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21

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 157980

2. To: (Receiving Organization) RFSH/Evaporator Plant Eng.	3. From: (Originating Organization) FDNW/Control Systems Eng.	4. Related EDT No.: None
5. Proj./Prog./Dept./Div.: AP Temperature Display Upgrade	6. Cog. Engr.: JL Dowell	7. Purchase Order No.: N/A
8. Originator Remarks: Routed for approval and release		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: 241-AP-271
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: ASAP

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-MM-ATP-184		0	Acceptance Test Procedure for the AP Farm Temperature Display Upgrade	Q	1,2	1	

16. KEY									
Approval Designator (F)		Reason for Transmittal (G)				Disposition (H) & (I)			
E, S, O, 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)	(H)	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN
Reason	Disp.								
1	1	Cog. Elec. Eng. CM TOWNE	per telecon	10-10-96	R1-43	AP Cog. Eng. KA White	per telecon	10-15-96	S5-09
1	1	Cog. Mgr. RJ NICKLAS	per telecon	10-15-96	R1-43	Operations BD Biddle	per telecon	10-10-96	S5-14
1	1	QA CA SAMS	per telecon	10-15-96	S5-13				
		Safety	N/A						
		Env.	N/A						
1	1	Design Authority CC Scaief	per telecon	10-15-96	R1-56				
18. Signature of EDT Originator <i>JL Dowell</i> 10-16-96									
19. Authorized Representative Date for Receiving Organization									
20. Cognizant Manager Date <i>RJ Nicklas</i> 10-15-96									
21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments									

Acceptance Test Procedure for the AP Farm Temperature Display Upgrade

JL DOWELL

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

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Key Words: Temperature, Data Acquisition, Datalogger, Temperature
Monitoring, Westronic, AP Tank Farm

Abstract: The purpose of this procedure is to document the Westronic
Data units function as intended as installed at 241-AP-271 tank farm.

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Approved for Public Release

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ACCEPTANCE TEST PROCEDURE FOR THE AP FARM TEMPERATURE DISPLAY UPGRADE

1.0 INSTRUCTION SECTION

1.1 PURPOSE/SCOPE

The purpose of this document is to demonstrate that new Temperature Displays installed at 241-AP-271 tank farm (replacing the obsolete temperature displays) operate as expected. Actual test execution steps begin in Section 1.7. All portions of the test shall be completed before the test results are either accepted or rejected. Testing is expected to take less than 3 days to complete.

The purpose of this procedure is to verify correct operation of the Westronic 3200/MB Temperature Display units. Acceptance testing will verify that the configured hardware functions according to intent prior to operational use. Note: the capability to communicate via the MODBUS port and/or modem is not tested in this procedure.

1.2 DESCRIPTION OF THE SYSTEM

Each of the two Temperature Displays are connected to 8 multiplexers, and each multiplexer is attached to over 60 thermocouples each. Each Temperature Display has its serial port (MODBUS) connected to modem so that the temperature readings can be relayed to TMACS.

1.3 CRITERIA

This Test Procedure will be successful if all the following criteria are met:

- 1.3.0.1 Each Temperature Display indicates there are no problems when power is applied.
- 1.3.0.2 Each Temperature Display responds appropriately to the change induced at the multiplexer terminals.
- 1.3.0.3 Readings taken with each Temperature Display match readings taken at the MUX selector switch within ± 7 degree F (± 3.9 degree C).

1.4 REFERENCES

1.4.1 Drawings

- H-2-90489, INSTRUMENTATION ENGINEERING BLOCK DIAGRAM.
- H-2-90494, (SHT 7) INSTN XMTR/MUX ENCLOSURE TYPE A
- H-2-90494, INSTN TEMP DISPLAY INTERCONNECTION DIAG
- H-2-90496, INSTN PANEL & RACK ARRANGEMENTS

1.4.2 Other

- *User Manual, Westronics Series 3200/MB Multibank Digital Data Recorder*, Manual Part No. MO100124-01.

1.4.3 Procedures

- TO-040-660, OBTAIN/RECORD DOUBLE SHELL TANK TEMPERATURE DATA
- TO-270-040, OPERATE 241-AP TEMPERATURE DISPLAY SYSTEM (TDS)
- TF-OR-A-03, OPERATOR ROUND SHEETS - AP, AW TANK FARMS AND LERF

1.5 RESPONSIBILITIES

Each organization participating in the execution of this test procedure will designate personnel for the responsibilities and duties as defined herein for their respective roles. The names of these designees shall be provided to the Recorder for listing on the Recorder's copy of the Test Execution Sheet prior to the performance of any part of this test procedure.

