ohms)			
2.14		IG	TB4-55	Check shield ground resistance (< 0.01 ohms)			
2.15		IG	TB4-59	Check shield ground resistance (< 0.01 ohms)			
2.16		IG	TB4-63	Check shield ground resistance (< 0.01 ohms)			

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7.4. Analog Inputs							
Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
3.0	Rack 0, Group 4						
3.1	12-RIT-506	TB4-65	TB4-66	Shipping/Receiving Gamma Rad Health Phys			
3.2	12-RIT-507	TB4-69	TB4-70	Shipping/Receiving Gamma Rad Health Phys			
3.3	12-RITA-504	TB4-73	TB4-74	TRU Process GB Vent Duct Alpha CAM Xmitter			
3.4	12-RITA-502	TB4-77	TB4-78	TRU RVM GB Vent Duct Alpha CAM Xmitter			
3.5	12-TT-553	TB4-81	TB4-82	Stack Effluent Temperature Transmitter			
3.6	12-RT-551	TB4-85	TB4-86	Stack Effluent Alpha Sampler CAM Rad. Level			
3.7	12-RT-552	TB4-89	TB4-90	Stack Effluent Beta Sampler CAM Rad. Level			
3.8	12-FQ-553	TB4-93	TB4-94	Stack Effluent Flow Totalizer			
3.9		IG	TB4-67	Check shield ground resistance (< 0.01 ohms)			
3.10		IG	TB4-71	Check shield ground resistance (< 0.01 ohms)			
3.11		IG	TB4-75	Check shield ground resistance (< 0.01 ohms)			
3.12		IG	TB4-79	Check shield ground resistance (< 0.01 ohms)			
3.13		IG	TB4-83	Check shield ground resistance (< 0.01 ohms)			
3.14		IG	TB4-87	Check shield ground resistance (< 0.01 ohms)			
3.15		IG	TB4-91	Check shield ground resistance (< 0.01 ohms)			
3.16		IG	TB4-95	Check shield ground resistance (< 0.01 ohms)			

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7.4. Analog Inputs							
Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
4.0	Rack 0, Group 5						
4.1	12-FT-553	TB4-97	TB4-98	Stack Effluent Air Flow Transmitter			
4.2	12-FT-551	TB4-101	TB4-102	Stack Effluent Alpha Sampler Air Flow Xmitter			
4.3	12-FT-552	TB4-105	TB4-106	Stack Effluent Beta Sampler Air Flow Xmitter			
4.4	12-FT-550	TB4-109	TB4-110	Stack Effluent Record Sampler Air Flow Xmitter			
4.5	13-PIT-016	TB4-113	TB4-114	Co-pressed Air Line Pressure Xmitter			
4.6	11-PDIT-606	TB4-117	TB4-118	Non-Conf./Atmosphere Diff Press Transmitter			
4.7	SPARE	TB4-121	TB4-122	SPARE			
4.8	SPARE	TB4-125	TB4-126	SPARE			
4.9		IG	TB4-99	Check shield ground reistance (< 0.01 ohms)			
4.10		IG	TB4-103	Check shield ground reistance (< 0.01 ohms)			
4.11		IG	TB4-107	Check shield ground reistance (< 0.01 ohms)			
4.12		IG	TB4-111	Check shield ground reistance (< 0.01 ohms)			
4.13		IG	TB4-115	Check shield ground reistance (< 0.01 ohms)			
4.14		IG	TB4-119	Check shield ground reistance (< 0.01 ohms)			
4.15		IG	TB4-123	Check shield ground reistance (< 0.01 ohms)			
4.16		IG	TB4-127	Check shield ground reistance (< 0.01 ohms)			

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7.4. Analog Inputs							
Step #	TAG ID	Jumper Terminals		Description	Pass	Fail	Check
5.0	Rack 0, Group 6						
5.1	SPARE	TB4-129	TB4-130	SPARE			
5.2	SPARE	TB4-133	TB4-134	SPARE			
5.3	SPARE	TB4-137	TB4-138	SPARE			
5.4	SPARE	TB4-141	TB4-142	SPARE			
5.5	SPARE	TB4-145	TB4-146	SPARE			
5.6	SPARE	TB4-149	TB4-150	SPARE			
5.7	SPARE	TB4-153	TB4-154	SPARE			
5.8	SPARE	TB4-157	TB4-158	SPARE			
5.9		IG	TB4-131	Check shield ground resistance (< 0.01 ohms)			
5.10		IG	TB4-135	Check shield ground resistance (< 0.01 ohms)			
5.11		IG	TB4-139	Check shield ground resistance (< 0.01 ohms)			
5.12		IG	TB4-143	Check shield ground resistance (< 0.01 ohms)			
5.13		IG	TB4-147	Check shield ground resistance (< 0.01 ohms)			
5.14		IG	TB4-151	Check shield ground resistance (< 0.01 ohms)			
5.15		IG	TB4-155	Check shield ground resistance (< 0.01 ohms)			
5.16		IG		Check shield ground resistance (< 0.01 ohms)			

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 OPERATOR CONTROL STATIONS A, B, C, D, E

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TEST LOCATION/TYPE:

☐	Seller Factory-SF	☐	Buyer Factory-BF	☐	Seller Plant-SP	☐	Buyer Plant-BP
--------------------------	-------------------	--------------------------	------------------	--------------------------	-----------------	--------------------------	----------------

PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
 Project Number W-026

Prepared By
SYSTEMS INTERFACE INC.

For Westinghouse Hanford Company

PROCEDURE APPROVAL

Author _____ Date _____

Project Manager _____ Date _____

Buyer Approval _____ Date _____

Other Approval _____ Date _____

☒ REVIEWED	☐ REVISE & RESUBMIT
☐ REJECTED	☐ MAKE CORRECTIONS NOTED

THE GENERAL CONTRACTOR'S REVIEW OF THIS SUBMITTAL IN NO WAY RELIEVES THE SUB-CONTRACTOR/VENDOR FROM HIS OBLIGATION TO COMPLY WITH THE PROJECT DOCUMENTS IN TERMS OF THE QUALITY OR QUANTITY NOR FROM THE RESPONSIBILITY FOR ERRORS OR OMISSIONS, INCLUDING SIZES, DIMENSIONS, OR LOCATIONS.

PCL Construction Services, Inc.

Initial: CEL Date: 5.4.95

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
OPERATOR CONTROL STATIONS A, B, C, D, E**

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APPROVAL TO START**TEST EXECUTION No. _____**_____
Test Director/Organization_____
Date**EXECUTION AND TEST APPROVAL**

EXECUTED BY

RECORDED BY

Test Operator/Organization_____
Date_____
Recorder/Organization_____
Date**WITNESSES**_____
Witness/Organization_____
Date_____
Witness/Organization_____
Date_____
Witness/Organization_____
Date_____
Witness/Organization_____
Date**TEST ACCEPTANCE**

	WITHOUT EXCEPTIONS
--	---------------------------

	WITH EXCEPTIONS OUTSTANDING
--	------------------------------------

Approver/Organization_____
Date_____
Approver/Organization_____
Date_____
Approver/Organization_____
Date_____
Approver/Organization_____
Date

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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OPERATOR CONTROL STATIONS A, B, C, D, E**

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1.0 PURPOSE AND SCOPE

This Acceptance Test Procedure has been prepared to demonstrate that the Operator Control Stations A,B,C,D,and E function as required by project criteria.

2.0 REFERENCES

Vendor information from Hewlett-Packard on Envizex X-Terminals, M-Power software, Intecolor 20" Rack-Mount Monitors, Addison Technology Speaker System, Emcior Enclosures, Islatrol Power Conditioners, and Leviton GFCI Duplex Outlets.

2.1 DRAWINGS

940824-HWD-D2301	Rev.2, "NDE OPERATOR CONTROL STATION #1 CNS-12-101"
940824-HWD-E3201	Rev.2, "NDE OPERATOR CONTROL STATION #2 CNS-12-102"
940824-HWD-F2301	Rev.2, "TRANSPORT/NDA OPERATOR CONTROL STATION#1 CNS-12-103"
940824-HWD-G2301	Rev.2, "TRANSPORT/NDA OPERATOR CONTROL STATION#2 CNS-12-104"

Additionally, test the equipment called on Bill Of Materials 940824-HWD-BOM8 for "DISPATCH OPERATOR CONTROL STATION CNS-12-105"

2.2 SPECIFICATIONS

UE&C Specification Sections 13461-2.03, 13461-2.04.A, and 13461-2.05 dated October 1993.

3.0 EQUIPMENT, MATERIALS AND TOOLS

NOTE

All Measuring and Test Equipment (M&TE) used to collect data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label.
 - Be capable of desired range.
 - Have an accuracy consistent with state-of-the-art limitations:
 - a. equal to or greater than the input tolerance specified on the Data Sheet.
- If device being calibrated is not data sheet associated,
- b. at least four times greater than the specified device tolerance.

Fluke 87 Digital Multimeter (DMM)

If necessary, a 4-20 mA current source

If necessary, a Laptop computer with necessary programming and configuration software such as:

Allen-Bradley Programming Software (ICOM)

Microware OS9000 Programming Software (for 'C' Coprocessors)

Procomm-Plus Terminal Emulation Software

120 VAC Jumpers (small alligator clips and or "scrap" wire)

Any required vendor manuals

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
OPERATOR CONTROL STATIONS A, B, C, D, E****5/1/95
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PAGE 4 of 19****4.0 SAFETY, PRECAUTIONS, AND LIMITATIONS**

- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:
- 1) Turn off the power source.
 - 2) Do not approach the victim until the source of the power has been turned off.
 - 3) Drag the victim clear, if necessary.
 - 4) Administer Artificial Respiration or CPR, if necessary.
 - 5) Treat for shock
 - 6) Check for other injuries and seek Medical help.
 - 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.
- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.
- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.
- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

5.0 PREREQUISITES

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 VERIFY Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 RECORD test equipment name, equipment number, and calibration expiration date on Data Sheet.
- 5.6 VERIFY that all tag numbers are listed on the Data Sheet.

6.0 SETUP

- 6.1 All computer and related systems are running with the appropriate Operator Interface screen displayed.

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7.0 INSTRUCTIONS

7.1 PRE-TEST AND INSPECTION

7.1.1 Verify Steps 1 through 8 on Data Sheets (7.1.x.y) are satisfied for each OCS Bay.

7.2 TEST

7.2.1 Perform actions in Steps 8 through end, on Data Sheets (7.1.x.y) for each OCS Bay.

7.2.2 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

8.0 RESTORATION

8.1 VERIFY test equipment and all jumpers are removed and field wiring reconnected.

8.2 RESTORE system to normal configuration.

8.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

9.0 DISPOSITION

9.1 The acceptance criteria of Steps 7.1 through 7.4 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

Test Director

Date

Test Recorder

Date

Test Operator

Date

Witness

Date

Witness

Date

Witness

Date

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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DATA SHEET 7.1

Test Equipment Name	Test Equipment Number	Calibration Expiration Date	Test Equipment Name	Test Equipment Number	Calibration Expiration Date

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HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
OPERATOR CONTROL STATIONS A, B, C, D, E**

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**Data Sheet 7.1.A.1
NDE OCS #1 CNS-12-101
BAY # 1**

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to GFCI outlets			
1.11	Load test AC circuits> 1.2 KW (14 amp heat gun)			
1.12	Test GFCI outlets, (Test Button, and fused jumper between neutral and ground)			
1.13	Install HP X-Terminal, 20 inch Intecolor Rack Mount Monitor, and audio system			
1.14	Apply power to monitor, terminal, and audio system, and verify power up			
1.15	Run M Power Software and verify audio signal is clear and set to acceptable loudness level.			
1.16	Verify specification requirements 13461-2.03.A.7.a, 2.03.A.8.c, and 2.04.A.2.e as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the X-Terminal. Configuration non-volatile memory should not be lost, during boot the X-terminals should execute power-up test utilities, and the HP-UX login prompt should appear within a minute. Login as Operator, verify HP-RTAP software auto-executes.			
1.17	Verify specification requirement 13461-2.04.A.3.e as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Check keyboard functions 1) Ability to login, 2) Start / execute programs, 3) All keys echo properly on screen.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
OPERATOR CONTROL STATIONS A, B, C, D, E

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Data Sheet 7.1.A.2
NDE OCS #1 CNS-12-101
BAY # 2

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to duplex outlets			
1.11	Load test AC circuits > 1.2 kW (14 amp heat gun)			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
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Data Sheet 7.1.A.3
NDE OCS #1 CNS-12-101
BAY #3

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to duplex outlets			
1.11	Load test AC circuits > 1.2 kW (14 amp heat gun)			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
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Data Sheet 7.1.B.1
NDE OCS #2 CNS-12-102
BAY # 1

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to GFCI outlets			
1.11	Load test AC circuits> 1.2 kW (14 amp heat gun)			
1.12	Test GFCI outlets, (Test Button, and fused jumper between neutral and ground)			
1.13	Install HP X-Terminal, 20 inch Intecolor Rack Mount Monitor, and audio system			
1.14	Apply power to monitor, terminal, and audio system, and verify power up			
1.15	Run M Power Software and verify audio signal is clear and set to acceptable loudness level			
1.16	Verify specification requirements 13461-2.03.A.7a, 2.03.A.8.c, and 2.04.A.2.e as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the X-Terminal. Configuration non-volatile memory should not be lost, during boot the X-terminals should execute power-up test utilities, and the HP-UX login prompt should appear within a minute. Login as Operator, verify HP-RTAP software auto-executes.			
1.17	Verify specification requirement 13461-2.04.A.3.e as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Check keyboard functions 1) Ability to login, 2) Start / execute programs, 3) All keys echo properly on screen.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
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Data Sheet 7.1.B.2
NDE OCS #2 CNS-12-102
BAY # 2

Step #	Description	Pass	Fall	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to duplex outlets			
1.11	Load test AC circuits> 1.2 kW (14 amp heat gun)			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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Data Sheet 7.1.B.3
NDE OCS #2 CNS-12-102
BAY #3

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to duplex outlets			
1.11	Load test AC circuits> 1.2 kW (14 amp heat gun)			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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Data Sheet 7.1.C.1
TRANSPORT / NDA OCS #1 CNS-12-103
BAY # 1

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to duplex outlets			
1.11	Load test AC circuits> 1.2 kW (14 amp heat gun)			

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
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**Data Sheet 7.1.C.2
TRANSPORT / NDA OCS #1 CNS-12-103
BAY # 2**

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to GFCI outlets			
1.11	Load test AC circuits> 1.2 kW (14 amp heat gun)			
1.12	Test GFCI outlets, (Test Button, and fused jumper between neutral and ground)			
1.13	Install HP X-Terminal, 20 inch Intecolor Rack Mount Monitor, and audio system			
1.14	Apply power to monitor, terminal, and audio system, and verify power up			
1.15	Run M Power Software and verify audio signal is clear and set to acceptable loudness level			
1.16	Verify specification requirements 13461-2.03.A.7.a, 2.03.A.8.c, and 2.04.A.2.e as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the X-Terminal. Configuration non-volatile memory should not be lost, during boot the X-terminals should execute power-up test utilities, and the HP-UX login prompt should appear within a minute. Login as Operator, verify HP-RTAP software auto-executes.			
1.17	Verify specification requirement 13461-2.04.A.3.e as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Check keyboard functions 1) Ability to login, 2) Start / execute programs, 3) All keys echo properly on screen.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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Data Sheet 7.1.C.3
TRANSPORT / NDA OCS #1 CNS-12-103
BAY # 3

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to duplex outlets			
1.11	Load test AC circuits> 1.2 kW (14 amp heat gun)			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
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Data Sheet 7.1.D.1
TRANSPORT / NDA OCS #2 CNS-12-104
BAY # 1

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to duplex outlets			
1.11	Load test AC circuits> 1.2 kW (14 amp heat gun)			

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
OPERATOR CONTROL STATIONS A, B, C, D, E**

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**Data Sheet 7.1.D.2
TRANSPORT / NDA OCS #2 CNS-12-104
BAY # 2**

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to GFCI outlets			
1.11	Load test AC circuits> 1.2 kW (14 amp heat gun)			
1.12	Test GFCI outlets, (Test Button, and fused jumper between neutral and ground)			
1.13	Install HP X-Terminal, 20 inch Intecolor Rack Mount Monitor, and audio system			
1.14	Apply power to monitor, terminal, and audio system, and verify power up			
1.15	Run M Power Software and verify audio signal is clear and set to acceptable loudness level			
1.16	Verify specification requirements 13461-2.03.A.7a, 2.03.A.8.c, and 2.04.A.2.e as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the X-Terminal. Configuration non-volatile memory should not be lost, during boot the X-terminals should execute power-up test utilities, and the HP-UX login prompt should appear within a minute. Login as Operator, verify HP-RTAP software auto-executes.			
1.17	Verify specification requirement 13461-2.04.A.3.e as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Check keyboard functions 1) Ability to login, 2) Start / execute programs, 3) All keys echo properly on screen.			

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
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Data Sheet 7.1.D.3 TRANSPORT / NDA OCS #2 CNS-12-104 BAY # 3				
Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Check AC outlets and lights, verify 120VAC to duplex outlets			
1.11	Load test AC circuits> 1.2 kW (14 amp heat gun)			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-5
OPERATOR CONTROL STATIONS A, B, C, D, E

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Data Sheet 7.1.E.1

Dispatch Operator Control Station (Government Furnished)

Step #	Description	Pass	Fail	Check
1.1	Install HP X-Terminal, 20 inch Intecolor Rack Mount Monitor, and audio system			
1.2	Apply power to Systems Interface Supplied audio system. Run M Power Software and verify audio signal is clear and set to acceptable loudness level			
1.3	Apply power to monitor, terminal, and audio system, and verify power up			
1.4	Verify specification requirements 13461-2.03.A.7a, 2.03.A.8.c, and 2.04.A.2.e as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the X-Terminal. Configuration non-volatile memory should not be lost, during boot the X-terminals should execute power-up test utilities, and the HP-UX login prompt should appear within a minute. Login as Operator, verify HP-RTAP software auto-executes.			
1.5	Verify specification requirement 13461-2.04.A.3.e as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Check keyboard functions 1) Ability to login, 2) Start / execute programs, 3) All keys echo properly on screen.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-6
DATA MANAGEMENT SYSTEM INCLUDING CPU-12-109, DRV-12-109, & TE-12-109

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TEST LOCATION/TYPE:

Seller Factory-SF

Buyer Factory-BF

Seller Plant-SP

Buyer Plant-BP

PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
Project Number W-026

Prepared By
SYSTEMS INTERFACE INC.

For Westinghouse Hanford Company

PROCEDURE APPROVAL

Author

Date

Project Manager

Date

Buyer Approval

Date

Other Approval

Date

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-6
DATA MANAGEMENT SYSTEM INCLUDING CPU-12-109, DRV-12-109, & TE-12-109

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APPROVAL TO START**TEST EXECUTION No. _____**_____
Test Director/Organization_____
Date**EXECUTION AND TEST APPROVAL**

EXECUTED BY

RECORDED BY

Test Operator/Organization_____
Date_____
Recorder/Organization_____
Date**WITNESSES**_____
Witness/Organization_____
Date_____
Witness/Organization_____
Date_____
Witness/Organization_____
Date_____
Witness/Organization_____
Date**TEST ACCEPTANCE**

WITHOUT EXCEPTIONS

WITH EXCEPTIONS OUTSTANDING

Approver/Organization_____
Date_____
Approver/Organization_____
Date_____
Approver/Organization_____
Date_____
Approver/Organization_____
Date

1.0 PURPOSE AND SCOPE

This Acceptance Test Procedure has been prepared to demonstrate that hardware provided for the Data Management System properly operates as required by project criteria and specifications.

2.0 REFERENCES

Vendor information from Hewlett-Packard on HP 9000/E35 Unix systems, Islatrol Power Conditioners, and SL Waber Surge Protectors.

2.1 DRAWINGS

Test the equipment called on Bill Of Materials 940820-HWD-BOM3, BOM4, and BOM5 for
 "DATA MANAGEMENT SYSTEM - CPU/DRV-12-109"

2.2 SPECIFICATIONS

UE&C Specification Sections 13461-2.04D and 13462-1.04A.1.b.

3.0 EQUIPMENT, MATERIALS AND TOOLS

NOTE

All Measuring and Test Equipment (M&TE) used to collect data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label.
- Be capable of desired range.
- Have an accuracy consistent with state-of-the-art limitations:
 - a. equal to or greater than the input tolerance specified on the Data Sheet.
 - If device being calibrated is not data sheet associated,
 - b. at least four times greater than the specified device tolerance.

Fluke 87 Digital Multimeter (DMM)

If necessary, a 4-20 mA current source

If necessary, a Laptop computer with necessary programming and configuration software such as:

Allen-Bradley Programming Software (ICOM)

Microware OS9000 Programming Software (for 'C' Coprocessors)

Procomm-Plus Terminal Emulation Software

120 VAC Jumpers (small alligator clips and or "scrap" wire)

Any required vendor manuals

4.0 SAFETY, PRECAUTIONS, AND LIMITATIONS

- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:
- 1) Turn off the power source.
 - 2) Do not approach the victim until the source of the power has been turned off.
 - 3) Drag the victim clear, if necessary.
 - 4) Administer Artificial Respiration or CPR, if necessary.
 - 5) Treat for shock
 - 6) Check for other injuries and seek Medical help.
 - 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.
- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.
- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.
- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

5.0 PREREQUISITES

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 VERIFY Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 RECORD test equipment name, equipment number, and calibration expiration date on Data Sheet.

6.0 SETUP

- 6.1 Ensure 120 VAC line power is available at a duplex outlet and all circuit breakers "upstream" are on.

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
 HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-6
 DATA MANAGEMENT SYSTEM INCLUDING CPU-12-109, DRV-12-109, & TE-12-109**

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7.0 INSTRUCTIONS

7.1 PRE-TEST AND INSPECTION

7.1.1 Verify Steps 1 through 7 on Data Sheet 7.1 are satisfied.

7.1.2 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

7.2 TEST

7.2.1 Perform actions in Steps 8 through end, on Data Sheet 7.1.

7.2.2 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

8.0 RESTORATION

8.1 VERIFY test equipment and all jumpers are removed and field wiring reconnected.

8.2 RESTORE system to normal configuration.

8.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

9.0 DISPOSITION

9.1 The acceptance criteria of all steps contained in section 7 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

_____	_____	_____	_____
Test Director	Date	Test Recorder	Date

_____	_____	_____	_____
Test Operator	Date	Witness	Date

_____	_____	_____	_____
Witness	Date	Witness	Date

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM**HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-6****DATA MANAGMENT SYSTEM INCLUDING CPU-12-109, DRV-12-109, & TE-12-109****12/8/95****REV. 1.0****PAGE 6 of 7****DATA SHEET 7.1**

Test Equipment Name	Test Equipment Number	Calibration Expiration Date	Test Equipment Name	Test Equipment Number	Calibration Expiration Date

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-6
DATA MANAGEMENT SYSTEM INCLUDING CPU-12-109, DRV-12-109, & TE-12-109**

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**Data Sheet 7.1
DATA MANAGEMENT SYSTEM
PROCESSOR CPU-12-109
EXTERNAL DISK DRIVE DRV-12-109
SYSTEM TERMINAL TE-12-109**

Step #	Description	Pass	Fail	Check
1.1	Install HP 9000/E35 Central Processing Unit. Connect Islatrol Power Line Conditioner to wall duplex and SL Waber Surge Suppressor to Islatrol. Finally plug in HP E35 CPU to SL Waber. Also connect serial multiplexor adaptor to back of E35. Keep the SL Waber power switched off until after step 1.3.			
1.2	Install HP 6000 SCSI/SE External Disk Drive Chassis. Connect power to SL Waber Surge Protector. Connect SCSI cable from drive chassis to HP E35 CPU rear SCSI adapter.			
1.3	Install HP 700 Character Terminal. Connect power to SL Waber Surge Protector. Connect serial cable from terminal to port 1 of the HP E35 CPU multiplexor adapter.			
1.4	Connect 10-Base-T network cable (RJ45 connector) to rear of E35.			
1.5	Verify all network cabling properly terminated (see HATP-11).			
1.6	Verify the Cabletron Hub/Router is configured, wired, and powered up (see HATP-11).			
1.7	Verify the Hanford site WLAN Domain Name Server (DNS) is on-line and functioning properly.			
1.8	Apply power and verify all systems are powering up. If nothing happens, check 120 VAC at surge suppressor, line conditioner, and duplex wall outlet and verify that all switches are in the "on" position. Monitor the terminal during power up and note any diagnostic messages that appear. If no trouble messages appear, system is properly executing.			
1.9	Login to E35 CPU via Terminal and Check keyboard functions 1) Ability to login, 2) Start / execute programs, 3) All keys echo properly on screen.			
1.10	Verify specification requirement 13462-1.04A.1.b.7 as called for in the ATP QA checklist in the Hardware Requirements matrix is met. To verify proper network communications to other systems, from the Unix prompt "ping" all devices on the network. These include: "pcs", "sie", "geaa", "geab", "pana", "panb", "bwas", "ocs101", "ocs102", "ocs103", "ocs104", "ocs105", "te124", "te108", "te107", "te104", "te103", "oiu105a", and "oiu106a". Failure to communicate with any or all of these devices probably indicates problems with wiring, the Cabletron Router, and/or site Domain Name Server.			
1.11	Execute the Unix command "sam" to verify that at least four 1.0 Gb hard drives, one CD-ROM drive, one DDS tape backup, and one 3.5" floppy drive can be located.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-7 PLANT CONTROL SYSTEM SERVER (CPU-12-110) & SYSTEM TERMINAL(TE-12-110)	12/8/95 REV. 1.0 PAGE 1 of 7
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TEST LOCATION/TYPE:

☐ Seller Factory-SF	☐ Buyer Factory-BF	☐ Seller Plant-SP	☐ Buyer Plant-BP
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PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
Project Number W-026

Prepared By
SYSTEMS INTERFACE INC.

For Westinghouse Hanford Company

PROCEDURE APPROVAL

_____ Author	_____ Date
_____ Project Manager	_____ Date
_____ Buyer Approval	_____ Date
_____ Other Approval	_____ Date

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
 HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-7

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PLANT CONTROL SYSTEM SERVER (CPU-12-110) & SYSTEM TERMINAL(TE-12-110)

APPROVAL TO START

TEST EXECUTION No. _____

 Test Director/Organization

 Date

EXECUTION AND TEST APPROVAL

EXECUTED BY

RECORDED BY

 Test Operator/Organization

 Date

 Recorder/Organization

 Date

WITNESSES

 Witness/Organization

 Date

 Witness/Organization

 Date

 Witness/Organization

 Date

 Witness/Organization

 Date

TEST ACCEPTANCE

WITHOUT EXCEPTIONS

WITH EXCEPTIONS OUTSTANDING

 Approver/Organization

 Date

 Approver/Organization

 Date

 Approver/Organization

 Date

 Approver/Organization

 Date

1.0 PURPOSE AND SCOPE

This Acceptance Test Procedure has been prepared to demonstrate that hardware provided for the Plant Control System server properly operates as required by project criteria and specifications.

2.0 REFERENCES

Vendor information from Hewlett-Packard on HP 9000/E45 Unix systems, Islatrol Power Conditioners, and SL Waber Surge Protectors.

2.1 DRAWINGS

Test the equipment called on Bill Of Materials

2.2 SPECIFICATIONS

UE&C Specification Sections 13461-2.04D and 13462-1.04A.1.b.

3.0 EQUIPMENT, MATERIALS AND TOOLS

NOTE

All Measuring and Test Equipment (M&TE) used to collect data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label.
- Be capable of desired range.
- Have an accuracy consistent with state-of-the-art limitations:
 - a. equal to or greater than the input tolerance specified on the Data Sheet.
 If device being calibrated is not data sheet associated,
 - b. at least four times greater than the specified device tolerance.

Fluke 87 Digital Multimeter (DMM)

If necessary, a 4-20 mA current source

If necessary, a Laptop computer with necessary programming and configuration software such as:

Allen-Bradley Programming Software (ICOM)

Microware OS9000 Programming Software (for 'C' Coprocessors)

Procomm-Plus Terminal Emulation Software

120 VAC Jumpers (small alligator clips and or "scrap" wire)

Any required vendor manuals

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-7
PLANT CONTROL SYSTEM SERVER (CPU-12-110) & SYSTEM TERMINAL (TE-12-110)****12/8/95
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4.0 SAFETY, PRECAUTIONS, AND LIMITATIONS

- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:
- 1) Turn off the power source.
 - 2) Do not approach the victim until the source of the power has been turned off.
 - 3) Drag the victim clear, if necessary.
 - 4) Administer Artificial Respiration or CPR, if necessary.
 - 5) Treat for shock
 - 6) Check for other injuries and seek Medical help.
 - 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.
- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.
- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.
- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

5.0 PREREQUISITES

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 **VERIFY** Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 **RECORD** test equipment name, equipment number, and calibration expiration date on Data Sheet.

6.0 SETUP

- 6.1 Ensure 120 VAC line power is available at a duplex outlet and all circuit breakers "upstream" are on.

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-7
PLANT CONTROL SYSTEM SERVER (CPU-12-110) & SYSTEM TERMINAL(TE-12-110)

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7.0 INSTRUCTIONS

7.1 PRE-TEST AND INSPECTION

7.1.1 Verify Steps 1 through 7 on Data Sheet 7.1 are satisfied.

7.2.2 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

7.2 TEST

7.2.1 Perform actions in Steps 8 through end, on Data Sheet 7.1.

7.2.2 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

8.0 RESTORATION

8.1 VERIFY test equipment and all jumpers are removed and field wiring reconnected.

8.2 RESTORE system to normal configuration.

8.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

9.0 DISPOSITION

9.1 The acceptance criteria of all steps contained in section 7 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

_____	_____	_____	_____
Test Director	Date	Test Recorder	Date

_____	_____	_____	_____
Test Operator	Date	Witness	Date

_____	_____	_____	_____
Witness	Date	Witness	Date

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-7****PLANT CONTROL SYSTEM SERVER (CPU-12-110) & SYSTEM TERMINAL (TE-12-110)****12/8/95****REV. 1.0****PAGE 6 of 7****DATA SHEET 7.1**

Test Equipment Name	Test Equipment Number	Calibration Expiration Date	Test Equipment Name	Test Equipment Number	Calibration Expiration Date

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-7
PLANT CONTROL SYSTEM SERVER (CPU-12-110) & SYSTEM TERMINAL(TE-12-110)

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Data Sheet 7.1				
PLANT CONTROL SYSTEM SERVER (CPU-12-110) & SYSTEM TERMINAL(TE-12-110)				
Step #	Description	Pass	Fail	Check
1.1	Install HP 9000/E45 Central Processing Unit. Connect Islatrol Power Line Conditioner to wall duplex and SL Waber Surge Suppressor to Islatrol. Finally plug in HP E45 CPU to SL Waber. Also connect serial multiplexor adaptor to back of E45. Keep the SL Waber power switched off until after step 1.3.			
1.2	Install HP 700 Character Terminal. Connect power to SL Waber Surge Protector. Connect serial cable from terminal to port 1 of the HP E45 CPU multiplexor adapter.			
1.3	Connect 10-Base-T network cable (RJ45 connector) to rear of E45.			
1.4	Verify all network cabling properly terminated (see HATP-11).			
1.5	Verify the Cabletron Hub/Router is configured, wired, and powered up (see HATP-11).			
1.6	Verify the Hanford site WLAN Domain Name Server (DNS) is on-line and functioning properly.			
1.7	Apply power and verify all systems are powering up. If nothing happens, check 120 VAC at surge suppressor, line conditioner, and duplex wall outlet. Ensure all switches are set to the "on" position. Monitor the terminal during power up and note any self-diagnostic messages that appear. If no trouble messages appear, system is properly executing.			
1.8	Login to E45 CPU via Terminal and Check keyboard functions 1) Ability to login, 2) Start / execute programs, 3) All keys echo properly on screen.			
1.9	Verify proper network communications to other systems; from the Unix prompt "ping" all devices on the network. These include: "dms", "sie", "geaa", "geab", "pana", "panb", "ocs101", "ocs102", "ocs103", "ocs104", "ocs105", "lcu101", "lcu102", "lcu103", "lcu104", "pam", "agv", "asrs" and "ny106". Failure to communicate with any or all of these devices probably indicates problems with wiring, the Cabletron Router, and/or site Domain Name Server.			
1.10	Execute the Unix command "sam" to verify that there exists two 1.0 Gb hard drives, one CD_ROM drive, one DDS tape backup, and one 3.5" floppy drive can be located.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM	8/7/95
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8	REV. 1.0
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)	PAGE 1 OF 17

TEST LOCATION/TYPE:

☐	Seller Factory-SF	☐	Buyer Factory-BF	☐	Seller Plant-SP	☐	Buyer Plant-BP
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PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
Project Number W-026

Prepared By
Systems Interface Inc.

For Westinghouse Hanford Company

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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TEST PROCEDURE COVER SHEET

Test Procedure ID: _____ Revision Number: _____
 Execution Number: _____ Start Date-Time: _____
 Test Operator: _____ End Date-Time: _____
 Witness: _____ Inspection Only?: ☐ Yes ☐ No

Test Exceptions Recorded? ☐ Yes ☐ No

COMMENTS:

TEST PROCEDURE APPROVAL

TEST ☐ Successful ☐ Unsuccessful

Contractor (Company): Systems Interface Inc.

Contractor Representative: _____ Date: _____

WHC Projects Representative: _____ Date: _____

WHC NFS Representative: _____ Date: _____
 (NFS = New Facility Startup)

CERTIFICATION OF SATISFACTORY EXECUTION

All test cases for this procedure have been tested and all exception sheets for this test have been resolved.

ICF KEH Representative: _____ Date: _____

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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1.0 PURPOSE AND SCOPE

This Acceptance Test Procedure has been prepared to demonstrate that the Operator Interface Units 103A, 103B, 103C, 104A, 104B, 104C, 104D, 105B and 106B function as required by project criteria.

2.0 REFERENCES

Vendor information from Total Control Products on 5" and 9" Color Quickpanels and Isiatrol Power Conditioners.