All individuals shall carry out their assigned work in a safe manner to protect themselves, others, and the equipment from undue hazards and to prevent damage to property and environment. Performance of test activities shall always include safety and health aspects as delineated in the operations manuals and as directed by the Project Engineer. Any hazard identified during the performance of this test procedure shall be reported to the Test Director.

1.5.1 Project Engineer

1.5.1.1 Designate a Test Director.

1.5.1.2 Coordinate testing with facility management.

1.5.1.3 Act as liaison between the test participants.

1.5.1.4 Ensure informal testing and inspection is complete.

1.5.1.5 Schedule and conduct a pre-test meeting with participants prior to start of testing.

1.5.1.6 Notify the persons performing and witnessing the test prior to the start of testing.

1.5.1.7 Notify all concerned parties when a change is made in the testing schedule.

- 1.5.1.8 Approve field changes to this test procedure.
- 1.5.1.9 Sign/date test execution sheet (Appendix D) when test procedure is approved and accepted.
- 1.5.1.10 Take necessary action to clear test exceptions.
- 1.5.1.11 Sign/date Test Exception Sheet (Appendix B) when an exception has been resolved.
- 1.5.1.12 Provide a distribution list for the approved and accepted test procedure.
- 1.5.1.13 Confirm that all equipment required for performing this test, as listed in Section 1.6.2, will be available for the test duration.
- 1.5.1.14 Provide equipment required for performing this test, which has not been designated as being provided by others.
-
- 1.5.2 Test Director
  - 1.5.2.1 Witness the tests.
  - 1.5.2.2 Coordinate all testing.
  - 1.5.2.3 Confirm that shop testing (if any) and/or inspection (if any) of the test unit(s) or portion of the test unit(s) have been completed.
  - 1.5.2.4 Stop any test which may cause damage to the test unit(s) until the test procedure has been revised.
  - 1.5.2.5 Approve field changes to this test procedure.
  - 1.5.2.6 Obtain revisions to this test procedure, as necessary, to comply with authorized field changes or to accommodate existing field conditions.
  - 1.5.2.7 Evaluate recorded data, discrepancies, and exceptions.
  - 1.5.2.8 Obtain from the Project Engineer, any information or changes necessary to clear or resolve exceptions.
  - 1.5.2.9 Sign/date Test Data sheets and Test Execution sheet (Appendix A & D) when execution of this test procedure has been completed.
  - 1.5.2.10 Sign/date Test Exception Sheet (Appendix B) when acceptable retest has been performed.
  - 1.5.2.11 Prepare and obtain required signatures on the Test Report prior to reproduction and distribution.

1.5.3 Recorder

- 1.5.3.1 Witness testing and perform all recording using black ink.
- 1.5.3.2 Record names of all designated personnel on the Test Execution sheet (Appendix D) on the Recorder's copy of test procedure prior to testing.
- 1.5.3.3 Observe tests, record test data and maintain Test Log (Appendix C).
- 1.5.3.4 Sign/date the Test Execution Sheet, Test Data sheets and Test Exception sheet(s) (Appendices A, B & D) as the Recorder.
- 1.5.3.5 "Checkoff" every test step on the Recorder's copy as it is completed, next to the step number and under the appropriate gauge identifier.
- 1.5.3.6 Record authorized field changes to this test procedure.
- 1.5.3.7 Record, on a Test Exception Sheet, exceptions and test steps that are either modified or are not performed. Additional Test Exception Sheets can be reproduced as needed (Appendix B).
- 1.5.3.8 Orally notify the Test Director at the time an objection is made.
- 1.5.3.9 After the test procedure is complete assign page numbers to Test Exception Sheets.
- 1.5.3.10 Submit the completed test procedure to the Test Director for approval signatures and distribution.