2.1 DRAWINGS

940823-HWD-B2302	"OIU 103A, 103C, 105B Mechanical and Electrical Details"
940823-HWD-B2303	"OIU 103B Mechanical and Electrical Details"
940823-HWD-C2302	"OIU 104A, 104C, 104D, 106B Mechanical and Electrical Details"
940823-HWD-C2303	"OIU 104B Mechanical and Electrical Details"
940823-HWD-E2301	"OIU 105Aand 106A Mechanical and Electrical Details"

2.2 SPECIFICATIONS

UE&C Specification Sections 13461-2.03, 13461-2.04.A, and 13461-2.05 dated October 1993.

3.0 EQUIPMENT, MATERIALS AND TOOLS

NOTE

All Measuring and Test Equipment (M&TE) used to collect data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label.
- Be capable of desired range.
- Have an accuracy consistent with state-of-the-art limitations:
 - a. equal to or greater than the input tolerance specified on the Data Sheet.
 - If device being calibrated is not data sheet associated,
 - b. at least four times greater than the specified device tolerance.

Fluke 87 Digital Multimeter (DMM)

If necessary, a 4-20 mA current source

If necessary, a Laptop computer with necessary programming and configuration software such as:

Allen-Bradley Programming Software (ICOM)

Microwave OS9000 Programming Software (for 'C' Coprocessors)

Procomm-Plus Terminal Emulation Software

Total Control Products Development Software

120 VAC Jumpers (small alligator clips and or "scrap" wire)

Any required vendor manuals

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM**HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8****OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)****8/7/95****REV. 1.0****PAGE 4 OF 17**

4.0 SAFETY, PRECAUTIONS, AND LIMITATIONS

- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:
- 1) Turn off the power source.
 - 2) Do not approach the victim until the source of the power has been turned off.
 - 3) Drag the victim clear, if necessary.
 - 4) Administer Artificial Respiration or CPR, if necessary.
 - 5) Treat for shock
 - 6) Check for other injuries and seek Medical help.
 - 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.
- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.
- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.
- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

5.0 PREREQUISITES

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 VERIFY Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 RECORD test equipment name, equipment number, and calibration expiration date on Data Sheet.
- 5.6 VERIFY that all tag numbers are listed on the Data Sheet.

6.0 SETUP

- 6.1 All computer and related systems are running with the appropriate Operator Interface screen displayed.

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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7.0 INSTRUCTIONS

7.1 PRE-TEST AND INSPECTION

- 7.1.1 Verify Steps 1 through 8 on Data Sheets (7.1.x) are satisfied for each Operator Interface Unit.
- 7.1.2 Check either "Pass" or "Fail" and initial the completed step.

7.2 TEST

- 7.2.1 Perform actions in Steps 8 through end, on Data Sheets (7.1.x) for each Operator Interface Unit.
- 7.2.2 Check either "Pass" or "Fail", and initial the completed step.

8.0 RESTORATION

- 8.1 VERIFY test equipment and all jumpers are removed and field wiring reconnected.
- 8.2 RESTORE system to normal configuration.
- 8.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

9.0 DISPOSITION

- 9.1 The acceptance criteria of all steps contained in section 7 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

_____ Test Director	_____ Date	_____ Test Recorder	_____ Date
_____ Test Operator	_____ Date	_____ Witness	_____ Date
_____ Witness	_____ Date	_____ Witness	_____ Date

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM**8/7/95****HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8****REV. 1.0****OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)****PAGE 6 OF 17****DATA SHEET 7.1**

Test Equipment Name	Test Equipment Number	Calibration Expiration Date	Test Equipment Name	Test Equipment Number	Calibration Expiration Date

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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Data Sheet 7.1.A
OPERATOR INTERFACE UNIT OIU-12-103A
LLW ENTRY GLOVEBOX

Step #	Description	Pass	Fail	Initials
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Apply power to Operator Interface Unit and verify power up.			
1.11	Download executable files to the OIU and verify by proper powerup to Main Menu Display.			
1.12	Verify specification requirements 13461-2.03.A.7.a and 2.03.A.7.b as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the Operator Interface Unit. Memory stored in the Flash Eprom should reload the OIU with the proper configuration and Main Menu should be displayed.			
1.13	Verify specification requirements 13461-2.03.A.8.c as called for in the ATP QA checklist of the Hardware Requirements matrix are met by disconnecting the Allen Bradley communications cable located on the back of the Operator Interface Unit. When reconnected the Operator Interface Unit should automatically come back "on-line" with the PLC Processor.			
1.14	Verify specification requirement 13461-2.04.C.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Generate an alarm condition for the glovebox using the PLC data tables and verify that the alarm condition is generated on the OIU alarm display screen. Note that the Software Acceptance Tests will verify all alarms.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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Data Sheet 7.1.B
OPERATOR INTERFACE UNIT OIU-12-103B
LLW SORTING GLOVEBOX

Step #	Description	Pass	Fail	Initials
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Apply power to Operator Interface Unit and verify power up.			
1.11	Download executable files to the OIU and verify by proper powerup to Main Menu Display.			
1.12	Verify specification requirements 13461-2.03.A.7.a and 2.03.A.7.b as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the Operator Interface Unit. Memory stored in the Flash Eprom should reload the OIU with the proper configuration and Main Menu should be displayed.			
1.13	Verify specification requirements 13461-2.03.A.8.c as called for in the ATP QA checklist of the Hardware Requirements matrix are met by disconnecting the Allen Bradley communications cable located on the back of the Operator Interface Unit. When reconnected the Operator Interface Unit should automatically come back "on-line" with the PLC Processor.			
1.14	Verify specification requirement 13461-2.04.C.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Generate an alarm condition for the glovebox using the PLC data tables and verify that the alarm condition is generated on the OIU alarm display screen. Note that the Software Acceptance Tests will verify all alarms.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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Data Sheet 7.1.C
OPERATOR INTERFACE UNIT OIU-12-103C
LLW EXIT GLOVEBOX

Step #	Description	Pass	Fail	Initials
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Apply power to Operator Interface Unit and verify power up.			
1.11	Download executable files to the OIU and verify by proper powerup to Main Menu Display.			
1.12	Verify specification requirements 13461-2.03.A.7.a and 2.03.A.7.b as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the Operator Interface Unit. Memory stored in the Flash Eprom should reload the OIU with the proper configuration and Main Menu should be displayed.			
1.13	Verify specification requirements 13461-2.03.A.8.c as called for in the ATP QA checklist of the Hardware Requirements matrix are met by disconnecting the Allen Bradley communications cable located on the back of the Operator Interface Unit. When reconnected the Operator Interface Unit should automatically come back "on-line" with the PLC Processor.			
1.14	Verify specification requirement 13461-2.04.C.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Generate an alarm condition for the glovebox using the PLC data tables and verify that the alarm condition is generated on the OIU alarm display screen. Note that the Software Acceptance Tests will verify all alarms.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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Data Sheet 7.1.D
OPERATOR INTERFACE UNIT OIU-12-105B
LLW RWM GLOVEBOX

Step #	Description	Pass	Fail	Initials
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Apply power to Operator Interface Unit and verify power up.			
1.11	Download executable files to the OIU and verify by proper powerup to Main Menu Display.			
1.12	Verify specification requirements 13461-2.03.A.7.a and 2.03.A.7.b as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the Operator Interface Unit. Memory stored in the Flash Eeprom should reload the OIU with the proper configuration and Main Menu should be displayed.			
1.13	Verify specification requirements 13461-2.03.A.8.c as called for in the ATP QA checklist of the Hardware Requirements matrix are met by disconnecting the Allen Bradley communications cable located on the back of the Operator Interface Unit. When reconnected the Operator Interface Unit should automatically come back "on-line" with the PLC Processor.			
1.14	Verify specification requirement 13461-2.04.C.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Generate an alarm condition for the glovebox using the PLC data tables and verify that the alarm condition is generated on the OIU alarm display screen. Note that the Software Acceptance Tests will verify all alarms.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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Data Sheet 7.1.E
OPERATOR INTERFACE UNIT OIU-12-105A
LLW RWM DMS TERMINAL

Step #	Description	Pass	Fail	Initials
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Verify 120VAC to GFCI outlets			
1.11	Load test AC circuits> 1.2 kW (14 amp heat gun)			
1.12	Test GFCI outlets, (Test Button, and fused jumper between neutral and ground)			
1.11	Install HP Vectra 486 Computer, terminal and keyboard. Keyboard rests on top of computer.			
1.12	Apply power to HP Vectra Computer and Dynacomp 14" Monitor and verify auto boot to windows application.			
1.13	Verify specification requirements 13461-2.03.A.7a and 2.03.A.7.b as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the HP Computer. Upon re-initialization of the computer the computer should boot up properly and display the appropriate software.			
1.14	Verify specification requirements 13462/PARTS 123-1.04.A.1.b.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by using network utility software to verify that the computer can communicate to the Data Management System.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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Data Sheet 7.1.F
OPERATOR INTERFACE UNIT OIU-12-104A
TRU ENTRY GLOVEBOX

Step #	Description	Pass	Fail	Initials
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Apply power to Operator Interface Unit and verify power up.			
1.11	Download executable files to the OIU and verify by proper powerup to Main Menu Display.			
1.12	Verify specification requirements 13461-2.03.A.7a and 2.03.A.7.b as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the Operator Interface Unit. Memory stored in the Flash Eeprom should reload the OIU with the proper configuration and Main Menu should be displayed.			
1.13	Verify specification requirements 13461-2.03.A.8.c as called for in the ATP QA checklist of the Hardware Requirements matrix are met by disconnecting the Allen Bradley communications cable located on the back of the Operator Interface Unit. When reconnected the Operator Interface Unit should automatically come back "on-line" with the PLC Processor.			
1.14	Verify specification requirement 13461-2.04.C.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Generate an alarm condition for the glovebox using the PLC data tables and verify that the alarm condition is generated on the OIU alarm display screen. Note that the Software Acceptance Tests will verify all alarms.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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Data Sheet 7.1.G
OPERATOR INTERFACE UNIT OIU-12-104B
TRU SORTING GLOVEBOX

Step #	Description	Pass	Fail	Initials
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Apply power to Operator Interface Unit and verify power up.			
1.11	Download executable files to the OIU and verify by proper powerup to Main Menu Display.			
1.12	Verify specification requirements 13461-2.03.A.7a and 2.03.A.7.b as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the Operator Interface Unit. Memory stored in the Flash Eeprom should reload the OIU with the proper configuration and Main Menu should be displayed.			
1.13	Verify specification requirements 13461-2.03.A.8.c as called for in the ATP QA checklist of the Hardware Requirements matrix are met by disconnecting the Allen Bradley communications cable located on the back of the Operator Interface Unit. When reconnected the Operator Interface Unit should automatically come back "on-line" with the PLC Processor.			
1.14	Verify specification requirement 13461-2.04.C.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Generate an alarm condition for the glovebox using the PLC data tables and verify that the alarm condition is generated on the OIU alarm display screen. Note that the Software Acceptance Tests will verify all alarms.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM**HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8****OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)****8/7/95****REV. 1.0****PAGE 14 OF 17****Data Sheet 7.1.H****OPERATOR INTERFACE UNIT OIU-12-104C****TRU EMPTY DRUM LOADOUT GLOVEBOX**

Step #	Description	Pass	Fail	Initials
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Apply power to Operator Interface Unit and verify power up.			
1.11	Download executable files to the OIU and verify by proper powerup to Main Menu Display.			
1.12	Verify specification requirements 13461-2.03.A.7a and 2.03.A.7.b as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the Operator Interface Unit. Memory stored in the Flash Eprom should reload the OIU with the proper configuration and Main Menu should be displayed.			
1.13	Verify specification requirements 13461-2.03.A.8.c as called for in the ATP QA checklist of the Hardware Requirements matrix are met by disconnecting the Allen Bradley communications cable located on the back of the Operator Interface Unit. When reconnected the Operator Interface Unit should automatically come back "on-line" with the PLC Processor.			
1.14	Verify specification requirement 13461-2.04.C.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Generate an alarm condition for the glovebox using the PLC data tables and verify that the alarm condition is generated on the OIU alarm display screen. Note that the Software Acceptance Tests will verify all alarms.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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Data Sheet 7.1.I
OPERATOR INTERFACE UNIT OIU-12-104D
TRU LOADOUT GLOVEBOX

Step #	Description	Pass	Fail	Initials
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Apply power to Operator Interface Unit and verify power up.			
1.11	Download executable files to the OIU and verify by proper powerup to Main Menu Display.			
1.12	Verify specification requirements 13461-2.03.A.7.a and 2.03.A.7.b as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the Operator Interface Unit. Memory stored in the Flash Eeprom should reload the OIU with the proper configuration and Main Menu should be displayed.			
1.13	Verify specification requirements 13461-2.03.A.8.c as called for in the ATP QA checklist of the Hardware Requirements matrix are met by disconnecting the Allen Bradley communications cable located on the back of the Operator Interface Unit. When reconnected the Operator Interface Unit should automatically come back "on-line" with the PLC Processor.			
1.14	Verify specification requirement 13461-2.04.C.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Generate an alarm condition for the glovebox using the PLC data tables and verify that the alarm condition is generated on the OIU alarm display screen. Note that the Software Acceptance Tests will verify all alarms.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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Data Sheet 7.1.J
OPERATOR INTERFACE UNIT OIU-12-106B
TRU RWM GLOVEBOX

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Apply power to Operator Interface Unit and verify power up.			
1.11	Download executable files to the OIU and verify by proper powerup to Main Menu Display.			
1.12	Verify specification requirements 13461-2.03.A.7.a and 2.03.A.7.b as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the Operator Interface Unit. Memory stored in the Flash Eeprom should reload the OIU with the proper configuration and Main Menu should be displayed.			
1.13	Verify specification requirements 13461-2.03.A.8.c as called for in the ATP QA checklist of the Hardware Requirements matrix are met by disconnecting the Allen Bradley communications cable located on the back of the Operator Interface Unit. When reconnected the Operator Interface Unit should automatically come back "on-line" with the PLC Processor.			
1.14	Verify specification requirement 13461-2.04.C.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met. Generate an alarm condition for the glovebox using the PLC data tables and verify that the alarm condition is generated on the OIU alarm display screen. Note that the Software Acceptance Tests will verify all alarms.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-8
OPERATOR INTERFACE UNITS (103A,B,C,104A,B,C,D, 105A,B AND 106A,B)

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Data Sheet 7.1.K
OPERATOR INTERFACE UNIT OIU-12-106A

TRU RWM DMS TERMINAL

Step #	Description	Pass	Fail	Check
1.1	Correct Hardware installed and secure			
1.2	Component Legends installed; Fuse replacement labels installed			
1.3	Terminal strips labeled and common jumpers installed on panel side			
1.4	Correct fuses or Circuit Breakers installed			
1.5	Wire AWG size, labeled, and color correct			
1.6	Door mounted devices tight and secure			
1.7	All terminals tight			
1.8	Main grounding lug, grounding integrity, separate grounds All grounds <0.1 ohms resistance			
1.9	Apply power and check AC control circuits			
1.10	Verify 120VAC to GFCI outlets			
1.11	Load test AC circuits > 1.2 kW (14 amp heat gun)			
1.12	Test GFCI outlets, (Test Button, and fused jumper between neutral and ground)			
1.11	Install HP Vectra 486 Computer, terminal and keyboard. Keyboard rests on top of computer.			
1.12	Apply power to HP Vectra Computer and Dynacomp 14" Monitor and verify auto boot to windows application.			
1.13	Verify specification requirements 13461-2.03.A.7a and 2.03.A.7.b as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the HP Computer. Upon re-initialization of the computer the computer should boot up properly and display the appropriate software.			
1.14	Verify specification requirements 13462/PARTS 123-1.04.A.1.b.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by using network utility software to verify that the computer can communicate to the Data Management System.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-9
PLANT MANAGEMENT SYSTEM PRINTERS

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TEST LOCATION/TYPE:

Seller Factory-SF

Buyer Factory-BF

Seller Plant-SP

Buyer Plant-BP

PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
Project Number W-026

Prepared By
SYSTEMS INTERFACE INC.

For Westinghouse Hanford Company

PROCEDURE APPROVAL

Author

Date

Project Manager

Date

Buyer Approval

Date

Other Approval

Date

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-9
PLANT MANAGEMENT SYSTEM PRINTERS**

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APPROVAL TO START**TEST EXECUTION No. _____**_____
Test Director/Organization_____
Date**EXECUTION AND TEST APPROVAL**

EXECUTED BY

RECORDED BY

Test Operator/Organization_____
Date_____
Recorder/Organization_____
Date**WITNESSES**_____
Witness/Organization_____
Date_____
Witness/Organization_____
Date_____
Witness/Organization_____
Date_____
Witness/Organization_____
Date**TEST ACCEPTANCE**

	WITHOUT EXCEPTIONS
--	---------------------------

	WITH EXCEPTIONS OUTSTANDING
--	------------------------------------

Approver/Organization_____
Date_____
Approver/Organization_____
Date_____
Approver/Organization_____
Date_____
Approver/Organization_____
Date

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-9
PLANT MANAGEMENT SYSTEM PRINTERS****12/8/95
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PAGE 3 of 10****1.0 PURPOSE AND SCOPE**

This Acceptance Test Procedure has been prepared to demonstrate that hardware provided for the Plant Management System printers properly operates as required by project criteria and specifications.