1.5.4 Quality

- 1.5.4.1 Witness the tests.
- 1.5.4.2 Evaluate recorded data, discrepancies, and exceptions.
- 1.5.4.3 Approve field changes to this test procedure.
- 1.5.4.4 Sign/date Test Execution Sheet (Appendix D) when execution of this test procedure is completed and again when it is approved and accepted.
- 1.5.4.5 Sign/date Test Exception Sheet (Appendix B) when an exception is made and again when it has been resolved.
- 1.5.4.6 Initial/mark Test Data sheets (Appendix A), assuring data is entered correctly.

1.5.5 Other Personnel

1.5.5.1 Instrument Technician(s) familiar with Westronic data recorder(s) and AP farm Multiplexers.

1.6 TEST CONDITIONS & EQUIPMENT REQUIRED

1.6.1 Test Conditions

No unique or unusual chemical, fire, release of energy, or criticality safety hazards involved with performing or supporting these tests have been identified. Normal facility safety rules and procedures shall be followed during these tests. All electrical and mechanical apparatus shall be operated as designed.

The test items, equipment, and facilities used in this test procedure are not expected to be affected permanently by this procedure. Test equipment that has been damaged shall be repaired or replaced.

1.6.2 Equipment Required

The Project Engineer shall assure all test equipment is available unless otherwise noted. The following list is provided as an aid and is not intended to be an exhaustive list.

- Jumper wire (about 6 inches long) with leads.
- Potentiometer, for type E thermocouples
- Hand Tools
- *User Manual, Westronics Series 3200/MB Multibank Digital Data Recorder, Manual Part No. MO100124-01.*

1.7 ACCEPTANCE TEST SETUP

Step Checkoff and Data Sheet Entries

Spaces for the Recorder to "check off" are provided to the left of the step numbers as the step is completed. Each **RECORD**, **RECORD VERIFICATION**, or **VERIFY** in a step requires an entry on the data sheets; the data sheets include the step numbers.

1.7.1 Preliminary Conditions

- _____ 1.7.1.1 The prejob meeting with test participants has been held and the personnel involved in the test understand their roles.
- _____ 1.7.1.2 Assure the modems, the Temperature Displays, and associated equipment are plugged in. If needed, plug in any equipment being tested.
- _____ 1.7.1.3 Assure the modems are turned ON. If needed, turn ON the modem(s) power switch.
- _____ 1.7.1.4 Assure both the Temperature Displays are turned OFF.

INFORMATION

This section checks that each display does not show an error code pertaining to an internal problem.

- _____ 1.7.1.5 Turn the power to TDS-AP-1 ON. **VERIFY** that TDS-AP-1 passes all internal hardware and software self diagnostics as described in Section 1.12.
- _____ 1.7.1.6 For each of the following parameters read the value from TDS-AP-1. If the value is different from that shown, change the value to match. **RECORD VERIFICATION** for each item in the test data sheet.
  - Date/Time is current ?
  - Printer status?

- _____ 1.7.1.7 Turn the power to TDS-AP-2 ON. **VERIFY** that TDS-AP-2 passes all internal hardware and software self diagnostics as described in Section 1.12.
- _____ 1.7.1.8 For each of the following parameters read the value from TDS-AP-2. If the value is different from that shown, change the value to match. **RECORD VERIFICATION** for each item in the test data sheet.
  - Date/Time is current ?
  - Printer status?

1.8 ACCEPTANCE TEST

1.8.1 Testing communication of TDS-AP-1 to each multiplexer

INFORMATION

Procedures in this section serve to verify and validate the communication capabilities of TDS-AP-1 to each multiplexer by shorting a selected thermocouple and verifying the response changed appropriately.

- _____ 1.8.1.1 In 241-AP-271 use TDS-AP-1 to read the value of point 001 (TE-101-1). **RECORD** the reading.
- _____ 1.8.1.2 At Tank AP-101, on multiplexer MUX-101-1: use the jumper to short the terminals the thermocouple in the previous step are attached.
- _____ 1.8.1.3 **VERIFY** the reading changed.
- _____ 1.8.1.4 Remove the jumper and **VERIFY** the reading is the same as the value of the prior reading ± 2 degrees F (0 ± 1 degrees C).
- _____ 1.8.1.5 Repeat steps 1.8.1.1 through 1.8.1.4 inclusive for the following thermocouples (located at the following multiplexers):

TDS-AP-1 Point No.	Tank No.	Multiplexer No.	Thermocouple No.
072	AP-101	MUX-101-2	TE-101-72
141	AP-102	MUX-102-1	TE-102-21
194	AP-102	MUX-102-2	TE-102-94
285	AP-103	MUX-103-1	TE-103-45
310	AP-103	MUX-103-2	TE-103-70
420	AP-104	MUX-104-1	TE-104-60
439	AP-104	MUX-104-2	TE-104-79

1.8.2 Compare TDS-AP-1 readings to MUX readings

- _____ 1.8.2.1 In the Test Data sheet, **RECORD** the calibration number and expiration date of the Type E instrument.
- _____ 1.8.2.2 In 241-AP-271 use TDS-AP-1 to read the value of points in the following table; **RECORD** the readings.