2.0 REFERENCES

Vendor information from Hewlett-Packard on HP LaserJet 4 printers and from EPSON on DFX-5000+ printers.

2.1 DRAWINGS

940820-HWD-01301 PMS SYSTEM ARCHITECTURE

2.2 SPECIFICATIONS

UE&C Specification Section 13461

3.0 EQUIPMENT, MATERIALS AND TOOLS**NOTE**

All Measuring and Test Equipment (M&TE) used to collect data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label.
- Be capable of desired range.
- Have an accuracy consistent with state-of-the-art limitations:
 - a. equal to or greater than the input tolerance specified on the Data Sheet.
 - If device being calibrated is not data sheet associated,
 - b. at least four times greater than the specified device tolerance.

Fluke 87 Digital Multimeter (DMM)

If necessary, a 4-20 mA current source

If necessary, a Laptop computer with necessary programming and configuration software such as:

Allen-Bradley Programming Software (ICOM)

Microware OS9000 Programming Software (for 'C' Coprocessors)

Procomm-Plus Terminal Emulation Software

120 VAC Jumpers (small alligator clips and or "scrap" wire)

Any required vendor manuals

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-9
PLANT MANAGEMENT SYSTEM PRINTERS****12/8/95
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- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:
- 1) Turn off the power source.
 - 2) Do not approach the victim until the source of the power has been turned off.
 - 3) Drag the victim clear, if necessary.
 - 4) Administer Artificial Respiration or CPR, if necessary.
 - 5) Treat for shock
 - 6) Check for other injuries and seek Medical help.
 - 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.
- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.
- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.
- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

5.0 PREREQUISITES

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 **VERIFY** Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 **RECORD** test equipment name, equipment number, and calibration expiration date on Data Sheet.

6.0 SETUP

- 6.1 Ensure 120 VAC line power is available at a duplex outlet and all circuit breakers "upstream" are on. Plug the printer in.
- 6.2 Ensure there is a supply of paper in the paper tray.

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-9
PLANT MANAGEMENT SYSTEM PRINTERS**

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7.0 INSTRUCTIONS

7.1 PRE-TEST AND INSPECTION

7.1.1 Verify Steps 1 through 7 on Data Sheet 7.1 are satisfied.

7.2.2 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

7.2 TEST

7.2.1 Perform actions in Steps 8 through end, on Data Sheet 7.1.

7.2.2 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

8.0 RESTORATION

8.1 VERIFY test equipment and all jumpers are removed and field wiring reconnected.

8.2 RESTORE system to normal configuration.

8.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

9.0 DISPOSITION

9.1 The acceptance criteria of all steps contained in section 7 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

_____	_____	_____	_____
Test Director	Date	Test Recorder	Date

_____	_____	_____	_____
Test Operator	Date	Witness	Date

_____	_____	_____	_____
Witness	Date	Witness	Date

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-9
PLANT MANAGEMENT SYSTEM PRINTERS****12/8/95
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Test Equipment Name	Test Equipment Number	Calibration Expiration Date	Test Equipment Name	Test Equipment Number	Calibration Expiration Date

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-9
PLANT MANAGEMENT SYSTEM PRINTERS

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Data Sheet 7.1 PLANT MANAGEMENT SYSTEM SAMPLE MANAGEMENT OFFICE PRINTER 109-PR-12-107				
Step #	Description	Pass	Fail	Check
1.1	Turn on the printer. After an initial warm-up sequence the printer is on-line.			
1.2	Press ONLINE to take the printer off-line.			
1.3	Press MENU until TEST MENU appears.			
1.4	Press ITEM until SELF-TEST appears.			
1.5	Press ENTER to start the test. The SELF TEST page is printed.			
1.6	Refer to the printer's Users manual for expected SELF TEST layout.			
1.7	Date, initial and attach the self test to the test document.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-9
PLANT MANAGEMENT SYSTEM PRINTERS

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Data Sheet 7.2
PLANT MANAGEMENT SYSTEM
SHIPPING/RECEIVING OFFICE PRINTER 101-PR-12-108

Step #	Description	Pass	Fail	Check
1.1	Turn on the printer. After an initial warm-up sequence the printer is on-line.			
1.2	Press ONLINE to take the printer off-line.			
1.3	Press MENU until TEST MENU appears.			
1.4	Press ITEM until SELF-TEST appears.			
1.5	Press ENTER to start the test. The SELF TEST page is printed.			
1.6	Refer to the printer's Users manual for expected SELF TEST layout.			
1.7	Date, initial and attach the self test to the test document.			

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-9
PLANT MANAGEMENT SYSTEM PRINTERS**

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**Data Sheet 7.3
PLANT MANAGEMENT SYSTEM
DATA MANAGEMENT SYSTEM PRINTER 202-PR-12-109**

Step #	Description	Pass	Fail	Check
1.1	Turn on the printer. After an initial warm-up sequence the printer is on-line.			
1.2	Press ONLINE to take the printer off-line.			
1.3	Press MENU until TEST MENU appears.			
1.4	Press ITEM until SELF-TEST appears.			
1.5	Press ENTER to start the test. The SELF TEST page is printed.			
1.6	Refer to the printer's Users manual for expected SELF TEST layout.			
1.7	Date, initial and attach the self test to the test document.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-9
PLANT MANAGEMENT SYSTEM PRINTERS

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Data Sheet 7.4
PLANT MANAGEMENT SYSTEM
PLANT CONTROL SYSTEM PRINTER 201-PR-12-110

Step #	Description	Pass	Fail	Check
1.1	While holding down the LF/FF button turn on the printer. The self test will print.			
1.2	Press the PAUSE button to stop the self test.			
1.3	Press the LF/FF button to advance the paper and cancel the self test.			
1.4	Refer to the printer's Users manual for expected SELF TEST layout.			
1.5	Date, initial and attach the self test to the test document.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
 HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-10
 DMS SYSTEM TERMINALS

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TEST LOCATION/TYPE:

☐	Seller Factory-SF
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☐	Buyer Factory-BF
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☒	Seller Plant-SP
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☐	Buyer Plant-BP
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PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
 Project Number W-026

Prepared By

*Systems Interface Inc.****For Westinghouse Hanford Company***

☒ REVIEWED	☐ REVISE & RESUBMIT
☐ REJECTED	☐ MAKE CORRECTIONS NOTED

THE GENERAL CONTRACTOR'S REVIEW OF THIS SUBMITTAL IN NO WAY RELIEVES THE SUB-CONTRACTOR/VENDOR FROM HIS OBLIGATION TO COMPLY WITH THE PROJECT DOCUMENTS IN TERMS OF THE QUALITY OR QUANTITY NOR FROM THE RESPONSIBILITY FOR ERRORS OR OMISSIONS, INCLUDING SIZES, DIMENSIONS, OR LOCATIONS.

PCL Construction Services, Inc.

Initial: GL Date: 9.6.95

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HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-10
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TEST PROCEDURE COVER SHEET

Test Procedure ID: _____ Revision Number: _____
 Execution Number: _____ Start Date-Time: _____
 Test Operator: _____ End Date-Time: _____
 Witness: _____ Inspection Only?: ☐ Yes ☐ No

Test Exceptions Recorded? ☐ Yes ☐ No

COMMENTS:

TEST PROCEDURE APPROVAL

TEST ☐ Successful ☐ Unsuccessful

Contractor (Company): Systems Interface Inc.

Contractor Representative: _____ Date: _____

WHC Projects Representative: _____ Date: _____

WHC NFS Representative: _____ Date: _____

(NFS = New Facility Startup)

CERTIFICATION OF SATISFACTORY EXECUTION

All test cases for this procedure have been tested and all exception sheets for this test have been resolved.

ICF KEH Representative: _____ Date: _____

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-10
DMS SYSTEM TERMINALS

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1.0 PURPOSE AND SCOPE

This Acceptance Test Procedure has been prepared to demonstrate that the DMS System Terminals (TE-12-103, TE-12-104, TE-12-107, TE-12-108, OIU-12-105A, OIU-12-106A and TE-12-124) all function as required by project criteria.

2.0 REFERENCES

Vendor information for the Hewlett-Packard Vectra VL2 4/66.

2.1 DRAWINGS

940824-HWD-B2301	"Data Management System Pedestal TE-12-103 Panel Layout"
940824-HWD-A4101	"Data Management System Pedestal TE-12-103 Power Distribution"
940824-HWD-A2301	"Data Management System Pedestal TE-12-104 Panel Layout"
940824-HWD-B4101	"Data Management System Pedestal TE-12-104 Power Distribution"
940824-HWD-C2301	"Data Management System Pedestal TE-12-124 Panel Layout"
940824-HWD-C4101	"Data Management System Pedestal TE-12-124 Power Distribution"

2.2 SPECIFICATIONS

UE&C Specification Sections 13461-2.03.A.7a and 13462/PARTS 123-1.04.A.1.b.7 dated December 15, 1994.

3.0 EQUIPMENT, MATERIALS AND TOOLS

NOTE

All Measuring and Test Equipment (M&TE) used to collect data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label.
- Be capable of desired range.
- Have an accuracy consistent with state-of-the-art limitations:
 - a. equal to or greater than the input tolerance specified on the Data Sheet.
 - If device being calibrated is not data sheet associated,
 - b. at least four times greater than the specified device tolerance.

Digital Multimeter (DMM)
 PC Test Software (Check-it)
 Any required vendor manuals

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-10
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- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:
- 1) Turn off the power source.
 - 2) Do not approach the victim until the source of the power has been turned off.
 - 3) Drag the victim clear, if necessary.
 - 4) Administer Artificial Respiration or CPR, if necessary.
 - 5) Treat for shock
 - 6) Check for other injuries and seek Medical help.
 - 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.
- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.
- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.
- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

5.0 PREREQUISITES

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 **VERIFY** Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 **RECORD** test equipment name, equipment number, and calibration expiration date.
- 5.6 **VERIFY** that all tag numbers are correct as listed on the Data Sheets.

6.0 INSTRUCTIONS**6.1 PRE-TEST AND INSPECTION**

- 6.1.1 Verify initial steps (all test steps prior to steps beginning with "Test" or "Verify") are met for the DMS equipment item being tested in data sheet 6.0.x.
- 6.1.2 Check either "Pass" or "Fail" and initial the completed step.

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6.2 TEST

- 6.2.1 Perform actions in the following test steps (all test steps beginning with "Test" or "Verify") for the DMS equipment item being tested in data sheet 6.0.x.
- 6.2.2 Check either "Pass" or "Fail", and initial the completed step.

7.0 RESTORATION

- 7.1 VERIFY test equipment is removed and field wiring reconnected.
- 7.2 RESTORE system to normal configuration.
- 7.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

8.0 DISPOSITION

- 8.1 The acceptance criteria of all steps contained in section 6 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

_____	_____	_____	_____
Test Director	Date	Test Recorder	Date
_____	_____	_____	_____
Test Operator	Date	Witness	Date
_____	_____	_____	_____
Witness	Date	Witness	Date

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DATA SHEET 5.5

Test Equipment Name	Test Equipment Number	Calibration Expiration Date	Test Equipment Name	Test Equipment Number	Calibration Expiration Date

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Data Sheet 6.0.A
LLW DMS Terminal
TE-12-103

Step #	Description	Pass	Fail	Initials
1.1	Correct hardware installed and secure.			
1.2	Component Legends installed; fuse replacement labels installed.			
1.3	Terminal strips labeled.			
1.4	Correct fuses or circuit breakers installed.			
1.5	Wire AWG size, labeled, and color correct.			
1.6	All terminals tight.			
1.7	Main grounding lug, grounding integrity. All grounds < 0.1 ohms resistance.			
1.8	Apply power and check AC control circuits.			
1.9	Verify 120 VAC to GFCI outlets.			
1.10	Test load of AC circuits > 1.2 kW (14 amp heat gun).			
1.11	Test GFCI outlets (test button, and fused jumper between neutral and ground).			
1.12	Test integrity of HP Vectra computer system using seller-supplied PC test software (Check-It). Select the "Test Everything" option under the "Test" menu to perform a complete diagnostic of the computer system.			
1.13	Verify specification requirements 13461-2.03.A.7a as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the HP computer. Upon re-initialization of power, the computer should boot up properly and display the appropriate software.			
1.14	Verify specification requirements 13462/PARTS 123-1.04.A.1.b.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by using buyer-supplied network utility software to verify that the computer can communicate to the Data Management System (i.e. attempt a network "ping" from the DMS terminal to the DMS Server).			
1.15	Verify that the LLW Process GB Suite Emergency Stop Push Button, 07-HS-315, is closed when the button is up (deactivated) and is open when the button is down (activated).			
1.16	Verify that the LLW Entry GB Auto Mode Key Switch, 07-HS-316, is closed when the key switch is in the AUTO position and is open when the switch is in the MAINT position.			
1.17	Verify that the LLW Sorting GB Auto Mode Key Switch, 07-HS-317, is closed when the key switch is in the AUTO position and is open when the switch is in the MAINT position.			
1.18	Verify that the LLW Exit GB Auto Mode Key Switch, 07-HS-318, is closed when the key switch is in the AUTO position and is open when the switch is in the MAINT position.			

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Data Sheet 6.0.B TRU DMS Terminal TE-12-104				
Step #	Description	Pass	Fail	Initials
1.1	Correct hardware installed and secure.			
1.2	Component Legends installed; fuse replacement labels installed.			
1.3	Terminal strips labeled.			
1.4	Correct fuses or circuit breakers installed.			
1.5	Wire AWG size, labeled, and color correct.			
1.6	All terminals tight.			
1.7	Main grounding lug, grounding integrity. All grounds < 0.1 ohms resistance.			
1.8	Apply power and check AC control circuits.			
1.9	Verify 120 VAC to GFCI outlets.			
1.10	Test load of AC circuits > 1.2 kW (14 amp heat gun).			
1.11	Test GFCI outlets (test button, and fused jumper between neutral and ground).			
1.12	Test integrity of HP Vectra computer system using seller-supplied PC test software (Check-it). Select the "Test Everything" option under the "Test" menu to perform a complete diagnostic of the computer system.			
1.13	Verify specification requirements 13461-2.03.A.7a as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the HP computer. Upon re-initialization of power, the computer should boot up properly and display the appropriate software.			
1.14	Verify specification requirements 13462/PARTS 123-1.04.A.1.b.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by using buyer-supplied network utility software to verify that the computer can communicate to the Data Management System (i.e. attempt a network "ping" from the DMS terminal to the DMS Server).			
1.15	Verify that the TRU Process GB Suite Emergency Stop Push Button, 07-HS-305, is closed when the button is up (deactivated) and is open when the button is down (activated).			
1.16	Verify that the TRU Entry GB Auto Mode Key Switch, 07-HS-306, is closed when the key switch is in the AUTO position and is open when the switch is in the MAINT position.			
1.17	Verify that the TRU Sorting GB Auto Mode Key Switch, 07-HS-307, is closed when the key switch is in the AUTO position and is open when the switch is in the MAINT position.			
1.18	Verify that the TRU Waste Loadout GB 309 Auto Mode Key Switch, 07-HS-308, is closed when the key switch is in the AUTO position and is open when the switch is in the MAINT position.			
1.19	Verify that the TRU Waste Loadout GB 309 Auto Mode Key Switch, 07-HS-309, is closed when the key switch is in the AUTO position and is open when the switch is in the MAINT position.			

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HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-10
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Data Sheet 6.0.C
Sample Management Office DMS Terminal
TE-12-107

Step #	Description	Pass	Fail	Initials
1.1	All cables from the monitor, keyboard and mouse are securely attached to the HP Vectra VL2 4/66 computer. Power cable is attached to computer and plugged into a 120 VAC outlet.			
1.2	Apply power by switching on the power switch of the computer.			
1.3	Test integrity of HP Vectra computer system using seller-supplied PC test software (Check-It). Select the "Test Everything" option under the "Test" menu to perform a complete diagnostic of the computer system.			
1.4	Verify specification requirements 13461-2.03.A.7a as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the HP computer. Upon re-initialization of power, the computer should boot up properly and display the appropriate software.			
1.5	Verify specification requirements 13462/PARTS 123-1.04.A.1.b.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by using buyer-supplied network utility software to verify that the computer can communicate to the Data Management System (i.e. attempt a network "ping" from the DMS terminal to the DMS Server).			

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Data Sheet 6.0.D Shipping / Receiving Office DMS Terminal TE-12-108				
Step #	Description	Pass	Fail	Initials
1.1	All cables from the monitor, keyboard and mouse are securely attached to the HP Vectra VL2 4/66 computer. Power cable is attached to computer and plugged into a 120 VAC outlet.			
1.2	Apply power by switching on the power switch of the computer.			
1.3	Test integrity of HP Vectra computer system using seller-supplied PC test software (Check-it). Select the "Test Everything" option under the "Test" menu to perform a complete diagnostic of the computer system.			
1.4	Verify specification requirements 13461-2.03.A.7a as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the HP computer. Upon re-initialization of power, the computer should boot up properly and display the appropriate software.			
1.5	Verify specification requirements 13462/PARTS 123-1.04.A.1.b.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by using buyer-supplied network utility software to verify that the computer can communicate to the Data Management System (i.e. attempt a network "ping" from the DMS terminal to the DMS Server).			

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Data Sheet 6.0.E
LLW RWM Processing DMS Monitor
OIU-12-105A

Step #	Description	Pass	Fail	Initials
1.1	All cables from the monitor, keyboard and mouse are securely attached to the HP Vectra VL2 4/66 computer. Power cable is attached to computer and plugged into a 120 VAC outlet.			
1.2	Apply power by switching on the power switch of the computer.			
1.3	Test integrity of HP Vectra computer system using seller-supplied PC test software (Check-It). Select the "Test Everything" option under the "Test" menu to perform a complete diagnostic of the computer system.			
1.4	Verify specification requirements 13461-2.03.A.7a as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the HP computer. Upon re-initialization of power, the computer should boot up properly and display the appropriate software.			
1.5	Verify specification requirements 13462/PARTS 123-1.04.A.1.b.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by using buyer-supplied network utility software to verify that the computer can communicate to the Data Management System (i.e. attempt a network "ping" from the DMS terminal to the DMS Server).			

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Data Sheet 6.0.F TRU RWM Processing DMS Monitor OIU-12-106A				
Step #	Description	Pass	Fail	Initials
1.1	All cables from the monitor, keyboard and mouse are securely attached to the HP Vectra VL2 4/66 computer. Power cable is attached to computer and plugged into a 120 VAC outlet.			
1.2	Apply power by switching on the power switch of the computer.			
1.3	Test integrity of HP Vectra computer system using seller-supplied PC test software (Check-it). Select the "Test Everything" option under the "Test" menu to perform a complete diagnostic of the computer system.			
1.4	Verify specification requirements 13461-2.03.A.7a as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the HP computer. Upon re-initialization of power, the computer should boot up properly and display the appropriate software.			
1.5	Verify specification requirements 13462/PARTS 123-1.04.A.1.b.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by using buyer-supplied network utility software to verify that the computer can communicate to the Data Management System (i.e. attempt a network "ping" from the DMS terminal to the DMS Server).			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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Data Sheet 6.0.G TRUPACT Station DMS Terminal TE-12-124				
Step #	Description	Pass	Fail	Initials
1.1	Correct hardware installed and secure.			
1.2	Component Legends installed; fuse replacement labels installed.			
1.3	Terminal strips labeled.			
1.4	Correct fuses or circuit breakers installed.			
1.5	Wire AWG size, labeled, and color correct.			
1.6	All terminals tight.			
1.7	Main grounding lug, grounding integrity. All grounds < 0.1 ohms resistance.			
1.8	Apply power and check AC control circuits.			
1.9	Verify 120 VAC to GFCI outlets.			
1.10	Test load of AC circuits > 1.2 kW (14 amp heat gun).			
1.11	Test GFCI outlets (test button, and fused jumper between neutral and ground).			
1.12	Test integrity of HP Vectra computer system using seller-supplied PC test software (Check-It). Select the "Test Everything" option under the "Test" menu to perform a complete diagnostic of the computer system.			
1.13	Verify specification requirements 13461-2.03.A.7a as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the HP computer. Upon re-initialization of power, the computer should boot up properly and display the appropriate software.			
1.14	Verify specification requirements 13462/PARTS 123-1.04.A.1.b.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by using buyer-supplied network utility software to verify that the computer can communicate to the Data Management System (i.e. attempt a network "ping" from the DMS terminal to the DMS Server).			

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TEST LOCATION/TYPE:

	Seller Factory-SF
--	-------------------

	Buyer Factory-BF
--	------------------

	Seller Plant-SP
--	-----------------

	Buyer Plant-BP
--	----------------

PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
Project Number W-026

Prepared By
SYSTEMS INTERFACE INC.

For Westinghouse Hanford Company

PROCEDURE APPROVAL

Author

Date

Project Manager

Date

Buyer Approval

Date

Other Approval

Date

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
 HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-11
 MISCELLANEOUS COMMUNICATIONS EQUIPMENT

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APPROVAL TO START**TEST EXECUTION No.** __________
 Test Director/Organization_____
 Date**EXECUTION AND TEST APPROVAL**

EXECUTED BY

RECORDED BY

 Test Operator/Organization_____
 Date_____
 Recorder/Organization_____
 Date**WITNESSES**_____
 Witness/Organization_____
 Date_____
 Witness/Organization_____
 Date_____
 Witness/Organization_____
 Date_____
 Witness/Organization_____
 Date**TEST ACCEPTANCE**

WITHOUT EXCEPTIONS

WITH EXCEPTIONS OUTSTANDING

 Approver/Organization_____
 Date_____
 Approver/Organization_____
 Date_____
 Approver/Organization_____
 Date_____
 Approver/Organization_____
 Date

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-11
MISCELLANEOUS COMMUNICATIONS EQUIPMENT**

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1.0 PURPOSE AND SCOPE

This Acceptance Test Procedure has been prepared to demonstrate that hardware provided for miscellaneous communications equipment including:

1. 1771 Control Coprocessors
2. PCS LAN cabling
3. Hub/Router

properly operates as required by project criteria and specifications.

2.0 REFERENCES

Vendor information from:

- Allen-Bradley for the 1771 Control Coprocessor

2.1 DRAWINGS

940820-HWD-01301	PMS SYSTEM ARCHITECTURE
940823-HWD-01301	PMS SYSTEM ARCHITECTURE
940823-HWD-01302	PMS SYSTEM ARCHITECTURE

2.2 SPECIFICATIONS

UE&C Specification Section 13461

3.0 EQUIPMENT, MATERIALS AND TOOLS

NOTE

All Measuring and Test Equipment (M&TE) used to collect data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label.
- Be capable of desired range.
- Have an accuracy consistent with state-of-the-art limitations:
 - a. equal to or greater than the input tolerance specified on the Data Sheet.
 If device being calibrated is not data sheet associated,
 - b. at least four times greater than the specified device tolerance.

Fluke 87 Digital Multimeter (DMM)

Fluke 650 LAN Cable Meter

If necessary, a 4-20 mA current source

If necessary, a Laptop computer with necessary programming and configuration software such as:

Allen-Bradley Programming Software (ICOM)

Microware OS9000 Programming Software (for 'C' Coprocessors)

Procomm-Plus Terminal Emulation Software

120 VAC Jumpers (small alligator clips and or "scrap" wire)

Any required vendor manuals

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-11
MISCELLANEOUS COMMUNICATIONS EQUIPMENT****12/8/95
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PAGE 4 of 8****4.0 SAFETY, PRECAUTIONS, AND LIMITATIONS**

- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:
- 1) Turn off the power source.
 - 2) Do not approach the victim until the source of the power has been turned off.
 - 3) Drag the victim clear, if necessary.
 - 4) Administer Artificial Respiration or CPR, if necessary.
 - 5) Treat for shock
 - 6) Check for other injuries and seek Medical help.
 - 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.
- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.
- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.
- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

5.0 PREREQUISITES

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 VERIFY Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 RECORD test equipment name, equipment number, and calibration expiration date on Data Sheet.

6.0 SETUP

- 6.1 Ensure 120 VAC line power is available at a duplex outlet and all circuit breakers "upstream" are on.

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-11
MISCELLANEOUS COMMUNICATIONS EQUIPMENT****12/8/95
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PAGE 5 of 8****7.0 INSTRUCTIONS****7.1 PRE-TEST AND INSPECTION**

7.1.1 Verify Steps 1 through 7 on Data Sheet 7.1 are satisfied.

7.2.2 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

7.2 TEST

7.2.1 Perform actions in Steps 8 through end, on Data Sheet 7.1.

7.2.2 Check either "Pass" or "Fail", and check (as completed) the Data Sheet.

8.0 RESTORATION

8.1 VERIFY test equipment and all jumpers are removed and field wiring reconnected.

8.2 RESTORE system to normal configuration.

8.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

9.0 DISPOSITION

9.1 The acceptance criteria of all steps contained in section 7 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

Test Director_____
Date_____
Test Recorder_____
Date_____
Test Operator_____
Date_____
Witness_____
Date_____
Witness_____
Date_____
Witness_____
Date

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-11
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Test Equipment Name	Test Equipment Number	Calibration Expiration Date	Test Equipment Name	Test Equipment Number	Calibration Expiration Date
FLUKE 650LAN Cable Meter					

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-11
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Data Sheet 7.1

PLANT MANAGEMENT SYSTEM
COMMUNICATIONS CO-PROCESSOR IN LCU 101

Step #	Description	Pass	Fail	Check
1.1	Power up the coprocessor. On the main module, the CPU LED blinks green four (4) times and then remains lit green.			
1.2	The BATT LED blinks red four times and then is not lit.			

Data Sheet 7.2

PLANT MANAGEMENT SYSTEM
COMMUNICATIONS CO-PROCESSOR IN LCU 102

Step #	Description	Pass	Fail	Check
1.1	Power up the coprocessor. On the main module, the CPU LED blinks green four (4) times and then remains lit green.			
1.2	The BATT LED blinks red four times and then is not lit.			
1.3	On the expander module, the four character positions on the ASCII display blink four times and then are not lit.			

Data Sheet 7.3

PLANT MANAGEMENT SYSTEM
COMMUNICATIONS CO-PROCESSOR IN LCU 103

Step #	Description	Pass	Fail	Check
1.1	Power up the coprocessor. On the main module, the CPU LED blinks green four (4) times and then remains lit green.			
1.2	The BATT LED blinks red four times and then is not lit.			
1.3	On the expander module, the four character positions on the ASCII display blink four times and then are not lit.			

Data Sheet 7.4

PLANT MANAGEMENT SYSTEM
COMMUNICATIONS CO-PROCESSOR IN LCU 104

Step #	Description	Pass	Fail	Check
1.1	Power up the coprocessor. On the main module, the CPU LED blinks green four (4) times and then remains lit green.			
1.2	The BATT LED blinks red four times and then is not lit.			

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-11
MISCELLANEOUS COMMUNICATIONS EQUIPMENT**

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Data Sheet 7.5 PLANT MANAGEMENT SYSTEM LAN CABLING				
Step #	Description	Pass	Fail	Check
1.1	PCS to HUB (01) Disconnect both ends of the cable. At one end attach the REMOTE UNIT, at the other attach the meter.			
1.2	Select AUTOTEST and select 10BaseT L5 for the cable type. The tests are run automatically. All tests pass.			
1.3	Save the test as #01 for later printing.			
Repeat the tests for the following cable runs:				
1.4	OCS 101 to HUB (02)			
1.5	OCS 102 to HUB (03)			
1.6	OCS 103 to HUB (04)			
1.7	OCS 104 to HUB (05)			
1.8	OCS 105 to HUB (06)			
1.9	HUB to LCU 101 (07)			
1.10	HUB to LCU 102 (08)			
1.11	HUB to LCU 103 (09)			
1.12	HUB to LCU 104 (10)			
1.13	Connect the meter to a serial printer and print a; of the save tests. Attach those tests to this testing document.			

Data Sheet 7.6 PLANT MANAGEMENT SYSTEM CABLETRON MMAC HUB/ROUTER				
Step #	Description	Pass	Fail	Check
1.1	Power up the router. There should be no red LED's.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
 HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-12
 BAR CODE EQUIPMENT

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TEST LOCATION/TYPE:

☐ Seller Factory-SF

☐ Buyer Factory-BF

☐ Seller Plant-SP

☐ Buyer Plant-BP

PROJECT TITLE: WRAP MODULE 1 PLANT MANAGEMENT SYSTEM
 Project Number W-026

Prepared By

Systems Interface Inc.

For Westinghouse Hanford Company

☒ REVIEWED	☐ REVISE & RESUBMIT
☐ REJECTED	☐ MAKE CORRECTIONS NOTED

THE GENERAL CONTRACTOR'S REVIEW OF THIS SUBMITTAL IN NO WAY RELIEVES THE SUB-CONTRACTOR/VENDOR FROM HIS OBLIGATION TO COMPLY WITH THE PROJECT DOCUMENTS IN TERMS OF THE QUALITY OR QUANTITY NOR FROM THE RESPONSIBILITY FOR ERRORS OR OMISSIONS, INCLUDING SIZES, DIMENSIONS, OR LOCATIONS.

PCL Construction Services, Inc.

Initial: GL Date: 8-18-95

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TEST PROCEDURE COVER SHEET

Test Procedure ID: _____ Revision Number: _____
Execution Number: _____ Start Date-Time: _____
Test Operator: _____ End Date-Time: _____
Witness: _____ Inspection Only?: ☐ Yes ☐ No

Test Exceptions Recorded? ☐ Yes ☐ No

COMMENTS:

TEST PROCEDURE APPROVAL

TEST ☐ Successful ☐ Unsuccessful

Contractor (Company): Systems Interface Inc.

Contractor Representative: _____ Date: _____

WHC Projects Representative: _____ Date: _____

WHC NFS Representative: _____ Date: _____
(NFS = New Facility Startup)

CERTIFICATION OF SATISFACTORY EXECUTION

All test cases for this procedure have been tested and all exception sheets for this test have been resolved.

ICF KEH Representative: _____ Date: _____

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1.0 PURPOSE AND SCOPE

This Acceptance Test Procedure has been prepared to demonstrate that the Bar Code Equipment, including the Fixed Bar Code Interface Module, the Bar Code Printer, the Fixed Bar Code Scanners/Terminals (12-NT/NE-102, 12-NT/NE-301, 12-NT/NE-304, 12-NT/NE-305, 12-NT/NE-311, 12-NT/NE-312, 12-NT/NE-314, 12-NT/NE-315, 12-NT/NE-316, 12-NT/NE-317), and the RF Bar Code Scanners/Terminals (12-NT/NE-101, 12-NT/NE-103, 12-NT/NE-300, 12-NT/NE-303, 12-NT/NE-310, 12-NT/NE-313), RF Bar Code Network Controller (12-NY-106), and Radio Link Controllers (12-NY-104, 12-NY-105, 12-NY-306) all function as required by project criteria.

2.0 REFERENCES

Vendor information and SII Configuration Sheets for the Allen-Bradley 2708 Wand Bar Code Decoder, the Allen-Bradley 2755 Fixed Bar Code Decoder, the Allen-Bradley 2760-RB Flexible Interface Module, and the Teklogix RF Bar Code Equipment (7025 RF Terminals, 9130 Radio Link Controllers and 9200 Network Controller); vendor information for the Zebra Bar Code Printer.

2.1 DRAWINGS

940821-HWD-01301	"Bar Code Block Diagram"
940821-HWD-04201	"Bar Code Scanner Connection Details"
940821-HWD-04202	"Bar Code Wand Reader Connection Details"
940821-HWD-A2301	"Bar Code Radio Link Controller"
940821-HWD-A2302	"Bar Code Fixed Scanner Decoders"
940821-HWD-A2303	"Bar Code Wand Scanner Decoders"

2.2 SPECIFICATIONS

UE&C Specification Sections 13406-2.04.A, 13406-2.04.C, 13406-2.04.D, 13406-2.04.E, 13406-2.04.F, 13406-2.04.G, 13406-2.04.K, 13406-2.04.L, 13406-3.05.A, dated December 15, 1994.

3.0 EQUIPMENT, MATERIALS AND TOOLS

Sample Bar Code Labels of all types and media to be used in the facility
 Laptop computer with necessary programming and configuration software such as:

- Allen-Bradley Programming Software (ICOM)
- Procomm-Plus Terminal Emulation Software
- Allen-Bradley Application Generator Software (for Wand Decoders)
- Allen-Bradley Network Manager Software (for Wand Decoders)
- Zebra Label Matrix Software (for Bar Code Printer)

- PCS Server
- HP-UX X-Terminal
- Any required vendor manuals

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- 4.1 Note that the test involves working with 120 Volt AC power which is potentially hazardous unless appropriate safety precautions are taken. This includes basic knowledge of electricity and awareness of whether a circuit or wire is energized before beginning work with or near any exposed electrical wiring or components. If someone does receive a serious electric shock, attempt to follow the following first aid procedures:
- 1) Turn off the power source.
 - 2) Do not approach the victim until the source of the power has been turned off.
 - 3) Drag the victim clear, if necessary.
 - 4) Administer Artificial Respiration or CPR, if necessary.
 - 5) Treat for shock
 - 6) Check for other injuries and seek Medical help.
 - 7) Monitor victim until Medical help arrives, continuing CPR, if necessary.
- 4.2 Inform the Test Director **IMMEDIATELY** if problems are encountered with this procedure.
- 4.3 If this procedure cannot be performed as written, stop work. Return equipment to safe configuration and inform Test Director that the procedure cannot be performed as written, and revision or retest is required.
- 4.4 Comply with the Hardware Test Plan Requirements and Procedures.

5.0 PREREQUISITES

- 5.1 Reverify test prerequisites prior to resumption of a suspended test procedure.
- 5.2 Release from Test Director has been obtained prior to testing or retesting of installed equipment.
- 5.3 VERIFY Test Operator has configured system or equipment as required to allow performance of this procedure.
- 5.4 Notify all appropriate personnel that a test is being initiated and false alarms and/or indications could be generated.
- 5.5 RECORD test equipment name, equipment number, and calibration expiration date on Data Sheet.
- 5.6 VERIFY that all tag numbers are listed on the Data Sheet.