- _____ 1.8.2.3 At each multiplexer use the type E instrument to obtain the readings for the temperature elements listed in the following table; **RECORD** the readings.
- _____ 1.8.2.4 **VERIFY** the difference between readings made with the TDS-AP-1 and the field reading is less than 7 degrees F (3.9 degrees C) for each thermocouple.

TDS-AP-1 Point No.	Tank No.	Thermocouple No.
052	AP-101	TE-101-52
046		TE-101-46
042		TE-101-42
040		TE-101-40
038		TE-101-38
036		TE-101-36
172	AP-102	TE-102-52
166		TE-102-46
162		TE-102-42
160		TE-102-40
158		TE-102-38
156		TE-102-36
290	AP-103	TE-103-52
286		TE-103-46
282		TE-103-42
280		TE-103-40
278		TE-103-38
276		TE-103-36
412	AP-104	TE-104-52
406		TE-104-46
402		TE-104-42
400		TE-104-40
398		TE-104-38
396		TE-104-36

1.8.3 Testing communication of TDS-AP-2 to each multiplexer

INFORMATION

Procedures in this section serve to verify and validate the communication capabilities of TDS-AP-2 to each multiplexer by shorting a selected thermocouple and verifying the response changed appropriately.

- _____ 1.8.3.1 In 241-AP-271 use TDS-AP-2 to read the value of point 501 (TE-105-1). **RECORD** the reading.
- _____ 1.8.3.2 At Tank AP-105, on multiplexer MUX-105-1: use the jumper to short the terminals the thermocouple in the previous step are attached.
- _____ 1.8.3.3 **VERIFY** the reading changed.
- _____ 1.8.3.4 Remove the jumper and **VERIFY** the reading is the same as the value of the prior reading ± 2 degrees F (± 1 degrees C).
- _____ 1.8.3.5 Repeat steps 1.8.3.1 through 1.8.3.4 inclusive for the following thermocouples (located at the following multiplexers):

TDS-AP-2 Point No.	Tank No.	Multiplexer No.	Thermocouple No.
572	AP-105	MUX-105-2	TE-105-72
641	AP-106	MUX-106-1	TE-106-21
741	AP-106	MUX-106-2	TE-106-94
785	AP-107	MUX-107-1	TE-107-45
810	AP-107	MUX-107-2	TE-107-70
920	AP-108	MUX-108-1	TE-108-60
939	AP-108	MUX-108-2	TE-108-79

1.8.4 Compare TDS-AP-2 readings to MUX readings

- _____ 1.8.4.1 In 241-AP-271 use TDS-AP-1 to read the value of points in the following table; **RECORD** the readings.
- _____ 1.8.4.2 At each multiplexer use the type E instrument to obtain the readings for the temperature elements listed in the following table; **RECORD** the readings.

1.8.4.3 **VERIFY** the difference between readings made with the TDS-AP-2 and the field reading is less than 7 degrees F (3.9 degrees C) for each thermocouple.

TDS-AP-2 Point No.	Tank No.	Thermocouple No.
552	AP-105	TE-105-52
546		TE-105-46
542		TE-105-42
540		TE-105-40
538		TE-105-38
536		TE-105-36
672	AP-106	TE-106-52
666		TE-106-46
662		TE-106-42
660		TE-106-40
658		TE-106-38
656		TE-106-36
792	AP-107	TE-107-52
786		TE-107-46
782		TE-107-42
780		TE-107-40
778		TE-107-38
776		TE-107-36
912	AP-108	TE-108-52
906		TE-108-46
902		TE-108-42
900		TE-108-40
898		TE-108-38
896		TE-108-36

1.9 ACCEPTANCE TEST CLOSURE

_____ 1.9.1 The person(s), by their signature below state the temperature displays TDS-AP-1, TDS-AP-2 and associated components (as configured) are functional and ready for use.

_____
Test Director

_____
Date

_____
Project Engineer

_____
Date

_____
AP Tank Farm Operations

_____
Date

1.10 TEST DATA SHEETS

The Test Data Sheets are used to document any procedure step requiring verification or recording of a value. All entries are made in black ink. A description of the data sheet format follows. Upon successful completion of testing activities, the master copy of the test execution data sheets shall be signed by the Test Witnesses. Witness signatures at the bottom of the data sheets indicate that the witness agrees to the accuracy of the data recorded and comparisons made.

1. Date of Test--Record the date the test is performed.
2. Procedure Step Number--This column contains the test steps requiring verification.
3. Item--This column contains the item or parameter being verified or recorded.
4. Expected Result--This column indicates the acceptable value of the item being recorded.
5. Value--Record the quantitative or qualitative measure (i.e., a line voltage may have a value of 120V, whereas a pump may have a value of ON or OFF) of the item being verified in this column.
6. Accept/Reject--Indicate whether the value obtained is acceptable in comparison with the Expected Value.
7. Comment--If the value is rejected, give a justification for denial.
8. QA--This column indicates that QA concurred with the items recorded or verified. Test Data Sheets are in Appendix A.

1.11 TEST LOG SHEET

Test Log Sheets are used to document test start and stop times and to document any other notes concerning the execution of the Acceptance Test Procedure. A Test Log Sheet is included in Appendix C.

1.12 DIGITAL DISPLAY UNIT: SELF TESTS PERFORMED AT POWER ON.

The system executes multiple hardware tests at initial start-up. As each test is performed, the system displays a message to indicate the test currently in progress. If it passes the current test, a beep will sound and the system will automatically proceed to the next test. If the system fails the current test, an error message will display and an error beep will sound. Be aware, however, that certain test failures are considered non-recoverable and will result in complete shut-down of the system. These failures require immediate repair before the recorder can continue power-up. For more information on non-recoverable failures, see the paragraph(s) below.

When hardware tests are complete, the system loads the user programmed database. The first step in the process is to load and check the Profile block. If the block is found defective, the user is given the option of having the system repair any bad data in the block. The next step is to load and check the user's programmed points. If a point is found defective, the system will automatically delete it from the load. Upon completion of the load, the system will briefly display an error message indicating that bad points were found.

Follow the instructions below to power-up the instrument. (See page 3-1 of Instruction Manual):

1. Press the chassis latch shown in Figure 3-1.
2. Open the swingout chassis.
3. Turn the instrument POWER ON/OFF Switch (Figure 3-2) to ON.

The following explains each test performed at initial start-up along with any possible error messages and recommended actions. Each message displays briefly as the system passes each test.

Memory Test:

Tests the main CPU temporary data memory. Failure of this test is considered non-recoverable and your unit must be repaired before operation can resume. If your system fails this test, the message **RAM FAIL XXXX HALT** will display. ("XXXX" specifies the address of the first failure).

Software Test:

Compares the current checksum value to the stored checksum value of the system program memory. If those values differ, the message **CHKSUM FAIL, IGNORE?** will display. Failure of this test is considered non-recoverable and your unit must be repaired before operation can resume. The only time this message should be ignored is if you have just installed a system software update in your unit. Any other time a failure occurs, it indicated either damaged system software or bad nonvolatile memory.

Systems Test:

This group of routines tests the functionality of critical system hardware. If all tests pass, the unit will proceed to **LOAD PROFILE**.

First, the system tests for a successful link between the CPU Wait-State Generator and the keyboard and display. If either of these wait-states fail, the system will briefly display the messages **KBD WAIT OFF** and/or **DIS WAIT OFF** respectively.

Next, the system verifies the system interrupt controller hardware. If this test fails, the message **8259 FAILURE, IGNORE** will briefly display. Failure of this test is considered non-recoverable and your unit must be repaired before operation can resume. The only time this message should be ignored is for trouble-shooting purposes.

The next routine tests for the presence and functionality of the ADC system. If this test fails, the system will briefly display the message **ADC INTERRUPT FAIL**. Failure of this test is not considered non-recoverable, however, your unit will not measure live inputs. If the system fails this test, it will bypass the two thermistor tests and continue to power-up with the Printer and Interface Controller (P/I) test.