6.0 SETUP

- 6.1 All computer and related systems are running, including LCU_103 (Fixed Bar Code Interface Module), the RF Network Controller 12-NY-106 in LCU_101, the RF Radio Link Controllers, the bar code decoders/scanners, test laptop, and, where necessary, the PCS Server and an HP-UX X-Terminal.

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7.0 INSTRUCTIONS

7.1 PRE-TEST AND INSPECTION

- 7.1.1 Verify initial steps are met for bar code equipment item being tested in data sheet 12.1.x.
- 7.1.2 Check either "Pass" or "Fail" and initial the completed step.

7.2 TEST

- 7.2.1 Perform actions in the following test steps for the bar code item being tested in data sheet 12.1.x.
- 7.2.2 Check either "Pass" or "Fail", and initial the completed step.

8.0 RESTORATION

- 8.1 VERIFY test equipment and all jumpers are removed and field wiring reconnected.
- 8.2 RESTORE system to normal configuration.
- 8.3 Notify appropriate personnel that a test is complete and no more false alarms and/or indications will be generated.

9.0 DISPOSITION

- 9.1 The acceptance criteria of all steps contained in section 7 HAVE / HAVE NOT (circle one) been met. RECORD on an Exception Form any steps where the acceptance criteria was NOT met. The following persons by their signature concur that the above tests have been successfully completed.

 Test Director

 Date

 Test Recorder

 Date

 Test Operator

 Date

 Witness

 Date

 Witness

 Date

 Witness

 Date

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Data Sheet 12.1.A
FIXED BAR CODE INTERFACE MODULE WITHIN LCU 103

Step #	Description	Pass	Fail	Initials
1.1	Allen-Bradley 2760-RB Flexible Interface Module correctly installed in PLC processor rack 0, slots 2 and 3 of LCU 103.			
1.2	Apply power to PLC processor rack by switching power supply on.			
1.3	Verify 2760-RB is configured properly for fixed bar code system. See attached configuration sheet for 2760-RB Module.			
1.4	Verify specification requirements 13406-2.04.K.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by cycling power to the PLC processory rack. Verify all module configuration information remains intact during the power loss.			

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Data Sheet 12.1.B
BAR CODE PRINTER at SHIPPING / RECEIVING
BP-12-120

Step #	Description	Pass	Fail	Initials
1.1	Printer is installed correctly: AC power cord is plugged into 120 VAC outlet; blank bar code labels installed correctly; printer print head is in proper position for printing.			
1.2	PC running Zebra Label Matrix software connected to printer.			
1.3	Apply power by turning on printer power switch.			
1.4	Verify specification requirements 13406-2.04.L.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by printing a sample Code 39 bar code label.			
1.5	Verify specification requirements 13406-2.04.L.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by printing a sample bar code label at a 90 degree rotation angle.			
1.6	Verify specification requirements 13406-2.04.L.9 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by examining bar code label to verify that there are (4) lines of entry spaced at least 2 inches long beneath the bar code number for manual data entry.			
1.7	Verify specification requirements 13406-3.05.A.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by printing a test case label with Code 39 bar code.			

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Data Sheet 12.1.C
RF BAR CODE SCANNER / TERMINAL in AS/RS AREA
12-NT/NE-101

Step #	Description	Pass	Fail	Initials
1.1	RF Bar Code Scanner / Terminal is powered on.			
1.2	RF Bar Code Scanner / Terminal is configured properly as terminal # 1 to read Code 39 ASCII bar codes. See attached configuration sheet for RF Bar Code Scanners.			
1.3	PCS Server is running. HP-UX X-Terminal is running with an HPTerm window open.			
1.4	Establish Telnet session with RF Terminal 1 to observe scanned bar codes by typing the following at the "\$" prompt: telnet ny106 10001			
1.5	Verify specification requirements 13406-2.04.A.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code at a maximum distance of 20 inches.			
1.6	Verify specification requirements 13406-2.04.A.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in both ambient indoor and outdoor light similar to that expected at the WRAP facility.			
1.7	Verify specification requirements 13406-2.04.G.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			
1.9	Verify specification requirement 13461-3.05.A.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met by scanning a test case bar code identification number from the most remote location in the plant where a bar code would be normally read during operation and also at any locations where transmission difficulties might be expected. Observe the bar code transmissions in the HPTerm window on the X-Terminal.			
1.10	Close telnet session when finished observing bar code scans by typing "Ctrl-J" in the HPTerm window to get the "telnet>" prompt, then typing "close" to close the session and return the to "\$" prompt.			

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Data Sheet 12.1.D

FIXED BAR CODE SCANNER/TERMINAL at Receiving Drum Scale Conveyor

12-NT/NE-102

Step #	Description	Pass	Fail	Initials
1.1	Fixed Bar Code Scanner / Terminal is powered on.			
1.2	Fixed Bar Code Scanner / Terminal is configured properly as terminal # 11 to read Code 39 ASCII bar codes. See attached configuration sheet for 2755 Bar Code Decoders.			
1.3	Verify specification requirements 13406-2.04.A.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code at a maximum distance of 20 inches.			
1.4	Verify specification requirements 13406-2.04.A.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in ambient indoor light similar to that expected at the WRAP facility.			
1.5	Verify specification requirements 13406-2.04.A.6 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by verifying that 9 foot cable is provided. If cable length is adequate, specification should be changed from 10 foot cable to 9 foot cable.			
1.6	Verify specification requirements 13406-2.04.F.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.7	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			

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Data Sheet 12.1.E

RF BAR CODE SCANNER / TERMINAL at TRUPACT AREA

12-NT/NE-103

Step #	Description	Pass	Fail	Initials
1.1	RF Bar Code Scanner / Terminal is powered on.			
1.2	RF Bar Code Scanner / Terminal is configured properly as terminal # 2 to read Code 39 ASCII bar codes. See attached configuration sheet for RF Bar Code Scanners.			
1.3	PCS Server is running. HP-UX X-Terminal is running with an HPterm window open.			
1.4	Establish Telnet session with RF Terminal 2 to observe scanned bar codes by typing the following at the "\$" prompt: telnet ny106 10002			
1.5	Verify specification requirements 13406-2.04.A.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code at a maximum distance of 20 inches.			
1.6	Verify specification requirements 13406-2.04.A.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in both ambient indoor and outdoor light similar to that expected at the WRAP facility.			
1.7	Verify specification requirements 13406-2.04.G.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			
1.9	Verify specification requirement 13461-3.05.A.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met by scanning a test case bar code identification number from the most remote location in the plant where a bar code would be normally read during operation and also at any locations where transmission difficulties might be expected. Observe the bar code transmissions in the HPterm window on the X-Terminal.			
1.10	Close telnet session when finished observing bar code scans by typing "Ctrl-J" in the HPterm window to get the "telnet>" prompt, then typing "close" to close the session and return the to "\$" prompt.			

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Data Sheet 12.1.F

RF BAR CODE SCANNER / TERMINAL at TRU Process Glovebox

12-NT/NE-300

Step #	Description	Pass	Fail	Initials
1.1	RF Bar Code Scanner / Terminal is powered on.			
1.2	RF Bar Code Scanner / Terminal is configured properly as terminal # 4 to read Code 39 ASCII bar codes. See attached configuration sheet for RF Bar Code Scanners.			
1.3	PCS Server is running. HP-UX X-Terminal is running with an HPterm window open.			
1.4	Establish Telnet session with RF Terminal 4 to observe scanned bar codes by typing the following at the "\$" prompt: telnet ny106 10004			
1.5	Verify specification requirements 13406-2.04.A.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code at a maximum distance of 20 inches.			
1.6	Verify specification requirements 13406-2.04.A.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in both ambient indoor and outdoor light similar to that expected at the WRAP facility.			
1.7	Verify specification requirements 13406-2.04.G.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			
1.9	Verify specification requirement 13461-3.05.A.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met by scanning a test case bar code identification number from the most remote location in the plant where a bar code would be normally read during operation and also at any locations where transmission difficulties might be expected. Observe the bar code transmissions in the HPterm window on the X-Terminal.			
1.10	Close telnet session when finished observing bar code scans by typing "Ctrl-J" in the HPterm window to get the "telnet->" prompt, then typing "close" to close the session and return the to "\$" prompt.			

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Data Sheet 12.1.G

FIXED BAR CODE SCANNER / TERMINAL at TRU Process Glovebox
12-NT/NE-301

Step #	Description	Pass	Fail	Initials
1.1	Fixed Bar Code Scanner / Terminal is powered on.			
1.2	Fixed Bar Code Scanner / Terminal is configured properly as terminal # 17 to read Code 39 ASCII bar codes. See attached configuration sheet for 2755 Bar Code Decoders.			
1.3	Verify specification requirements 13406-2.04.C.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code at distances from 10 to 36 inches (approximate bar code element width of 1mm).			
1.4	Verify specification requirements 13406-2.04.C.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in industrial lighting levels similar to that expected at the WRAP facility.			
1.5	Verify specification requirements 13406-2.04.C.5 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning sample bar codes of all types to be used in the facility.			
1.6	Verify specification requirements 13406-2.04.C.6 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code through 1/4 laminated glass.			
1.7	Verify specification requirements 13406-2.04.F.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			

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Data Sheet 12.1.H
RF BAR CODE SCANNER / TERMINAL at TRU RWM Glovebox
12-NT/NE-303

Step #	Description	Pass	Fail	Initials
1.1	RF Bar Code Scanner / Terminal is powered on.			
1.2	RF Bar Code Scanner / Terminal is configured properly as terminal # 6 to read Code 39 ASCII bar codes. See attached configuration sheet for RF Bar Code Scanners.			
1.3	PCS Server is running. HP-UX X-Terminal is running with an HPTerm window open.			
1.4	Establish Telnet session with RF Terminal 6 to observe scanned bar codes by typing the following at the "\$" prompt: telnet ny106 10006			
1.5	Verify specification requirements 13406-2.04.A.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code at a maximum distance of 20 inches.			
1.6	Verify specification requirements 13406-2.04.A.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in both ambient indoor and outdoor light similar to that expected at the WRAP facility.			
1.7	Verify specification requirements 13406-2.04.G.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			
1.9	Verify specification requirement 13461-3.05.A.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met by scanning a test case bar code identification number from the most remote location in the plant where a bar code would be normally read during operation and also at any locations where transmission difficulties might be expected. Observe the bar code transmissions in the HPTerm window on the X-Terminal..			
1.10	Close telnet session when finished observing bar code scans by typing "Ctrl-I" in the HPTerm window to get the "telnet>" prompt, then typing "close" to close the session and return the to "\$" prompt.			

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Data Sheet 12.1.I FIXED BAR CODE SCANNER / TERMINAL at TRU RWM Glovebox 12-NT/NE-304				
Step #	Description	Pass	Fail	Initials
1.1	Fixed Bar Code Scanner / Terminal is powered on.			
1.2	Fixed Bar Code Scanner / Terminal is configured properly as terminal # 18 to read Code 39 ASCII bar codes. See attached configuration sheet for 2755 Bar Code Decoders.			
1.3	Verify specification requirements 13406-2.04.C.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code at distances from 10 to 36 inches (approximate bar code element width of 1mm).			
1.4	Verify specification requirements 13406-2.04.C.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in industrial lighting levels similar to that expected at the WRAP facility.			
1.5	Verify specification requirements 13406-2.04.C.5 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning sample bar codes of all types to be used in the facility.			
1.6	Verify specification requirements 13406-2.04.C.6 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code through 1/4 laminated glass.			
1.7	Verify specification requirements 13406-2.04.F.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			

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Data Sheet 12.1.J FIXED BAR CODE SCANNER / TERMINAL at TRU RWM Glovebox 12-NT/NE-305				
Step #	Description	Pass	Fail	Check
1.1	Fixed Bar Code Scanner / Terminal is powered on.			
1.2	Fixed Bar Code Scanner / Terminal is configured properly as terminal # 19 to read Code 39 ASCII bar codes. See attached configuration sheet for 2755 Bar Code Decoders.			
1.3	Verify specification requirements 13406-2.04.C.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code at distances from 10 to 36 inches (approximate bar code element width of 1mm).			
1.4	Verify specification requirements 13406-2.04.C.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in industrial lighting levels similar to that expected at the WRAP facility.			
1.5	Verify specification requirements 13406-2.04.C.5 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning sample bar codes of all types to be used in the facility.			
1.6	Verify specification requirements 13406-2.04.C.6 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code through 1/4 laminated glass.			
1.7	Verify specification requirements 13406-2.04.F.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			

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Data Sheet 12.1.K
RF BAR CODE SCANNER / TERMINAL at LLW Process Glovebox
12-NT/NE-310

Step #	Description	Pass	Fail	Check
1.1	RF Bar Code Scanner / Terminal is powered on.			
1.2	RF Bar Code Scanner / Terminal is configured properly as terminal # 3 to read Code 39 ASCII bar codes. See attached configuration sheet for RF Bar Code Scanners.			
1.3	PCS Server is running. HP-UX X-Terminal is running with an HPterm window open.			
1.4	Establish Telnet session with RF Terminal 3 to observe scanned bar codes by typing the following at the "\$" prompt: telnet ny106 10003			
1.5	Verify specification requirements 13406-2.04.A.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code at a maximum distance of 20 inches.			
1.6	Verify specification requirements 13406-2.04.A.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in both ambient indoor and outdoor light similar to that expected at the WRAP facility.			
1.7	Verify specification requirements 13406-2.04.G.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			
1.9	Verify specification requirement 13461-3.05.A.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met by scanning a test case bar code identification number from the most remote location in the plant where a bar code would be normally read during operation and also at any locations where transmission difficulties might be expected. Observe the bar code transmissions in the HPterm window on the X-Terminal.			
1.10	Close telnet session when finished observing bar code scans by typing "Ctrl-J" in the HPterm window to get the "telnet->" prompt, then typing "close" to close the session and return the to "\$" prompt.			

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Data Sheet 12.1.L

FIXED BAR CODE SCANNER / TERMINAL at LLW Process Glovebox
12-NT/NE-311

Step #	Description	Pass	Fail	Check
1.1	Fixed Bar Code Scanner / Terminal is powered on.			
1.2	Fixed Bar Code Scanner / Terminal is configured properly as terminal # 12 to read Code 39 ASCII bar codes. See attached configuration sheet for 2755 Bar Code Decoders.			
1.3	Verify specification requirements 13406-2.04.C.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code at distances from 10 to 36 inches (approximate bar code element width of 1mm).			
1.4	Verify specification requirements 13406-2.04.C.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in industrial lighting levels similar to that expected at the WRAP facility.			
1.5	Verify specification requirements 13406-2.04.C.5 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning sample bar codes of all types to be used in the facility.			
1.6	Verify specification requirements 13406-2.04.C.6 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code through 1/4 laminated glass.			
1.7	Verify specification requirements 13406-2.04.F.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			

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HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-12
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Data Sheet 12.1.M FIXED BAR CODE SCANNER / TERMINAL at LLW Process Glovebox 12-NT/NE-312				
Step #	Description	Pass	Fail	Check
1.1	Fixed Bar Code Scanner / Terminal is powered on.			
1.2	Fixed Bar Code Scanner / Terminal is configured properly as terminal # 13 to read Code 39 ASCII bar codes. See attached configuration sheet for 2708 Bar Code Decoders.			
1.3	Verify specification requirements 13406-2.04.D.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning sample low to medium density bar codes.			
1.4	Verify specification requirements 13406-2.04.D.5 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning sample bar codes at angles of 0 to 35 degrees from vertical.			
1.5	Verify specification requirements 13406-2.04.D.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by verifying that 9 out of 10 bar codes are successfully read on the first scan.			
1.6	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			

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HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-12
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Data Sheet 12.1.N
RF BAR CODE SCANNER / TERMINAL at LLW RWM Glovebox
12-NT/NE-313

Step #	Description	Pass	Fail	Check
1.1	RF Bar Code Scanner / Terminal is powered on.			
1.2	RF Bar Code Scanner / Terminal is configured properly as terminal # 5 to read Code 39 ASCII bar codes. See attached configuration sheet for RF Bar Code Scanners.			
1.3	PCS Server is running. HP-UX X-Terminal is running with an HPTerm window open.			
1.4	Establish Telnet session with RF Terminal 5 to observe scanned bar codes by typing the following at the "\$" prompt: telnet ny106 10005			
1.5	Verify specification requirements 13406-2.04.A.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code at a maximum distance of 20 inches.			
1.6	Verify specification requirements 13406-2.04.A.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in both ambient indoor and outdoor light similar to that expected at the WRAP facility.			
1.7	Verify specification requirements 13406-2.04.G.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			
1.9	Verify specification requirement 13461-3.05.A.4 as called for in the ATP QA checklist in the Hardware Requirements matrix are met by scanning a test case bar code identification number from the most remote location in the plant where a bar code would be normally read during operation and also at any locations where transmission difficulties might be expected. Observe the bar code transmissions in the HPTerm window on the X-Terminal.			
1.10	Close telnet session when finished observing bar code scans by typing "Ctrl-]" in the HPTerm window to get the "telnet>" prompt, then typing "close" to close the session and return the to "\$" prompt.			

WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
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Data Sheet 12.1.O FIXED BAR CODE SCANNER / TERMINAL at LLW RWM Glovebox 12-NT/NE-314				
Step #	Description	Pass	Fail	Check
1.1	Fixed Bar Code Scanner / Terminal is powered on.			
1.2	Fixed Bar Code Scanner / Terminal is configured properly as terminal # 15 to read Code 39 ASCII bar codes. See attached configuration sheet for 2755 Bar Code Decoders.			
1.3	Verify specification requirements 13406-2.04.C.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code at distances from 10 to 36 inches (approximate bar code element width of 1mm).			
1.4	Verify specification requirements 13406-2.04.C.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in industrial lighting levels similar to that expected at the WRAP facility.			
1.5	Verify specification requirements 13406-2.04.C.5 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning sample bar codes of all types to be used in the facility.			
1.6	Verify specification requirements 13406-2.04.C.6 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code through 1/4 laminated glass.			
1.7	Verify specification requirements 13406-2.04.F.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			

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Data Sheet 12.1.P FIXED BAR CODE SCANNER / TERMINAL at LLW RWM Glovebox 12-NT/NE-315				
Step #	Description	Pass	Fail	Check
1.1	Fixed Bar Code Scanner / Terminal is powered on.			
1.2	Fixed Bar Code Scanner / Terminal is configured properly as terminal # 16 to read Code 39 ASCII bar codes. See attached configuration sheet for 2755 Bar Code Decoders.			
1.3	Verify specification requirements 13406-2.04.C.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code at distances from 10 to 36 inches (approximate bar code element width of 1mm).			
1.4	Verify specification requirements 13406-2.04.C.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code in industrial lighting levels similar to that expected at the WRAP facility.			
1.5	Verify specification requirements 13406-2.04.C.5 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning sample bar codes of all types to be used in the facility.			
1.6	Verify specification requirements 13406-2.04.C.6 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample bar code through 1/4 laminated glass.			
1.7	Verify specification requirements 13406-2.04.F.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by pulling the scan trigger and observing the laser scanner.			
1.8	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			

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Data Sheet 12.1.Q FIXED BAR CODE SCANNER / TERMINAL at LLW Process Glovebox 12-NT/NE-316				
Step #	Description	Pass	Fail	Check
1.1	Fixed Bar Code Scanner / Terminal is powered on.			
1.2	Fixed Bar Code Scanner / Terminal is configured properly as terminal # 14 to read Code 39 ASCII bar codes. See attached configuration sheet for 2708 Bar Code Decoders.			
1.3	Verify specification requirements 13406-2.04.D.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning sample low to medium density bar codes.			
1.4	Verify specification requirements 13406-2.04.D.5 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning sample bar codes at angles of 0 to 35 degrees from vertical.			
1.5	Verify specification requirements 13406-2.04.D.7 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by verifying that 9 out of 10 bar codes are successfully read on the first scan.			
1.6	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			

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Data Sheet 12.1.R FIXED BAR CODE WEDGE / TERMINAL at Sample Management Office 12-NT/NE-317				
Step #	Description	Pass	Fail	Check
1.1	Fixed Bar Code Wedge / Terminal is powered on and connected to the DMS terminal in the Sample Management Office.			
1.2	Fixed Bar Code Wedge / Terminal is configured properly to read Code 39 ASCII bar codes.			
1.3	Verify specification requirements 13406-2.04.E.2 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by verifying that all necessary software to drive the reader is loaded onto the DMS Terminal.			
1.4	Verify specification requirements 13406-2.04.E.3 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning sample high to medium density bar codes.			
1.5	Verify specification requirements 13406-2.04.E.4 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by verifying that 9 out of 10 bar codes are successfully read on the first scan.			
1.6	Verify specification requirements 13406-3.05.A.1 as called for in the ATP QA checklist of the Hardware Requirements matrix are met by scanning a sample Code 39 bar code.			

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-12
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RF BAR CODE NETWORK CONTROLLER in LCU 101
12-NY-106**

Step #	Description	Pass	Fail	Check
1.1	Verify power and communication cables are properly connected to controller.			
1.2	Power on Network Controller by switching on power switch.			
1.3	Verify Network Controller is properly configured by verifying configuration via laptop computer. See attached configuration sheet for RF Bar Code Network Controller.			

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Data Sheet 12.1.T RF BAR CODE RADIO LINK CONTROLLER in Shipping / Receiving Area 12-NY-105				
Step #	Description	Pass	Fail	Check
1.1	Verify Radio Link Controller power and communication cables and antenna are connected and dip switches are set properly. See attached configuration sheet for Radio Link Controllers.			
1.2	Power on controller by switching on power switch. Note: Only LED's #4 and #5 should be active (and only when data is being transmitted or received); all other LED's should be off.			

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-12
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RF BAR CODE RADIO LINK CONTROLLER in NDE/NDA Area
12-NY-104**

Step #	Description	Pass	Fail	Check
1.1	Verify Radio Link Controller power and communication cables and antenna are connected and dip switches are set properly. See attached configuration sheet for Radio Link Controllers.			
1.2	Power on controller by switching on power switch. Note: Only LED's #4 and #5 should be active (and only when data is being transmitted or received); all other LED's should be off.			

**WRAP MODULE 1 - PLANT MANAGEMENT SYSTEM
HARDWARE ACCEPTANCE TEST PROCEDURE: HATP-12
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RF BAR CODE RADIO LINK CONTROLLER in Process Area
12-NY-306**

Step #	Description	Pass	Fail	Check
1.1	Verify Radio Link Controller power and communication cables and antenna are connected and dip switches are set properly. See attached configuration sheet for Radio Link Controllers.			
1.2	Power on controller by switching on power switch. Note: Only LED's #4 and #5 should be active (and only when data is being transmitted or received); all other LED's should be off.			

SUPPORTING DOCUMENTS

Allen-Bradley 2708 Wand Bar Code Decoder Configuration Sheet

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2708 Configuration

Network Menu:

Workstation: [Bar Code Terminal ID #]
Workstation Type: [Master (ID # 14) or Normal (ID # 13)]
Host Port: COM
Host Mode: XON/XOFF

Comm Port Menu:

Com Baud Rate: 9600
Com Char: 7 Even
Com Stop Bits: 1
Com CRLF: Enabled
Com Echo: Disabled
Com XON/XOFF: Enabled

Bar Code Parameters Menu:

3 Of 9: Enabled

2708 - PLC Messaging (in BARCODE Submodule of LCU 103)

PLC - to - 2708 Commands

Format:	Byte Count (Word 1) HEX	Source (Word 2) HEX	Dest. (Word 3) HEX	Command (Words 3 - ...) ASCII
	00nn	05	0X	AA...

nn - Total Bytes in message

X - Port # that 2708 is connected to (1, 2, 3)

AA - ASCII Command

I.e. Display Text Message:

mm-nn:>D TEXT

mm - Master 2708 node #

nn - Normal (slave) 2708 node # (where text is to be displayed)

TEXT - Text to be displayed

2708 - to - PLC Messages

Format:	Words 0 - 1	Header Data
	Word 2	Master Terminal ID ASCII
	Word 3	Normal (slave) Terminal ID ASCII
	Word 7	Bar Code Data ASCII

2755 Configuration

2755-DS1A/DS4A V2.01 Bar Code Decoder Copyright 1992 Allen-Bradley Company, Inc.

CONFIGURATION

- 1) Symbology
- 2) Scanner Control, Primary Match Table, Discrete I/O
- 3) Extended Match Table and Counters
- 4) Aux and LCD Display Format
- 5) Host Message Replacement Rules
- 6) Host Message Format
- 7) Host Communications
- 8) Aux Terminal Data Entry

Display

System

- A) Bar Code Strings C) Reset Status and Primary Counters
B) Status and Primary Counters D) Reset Extended Match Counters
E) Restart System
F) Select Language
G) Save Configuration

Press 1...8, A...G or ESC

CAUTION Changing Configuration Parameters may cause the discrete outputs to switch unexpectedly. To configure the decoder with the outputs **DISABLED**, press any key except the **ESC** key, make changes, **SAVE** and **RESTART** the decoder. If outputs are to remain **ENABLED** during configuration, press the **ESC** key to view configuration screens.

--SYMBOLGY-- -----LENGTHS----- --CHECK CHARACTERS--

CODE 39: Yes No INCLUDE: No
 12/5: No No INCLUDE: No GUARD BARS: No
 CODABAR: No No INCLUDE: No
 CODE 128: No FNC1 CHAR:

UPC-A: No	SUPPLEMENTS: None	
UPC-E: No	SUPPLEMENTS: None	EXPAND: No
EAN-8: No	SUPPLEMENTS: None	
EAN-13: No	SUPPLEMENTS: None	

QUIET ZONE RATIO: Default

Commands:ESC Change:SPACE Cursor Control:ARROWS

**Allen-Bradley 2755 Fixed Bar Code Decoder
Configuration Sheet**
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-----SCANNER (A) CONTROL-----

LASER LIGHT: Triggered

DECODE MODE: Package Detect

NO-READ TIMER: None (msec)

INTER-SCAN TIMER: None (msec)

CAPTURE COUNT: 2

SYMBOLS/SCAN: 1

-----PACKAGE DETECT INPUT-----

SYMBOLS/PACKAGE: 1 (A) FILTER: No SENSE: LO=Package

MATCH COMPLETE: 1

-----MATCH CODE TABLE-----DISCRETE I/O [Enabled]-1) Any

O A None

0

2) Any

O A None

0

3) Any

O A None

0

4) Any

O A None

0

5) Any

O A None

0

6) Any

O A None

0

7) Any

O A None

0

8) Any

O A None

0

 Commands:ESC Change:SPACE Cursor Control:ARROWS

-----AUX and LCD DISPLAY FORMAT-----

DISPLAY DATA: LCD Only

MESSAGE FORMAT: Host Format

SCROLL LCD: No

POSITION

0 BAR CODE STRINGS

0 DECODER PERFORMANCE

0 PACKAGE COUNTER

0 SYMBOLS NOT READ COUNTER

---PRIMARY COUNTERS---

0 1) None

0 2) None

0 3) None

0 4) None

0 5) None

0 6) None

0 7) None

0 8) None

 Commands:ESC Change:SPACE Cursor Control:ARROWS

Allen-Bradley 2755 Fixed Bar Code Decoder Configuration Sheet

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START CHARACTER: None	255		
SOURCE IDENTIFIER for (AUX):	(A):		
HEADER STRING:			
FIELD DELIMITER: None	255	NUMBER OF FIELDS IN MESSAGE:	1
SEND SYMBOLOGY: No		SEND PACKAGE COUNT:	No
SEND BAR CODE STRINGS: Yes		SEND DECODER PERFORMANCE:	No
		END MESSAGE:	Lf
DEFAULT NO-READ STRING: NO-READ			
FIELD		FIELD	
NUMBER NO-READ REPLACEMENT STRING		NUMBER NO-READ REPLACEMENT	
STRING 1		9	
2		10	
3		11	
4		12	
5		13	
6		14	
7		15	
8		16	

COMMAND -- Exit:ESC Select:RETURN Next:SPACE

-----HOST COMMUNICATIONS-----

BAUD RATE*: 19200

BITS/CHAR*: 8 Data 1 Stop

PARITY*: Even

HOST PROTOCOL*: DH485 ASCII - 1

DEVICE ADDRESS*: 11¹

ACK CHAR*: None

NAK CHAR*: None

*Save and Restart required for these parameters to take effect.

SCANNER A

START SCAN CHAR: None 255

STOP SCAN CHAR: None 255

LARGE BUFFER: No

SEND HOST MESSAGE: Immediately After Valid Package

TRANSMISSION CHECK: None

COMMAND -- Exit:ESC Select:RETURN Next:SPACE

¹ Insert Bar Code Decoder Terminal ID here.

Allen-Bradley 2755 Fixed Bar Code Decoder Configuration Sheet

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2755 - PLC Messaging (in BARCODE Submodule of LCU 103)

PLC - to - 2755 Commands

Format:	Byte Count (Word 1) HEX	Source (Word 2) HEX	Dest. (Word 3) HEX	LSAP (Word 4) HEX	Node (Word 5) HEX	ASCII Command (Words 6 - ...) ASCII
	00nn	05	0X	01	YY	AA...

nn - Total Bytes in message

X - Port # that 2755 is connected to (1, 2, 3)

YY - Node # of 2755 (0 - 30)

AA - ASCII Command

i.e. Display Text Message:

TMkccTEXT

k - Enable (1) / Disable (0) keyboard entry

cc - Number of Characters in TEXT

TEXT - Text to be displayed

If cc = 0, Default Prompt Message (Defined in
AUX DATA ENTRY Menu) will be displayed.

2755 - to - PLC Messages

Format:	Words 0 - 1	Header Data
	Word 2	Terminal ID (2nd Byte) HEX
	Word 3	Bar Code Data ASCII

2760-RB Configuration

2760-RB SERIES A REVISION J
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1X - CONFIGURATION PARAMETERS	2X - IDENTIFICATION NUMBERS
3 - DEVICE PORT PROTOCOL NAMES	4DM - MATCH CODE ENTRIES
5I - DISCRETE BYTE INPUT ENTRIES	6 - THE DATA MATRIX ENTRIES
7 - THE PASS THROUGH ENTRIES	8 - NON-VOLATILE SCRATCH PAD AREA
9XF - RB MODULE FUNCTIONS	AX - HARDWARE DIAGNOSTICS
BX - SOFTWARE DIAGNOSTICS	C - EXIT CONFIGURATION MODE

WHERE X (0 TO 7) AND D (1 TO 3) ARE PORT NUMBERS WHICH ARE DEFINED BELOW:

0 - RB CMMND PRCS 2 - SERIAL PORT 2 4 - CONFIG PORT 6 - I/O RACK SLT 1
1 - SERIAL PORT 1 3 - SERIAL PORT 3 5 - I/O RACK SLT 0 7 - RESERVED

WHERE F (A TO E) ARE FUNCTIONS THAT RB CAN PERFORM WHICH ARE DEFINED BELOW:

A - RESET B - SET DEFAULTS C - FLUSH D - INITIALIZE E - CLEAR DIAGS

WHERE M (A TO T) AND I (A TO H) ARE ENTRY NUMBERS FOR THE SELECTION MADE ABOVE.

ENTER A MAIN MENU SELECTION: 12

SLOT TIME (NO. CHARS) (DEC 0...255) = 7.
INTER-CHAR TIME (NO. CHARS) (DEC 0...255) = 7.
IDLE TIME (NO. CHARS) (DEC 0...255) = 3.
RETRIES (DEC 0...255) = 3.
19200 BITS PER SECOND (YES/NO) = YES.
BCD NODE NUMBERS (ENABLE/DISABLE) = ENABLE.
BYTE SWAPPING (ENABLE/DISABLE) = ENABLE.
RECEIVE MATRIXING (ENABLE/DISABLE) = DISABLE.
MATRIX ADDRESS (HEX 0...ffff) = 0.
RE-ESTABLISH FREQUENCY (DEC 0...255) = 5.
POLL FREQUENCY/DESTINATION[0] (HEX 0...ffff) = 5.¹
POLL FREQUENCY/DESTINATION[1] (HEX 0...ffff) = 5.
POLL FREQUENCY/DESTINATION[2] (HEX 0...ffff) = 5.
.
.
POLL FREQUENCY/DESTINATION[10] (HEX 0...ffff) = 5.
POLL FREQUENCY/DESTINATION[11] (HEX 0...ffff) = 105.
POLL FREQUENCY/DESTINATION[12] (HEX 0...ffff) = 5.
.
.

¹ For each bar code terminal number on the current port, activate scanning by setting DESTINATION = 105.

**Allen-Bradley 2760-RB Flexible Interface Module
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POLL FREQUENCY/DESTINATION[30] (HEX 0...fff) = 5.
 MATRX SEND DESTINATIONS [RB SRC][0] (DEC 0...255) = 255.
 MATRX SEND DESTINATIONS [RB SRC][1] (DEC 0...255) = 255.
 MATRX SEND DESTINATIONS [RB SRC][2] (DEC 0...255) = 255.
 MATRX SEND DESTINATIONS [RB SRC][3] (DEC 0...255) = 255.
 MATRX SEND DESTINATIONS [RB SRC][4] (DEC 0...255) = 255.
 MATRX SEND DESTINATIONS [RB SRC][5] (DEC 0...255) = 255.
 MATRX SEND DESTINATIONS [RB SRC][6] (DEC 0...255) = 255.
 MATRX SEND DESTINATIONS [RB SRC][7] (DEC 0...255) = 255.
 DATA LSAP[0] (DEC 0...255) = 128.
 DATA LSAP[1] (DEC 0...255) = 128.

DATA LSAP[30] (DEC 0...255) = 128.

ENTER A MAIN MENU SELECTION: 22

RS485 LAN 2755-DM6 ASCII MODE 3, 0h (YES/NO) = YES.

ENTER A MAIN MENU SELECTION: 3

PORT 1 = COPYRIGHT 1989 ALLEN-BRADLEY COMPANY, INC.
 2760-SFC2 LAN , SERIES A , REVISION B (YES/NO) = YES.