Next, the system verifies the functionality of the thermistors (A, B, C, and D) used for ambient temperature local compensation of thermocouple inputs. (If you are equipped with a 24-point recorder, only thermistors A and B will be checked.) If thermistor A or B fails, the message **THERM X FAILED!** will briefly display. If either any of these thermistors fail, all locally compensated thermocouple inputs will display as **INVALID**.

Finally, the system verifies the communication hardware between the main CPU and the printer system (PDC). If the 8255 chip on the Printer and Interface Controller (P/I) is defective, the message **P/I COM PORT FAILED!** will briefly display. If the First-in, First-out (FIFO) chip to the P/I is defective, the message **P/I FIFO FAILED!** will briefly display. Neither of these failures is considered non-recoverable and your unit will continue to power-up after briefly displaying one or both of the above failure messages. If either of these tests fails, the printer will probably malfunction. However the point scanning and alarm monitoring will function properly.

Load Profile:

Tests and loads all user-programmed parameters into memory. Two failure messages are possible:

If the transfer was unsuccessful and some or all of the database is now faulty, the message **DB RAM FAIL IGNORE?** will briefly display. If you press the **YES** key, the system will continue to power-up. However, the database may not be intact. If you press the **NO** key, the message **SYSTEM HALT** will display and the power-up sequence will abort.

If the system found bad parameters during the transfer of the profile block, the message **PROFILE ERR, CORRECT?** will briefly display. If you press the **YES** key, the unit will perform a boundary analysis of all profile data values and set "out of range" values to safe defaults. The "correction" will not necessarily restore the data to the user's original selections. Instead, the correction process is intended to allow the system to continue the power-up sequence successfully. If you press the **NO** key, a system "lock-up" may occur due to erroneous data in the profile block.

Whether you choose to correct this error or ignore it, it is recommended that you run a profile log immediately upon completion of the power-up sequence. This new log should be compared to the user's on-file historical profile log. If there are any differences, correct them by re-programming those parameters and performing a learn.

Load Program:

This routine tests and loads all user-programmed points into memory. Two failure messages as possible:

If the transfer to **RAM** was unsuccessful and some or all of the database is now faulty, the message **DB RAM FAIL, IGNORE?** will briefly display. If you press the **YES** key, the system will continue to power-up. However, the database may not be intact. If you press the **NO** key, the message **SYSTEM HALT** will display and the power-up sequence will abort.

If one or more points contain defective program parameters, the message **BAD POINTS FOUND** will display for only 3 seconds. Bad points are automatically deleted from the download and the system display will read **COMMAND ?**. The following steps must be taken if this error occurs:

1. Run a program log.
2. Compare the program log to the historical program log.
3. Re-program lost points.
4. Perform a **LEARN** operation.

Repeated failures of this type indicate a problem with nonvolatile memory

2.0 CHANGE CONTROL AND EXCEPTIONS TO ACCEPTANCE TEST SECTION

2.1 ACCEPTANCE TEST PROCEDURE CHANGE CONTROL

Testing is to be conducted in accordance with the steps and requirements specified in this procedure. Any required field changes must be per Sections 1.5.1, 1.5.2, and 1.5.4. Field changes shall also be recorded as a test exception.

2.2 TEST EXECUTION

The test procedures detailed in Sections 1.7 and 1.8 shall be performed in sequential steps starting with Section 1.7.1, except for fault recovery, as specified within the procedure. As required by Section 1.5.3, the Recorder will "checkoff" every test step in the space provided on the Recorder's copy of the test procedure as each step is completed. Any step that requires a value recording or verification must also be recorded on the Test Data Sheet.

2.2.1 Without Exception

2.2.1.1 Check applicable space on the Test Execution Sheet (Appendix D) to show that the test procedure has been performed and no exceptions have been recorded.

2.2.1.2 Sign and date the Test Execution Sheet in the spaces provided.

2.2.1.3 Distribute requisite copies of test procedure.

2.2.2 With Exception(s) Resolved

2.2.2.1 Check applicable space on the Test Execution Sheet to show that the test procedure has been performed with exceptions recorded and resolved.