PORT 2 = COPYRIGHT 1989 ALLEN-BRADLEY COMPANY, INC.
 2760-SFC2 LAN , SERIES A , REVISION B (YES/NO) = YES.

PORT 3 = COPYRIGHT 1989 ALLEN-BRADLEY COMPANY, INC.
 2760-SFC2 DT , SERIES A , REVISION B (YES/NO) = YES.

2760-RB SERIES A REVISION J
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1X - CONFIGURATION PARAMETERS	2X - IDENTIFICATION NUMBERS
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7 - THE PASS THROUGH ENTRIES	8 - NON-VOLATILE SCRATCH PAD AREA
9XF - RB MODULE FUNCTIONS	AX - HARDWARE DIAGNOSTICS
BX - SOFTWARE DIAGNOSTICS	C - EXIT CONFIGURATION MODE

WHERE X (0 TO 7) AND D (1 TO 3) ARE PORT NUMBERS WHICH ARE DEFINED BELOW :

0 - RB CMMND PRCSS 2 - SERIAL PORT 2 4 - CONFIG PORT 6 - I/O RACK SLT 1
 1 - SERIAL PORT 1 3 - SERIAL PORT 3 5 - I/O RACK SLT 0 7 - RESERVED

WHERE F (A TO E) ARE FUNCTIONS THAT RB CAN PERFORM WHICH ARE DEFINED BELOW :

A - RESET B - SET DEFAULTS C - FLUSH D - INITIALIZE E - CLEAR DIAGS

**Allen-Bradley 2760-RB Flexible Interface Module
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WHERE M (A TO T) AND I (A TO H) ARE ENTRY NUMBERS FOR THE SELECTION MADE ABOVE.

ENTER A MAIN MENU SELECTION: 13

MODEM CONTROL (ENABLE/DISABLE) = DISABLE.
 9600 BITS PER SECOND (YES/NO) = YES.
 7 BITS EVEN PARITY (YES/NO) = YES.
 XON/XOFF (ENABLE/DISABLE) = ENABLE.
 RS232 (YES/NO) = YES.
 RECEIVE MATRIXING (ENABLE/DISABLE) = ENABLE.
 BYTE SWAPPING (ENABLE/DISABLE) = ENABLE.
 BINARY DATA NO CONVERSIONS (YES/NO) = YES.
 HDR/TLR ON OUTPUT (ENABLE/DISABLE) = DISABLE.
 HEADER BYTE LENGTH (DEC 0...4) = 0.
 HEADER DATA[0] (HEX 0...ff) = 0.
 HEADER DATA[1] (HEX 0...ff) = 0.
 HEADER DATA[2] (HEX 0...ff) = 0.
 HEADER DATA[3] (HEX 0...ff) = 0.
 TRAILER BYTE LENGTH (DEC 0...4) = 2.
 TRAILER DATA[0] (HEX 0...ff) = a.
 TRAILER DATA[1] (HEX 0...ff) = d.
 TRAILER DATA[2] (HEX 0...ff) = 0.
 TRAILER DATA[3] (HEX 0...ff) = 0.
 MAX DATA BYTE LENGTH (DEC 0...124) = 0.
 MIN DATA BYTE LENGTH (DEC 0...124) = 0.
 PAD CHARACTER (HEX 0...ff) = 0.
 BIG MESSAGES (ENABLE/DISABLE) = DISABLE.
 DEFAULT DESTINATION (DEC 0...255) = 5.
 DEFAULT SOURCE (DEC 0...255) = 255.
 DEFAULT ADDRESS (HEX 0...ffff) = 200.
 SETUP TIMEOUT/SECS (DEC 0...255) = 0.
 SETUP BYTE LENGTH (DEC 0...78) = 0.
 SETUP DATA[0] (HEX 0...ff) = 0.
 SETUP DATA[1] (HEX 0...ff) = 0.
 SETUP DATA[2] (HEX 0...ff) = 0.

SETUP DATA[77] (HEX 0...ff) = 0.

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1X - CONFIGURATION PARAMETERS	2X - IDENTIFICATION NUMBERS
3 - DEVICE PORT PROTOCOL NAMES	4DM - MATCH CODE ENTRIES
5I - DISCRETE BYTE INPUT ENTRIES	6 - THE DATA MATRIX ENTRIES
7 - THE PASS THROUGH ENTRIES	8 - NON-VOLATILE SCRATCH PAD AREA
9XF - RB MODULE FUNCTIONS	AX - HARDWARE DIAGNOSTICS
BX - SOFTWARE DIAGNOSTICS	C - EXIT CONFIGURATION MODE

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WHERE X (0 TO 7) AND D (1 TO 3) ARE PORT NUMBERS WHICH ARE DEFINED BELOW :

0 - RB CMMND PRCSS 2 - SERIAL PORT 2 4 - CONFIG PORT 6 - I/O RACK SLT 1
1 - SERIAL PORT 1 3 - SERIAL PORT 3 5 - I/O RACK SLT 0 7 - RESERVED

WHERE F (A TO E) ARE FUNCTIONS THAT RB CAN PERFORM WHICH ARE DEFINED BELOW :

A - RESET B - SET DEFAULTS C - FLUSH D - INITIALIZE E - CLEAR DIAGS

WHERE M (A TO T) AND I (A TO H) ARE ENTRY NUMBERS FOR THE SELECTION MADE ABOVE.

ENTER A MAIN MENU SELECTION: 23

DUMB TERM. UNSPECIFIED PROTOCOL, 13fh (YES/NO) = YES.

2760-RB SERIES A REVISION J
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1X - CONFIGURATION PARAMETERS	2X - IDENTIFICATION NUMBERS
3 - DEVICE PORT PROTOCOL NAMES	4DM - MATCH CODE ENTRIES
5I - DISCRETE BYTE INPUT ENTRIES	6 - THE DATA MATRIX ENTRIES
7 - THE PASS THROUGH ENTRIES	8 - NON-VOLATILE SCRATCH PAD AREA
9XF - RB MODULE FUNCTIONS	AX - HARDWARE DIAGNOSTICS
BX - SOFTWARE DIAGNOSTICS	C - EXIT CONFIGURATION MODE

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ENTER A MAIN MENU SELECTION: 3

Allen-Bradley 2760-RB Flexible Interface Module Configuration Sheet

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PORT 1 = COPYRIGHT 1989 ALLEN-BRADLEY COMPANY, INC.
2760-SFC2 DT , SERIES A , REVISION B (YES/NO) = YES.

PORT 2 = COPYRIGHT 1989 ALLEN-BRADLEY COMPANY, INC.
2760-SFC2 DT , SERIES A , REVISION B (YES/NO) = YES.

PORT 3 = COPYRIGHT 1989 ALLEN-BRADLEY COMPANY, INC.
2760-SFC2 DT , SERIES A , REVISION B (YES/NO) = YES.

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ENTER A MAIN MENU SELECTION: 14

XON/XOFF PROTOCOL (ENABLE/DISABLE) = DISABLE.
BYTE SWAPPING ON OUTPUT ONLY (ENABLE/DISABLE) = DISABLE.
BINARY DATA NO CONVERSIONS (YES/NO) = YES.
HDR/TLR ON OUTPUT (ENABLE/DISABLE) = DISABLE.
HEADER BYTE LENGTH (DEC 0...4) = 0.
HEADER DATA[0] (HEX 0...ff) = 0.
HEADER DATA[1] (HEX 0...ff) = 0.
HEADER DATA[2] (HEX 0...ff) = 0.
HEADER DATA[3] (HEX 0...ff) = 0.
TRAILER BYTE LENGTH (DEC 0...4) = 1.
TRAILER DATA[0] (HEX 0...ff) = d.
TRAILER DATA[1] (HEX 0...ff) = 0.
TRAILER DATA[2] (HEX 0...ff) = 0.
TRAILER DATA[3] (HEX 0...ff) = 0.
MAX DATA LENGTH IN (DEC 0...124) = 124.
MIN DATA LENGTH OUT (DEC 0...255) = 0.
PAD CHARACTER (HEX 0...ff) = 0.
DEFAULT RB DESTINATION (HEX 0...ff) = 5.
DEFAULT RB SOURCE (HEX 0...ff) = 4.

DEFAULT RB ADDRESS (HEX 0...fff) = 0.
SETUP TIMEOUT/SECS (DEC 0...255) = 0.
SETUP BYTE LENGTH (DEC 0...78) = 26.
SETUP DATA[0] (HEX 0...ff) = d.
SETUP DATA[1] (HEX 0...ff) = a.
SETUP DATA[2] (HEX 0...ff) = a.
SETUP DATA[3] (HEX 0...ff) = a.
SETUP DATA[4] (HEX 0...ff) = a.

SETUP DATA[25] (HEX 0...ff) = a.
SETUP DATA[26] (HEX 0...ff) = 0.
SETUP DATA[27] (HEX 0...ff) = 0.

SETUP DATA[77] (HEX 0...ff) = 0.

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1X - CONFIGURATION PARAMETERS	2X - IDENTIFICATION NUMBERS
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ENTER A MAIN MENU SELECTION: 24

DUMB TERM. UNSPECIFIED PROTOCOL, 13th (YES/NO) = YES.

Allen-Bradley 2760-RB Flexible Interface Module Configuration Sheet

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2760 - PLC Messaging

PLC - to - 2760 Commands

Format (HEX):	Byte Count (Word 1)	Source (Word 2)	Dest. (Word 2)	Status (Word 3)	Cmd (Word 3)	Trans # (Word 4)	Cmd Addr. (Word 5)
---------------	------------------------	--------------------	-------------------	--------------------	-----------------	---------------------	-----------------------

0010	05	00	00	08	0001	1X0Y
------	----	----	----	----	------	------

X - Port # (0, 1, 2, 3, 4)

Y - Command: 2 - Reset Port

4 - Flush Port

5 - Clear Port Diagnostics

**Teklogix 7025-ILR RF Portable Bar Code Scanner / Terminal
Configuration Sheet**

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RF Portable Scanner Configuration

Radio Parameters Menu:

Narrow Band

Synthesized

Spread Spectrum:

Channel:

Chan #	1
Power-up chan	N
Voice Chan	0
Chan1 enable	Y
Chan2 enable	N
Chan3 enable	Y
Chan4 enable	N
Chan5 enable	Y
Chan6 enable	N
Chan7 enable	N

Chan-auto:

Next ch-auto	1
Next ch-auto	3
Next ch-auto	5
Next ch-auto	0
Next ch-auto	0
Next ch-auto	0
Next ch-auto	0

Contents:

Power	Hi
Baud Rate	122k
Sync Delay	4
TX on Time	10
Poll Tmout	3
PwrON time	0
PwrOFF time	0

Voice:

Speaker low	Y
Speaker med	Y

Wlan N

Tests:

Online	Y
Rcv Once	N
Rcv Test	N
Xmt Test	N
Xmt Long	N
Xmt -Mod	N
Stop	N
Tst Chan	0
Pattern	0
Msg Size	30
Xmit Time	30

Barcode Usage Parameters Menu:

Code 39 Y

Teklogix 7025-ILR RF Portable Bar Code Scanner / Terminal Configuration Sheet

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Full Ascii	Y
Mod 43 Chk	N
Mod 10 Chk	N
Include Chk	N
AIAG Strip	N
Err Accept	N
Size/Chars:	
Field Size	0
Prefix Char	0
Suffix Char	1
Strip 1st Char	N
Code 128	N
.	.
.	.
.	.
D 2 of 5	N
Options:	
Translate:	(No Translations)
Verify	0
Security	30
Large	Y
Beam Lockout	N
Long Scan	N

View Manager Parameters Menu:

Shut-down	10
Backlight	10
LCD change	N
LCD Contrast	5
Block Cursor	Y
ESC protect	Y
' ' --> ' '	N
Display shift	Y
Use increment	N
X-increment	5
Y-increment	5
Beeper defaults:	
kb-klik time	1
kb-klik tone	61
kb-err time	10
kb-err tone	60
Scanner Trigger:	
Timeout	0
Character	0
Scan Indication	N
Scan Results	N
Function Lock:	
Summary (Enter)	N
.	.
.	.
.	.
View Mode	N

Select Scanner Parameters Menu:

**Teklogix 7025-ILR RF Portable Bar Code Scanner / Terminal
Configuration Sheet**
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Scanner	Y
Wand	N
Custom	N

Global Macros Parameters Menu:
(None)

Character Set Parameters Menu:

National:

US ASCII	Y
British	N
.	.
.	.
.	.
Other Sets	N

Extended:

IBM PC	Y
DEC Multinat'l	N
ISO Latin Nr 1	n
IBM 5250 Multi	N
Custom	N

Custom ASCII:
(No Changes)

Custom Extended:
(No Changes)

CTRL F1 - F6 keys:
(No Changes)

Applications Parameters Menu:

Name	#1	ansi	
Title	#1	TERMn	n = Scanner Terminal ID # (1 - 6)

Ports Set-up Parameters Menu:

Console:

Select	Disable
(Not Applicable)	

Serial:

Select	Disable
(Not Applicable)	

TERMn Parameters Menu: n = Scanner Terminal ID # (1 - 6)

Terminal #	n
------------	---

Screen:

# of pages	2
# of rows	16
# of columns	32
Default font	16x3

Video:

Bold	NONE
Blink	BLNK
Reverse	REV
Underline	ULIN

Xmit Modes:

Xmit Count	3
------------	---

**Teklogix 7025-ILR RF Portable Bar Code Scanner / Terminal
Configuration Sheet**8/4/95
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Xmit Wait	0
Dev Attr	<- [? 62 ;
7 bit	Y
Block Mode:	
Kbd lock	N
.	.
.	.
.	.
TTM	N
EOL chars	(None)
EOB chars	(None)

Kbd Modes:

Arrow mode	cursor
Echo mode	Smart
DEL key	DEL
Xmit Enter	N
Insert	N
Newline	N
Disable kbd	N

Edit Modes:

Auto wrap	N
Erasure mode	N
Tab Stop mode	N
Edit extent	Dis
Disp controls	N

Serial:

Async In	N
Start	0
End	0

**Teklogix 9130 Radio Link Controller
Configuration Sheet**
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9130 Configuration

Dip-switch Settings:	1	2	3	4	5	6	7	8
NY-104	On	Off	On	Off	Off	Off	Off	Off
		Channel 5			Base station mode, on-line			
NY-105	On	Off	Off	Off	Off	Off	Off	Off
		Channel 1			Base station mode, on-line			
NY-306	On	On	Off	Off	Off	Off	Off	Off
		Channel 3			Base station mode, on-line			

Teklogix 9200 Network Controller Configuration Sheet

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9200 Configuration

Terminals = 16 Hosts = 1 Base Stations = 3 RRM Groups = 0

Host 1 Submenu:

Protocol = TCP/IP Emulation = ANSI Name = NY-106
Port = E1 Speed = 19200 Terminals: 1 ... 16
North American

Base Station 1 Submenu:

Port = M2 Speed = 122000 Terminals: 1 ... 16
Poll Windows: 4 Size = 8 Message Mode: Factor = 0 Limit = 4 Retries = 3
Message Size = 100
Poll Period = 10 Poll Timeout = 2 CRC = YES Auto Startup = YES
Full Duplex = NO

Base Station 2 Submenu:

Port = M3 Speed = 122000 Terminals: 1 ... 16
Poll Windows: 4 Size = 8 Message Mode: Factor = 0 Limit = 4 Retries = 3
Message Size = 100
Poll Period = 10 Poll Timeout = 2 CRC = YES Auto Startup = YES
Full Duplex = NO

Base Station 3 Submenu:

Port = M4 Speed = 122000 Terminals: 1 ... 16
Poll Windows: 4 Size = 8 Message Mode: Factor = 0 Limit = 4 Retries = 3
Message Size = 100
Poll Period = 10 Poll Timeout = 2 CRC = YES Auto Startup = YES
Full Duplex = NO

Ports Submenu:

M2 = Base Station 1 Speed = 122000
M3 = Base Station 2 Speed = 122000
M4 = Base Station 3 Speed = 122000

Console Speed = 19200

Screen Features Submenu:

Alarm = NO Clear = NO Procedures = NO Passthru = NO Transmit Line = 0 AIAG = 0
Visible Match = 0 Hidden Match = 0 Barcode Input Only = 0 Serial I/O = 0
Host Print = NO Remote Print = NO Print Line = 0 Print Formlength = 0
Entry Line = 0 Command Region = 0,0 - 0,0
Local = NO Queing = NO

Radio-Link Features Submenu:

Poll ID = 0 Terminal Offline: Timeout = 60 Percent = 75
Pages = 8 Field Overhead = 5

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	WRAP 1 Facility	Date 01/21/97
Project Title/Work Order		EDT No. 161644
Project W-026, Plant Control System ATP/ATR		ECN No.

Name	MSIN	Text With All Attach.	Text Only	Attach./Appendix Only	EDT/ECN Only
------	------	-----------------------	-----------	-----------------------	--------------

TL Watson	T2-54				X
JB Payne	T4-02				X
JR Weidert	T4-52				X
RJ Bottenus	T4-52				X
JR McGee	T4-02				X
JK Kersten	T4-52	X			
WRAP 1 DMC	T4-02	X			