2.2.2.2 Sign and date the Test Execution Sheet in the spaces provided.

2.2.2.3 Distribute requisite copies of test procedure.

2.2.3 With Exception(s) Outstanding

2.2.3.1 Check applicable space on the Test Execution Sheet to show that the test procedure has been performed with exceptions recorded, some or all of which are presently outstanding, unresolved.

2.2.3.2 Sign and date the Test Execution Sheet in the spaces provided.

2.2.3.3 Distribute requisite copies of test procedure.

3.0 RECORDING AND RESOLVING EXCEPTIONS

3.1 GENERAL

Exceptions to the test procedure are sequentially numbered and recorded on individual Exception Sheets. This enables case-by-case resolution, recording, approval, and distribution of each exception.

3.2 RECORDING

- 3.2.1 Number each exception sequentially as it occurs in the comments column on the Test Data Sheet, or in the body of the test procedure, as applicable, and also record it on a Test Exception Sheet.
- 3.2.2 Enter test function of objecting party (ie Project Engineer, Quality).
- 3.2.3 Enter problem encountered and/or planned action to resolve each exception when determined.
- 3.2.4 The initials of the Project Engineer and Quality witness affirm the description of the Test Exception is accurate and complete.

3.3 RETEST/RESOLUTION

- 3.3.1 Record the action taken to resolve each exception on the Test Exception Sheet. Action taken might not be the same as planned action.
- 3.3.2 When action taken results in an acceptable retest, sign and date Acceptable Retest section of the Test Exception Sheet.
- 3.3.3 When action taken does not involve an acceptable retest, mark the N/A block. Resolve exception per Section 3.4.
- 3.3.4 The signatures of the Test Director and Quality witness affirm the description of the Retest performance is accurate and complete.

3.4 APPROVAL AND ACCEPTANCE

3.4.1 The Project Engineer and Quality representative provides final approval of exception by checking one of the following on the Test Exception Sheet:

- Retest Approved and Accepted: Applicable when Retest Execution and Acceptance section is completed.
- Exception Accepted-As-Is: Requires detailed explanation.
- Other: Requires detailed explanation.

3.4.2 The Project Engineer and Quality representative signs and dates the Test Exception Sheet and obtains other internal approval, if required.

3.5 DISTRIBUTION

Distribute requisite copies of completed Test Exception Sheets to the test participants.

APPENDIX A TEST DATA SHEETS

Test Data Sheets

Date of test:			TEST DATA			
Procedure Step Number	Item	Expected Result	Value	(A/R)	Comment	QA
1.7.1.5	TDS-AP-1 self test	Passed				
1.7.1.6	Date/Time current?	Yes				
	Printer Status?	Off				
1.7.1.7	TDS-AP-2 self test	Passed				
1.7.1.8	Date/Time current?	Yes				
	Printer Status?	Off				
1.8.1.1	Point No. 001	Record value				
1.8.1.3		Changed? (Yes)				
1.8.1.4	Same as prior?	Yes				
1.8.1.5	Point No. 072	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.1.5	Point No. 141	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.1.5	Point No. 194	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.1.5	Point No. 285	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				

Test Data Sheets

Date of test:			TEST DATA			
Procedure Step Number	Item	Expected Result	Value	(A/R)	Comment	QA
1.8.1.5	Point No. 310	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.1.5	Point No. 420	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.1.5	Point No. 439	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.2.1	Inst. Cal. No.	Record Value				
	Expiration Date	Record Value				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 052	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 046	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 042	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				

Test Data Sheets

Date of test:			TEST DATA			
Procedure Step Number	Item	Expected Result	Value	(A/R)	Comment	QA
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 040	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 038	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 036	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 172	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 166	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 162	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				

Test Data Sheets

Date of test:			TEST DATA			
Procedure Step Number	Item	Expected Result	Value	(A/R)	Comment	QA
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 160	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 158	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 156	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 290	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 286	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 282	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				

Test Data Sheets

Date of test:			TEST DATA			
Procedure Step Number	Item	Expected Result	Value	(A/R)	Comment	QA
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 280	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 278	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 276	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 412	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 406	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 402	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				

Test Data Sheets

Date of test:			TEST DATA			
Procedure Step Number	Item	Expected Result	Value	(A/R)	Comment	QA
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 400	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 398	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.2.2 1.8.2.3 1.8.2.4	Point No. 396	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.3.1	Point No. 501	Record Value				
1.8.3.3		Changed? (Yes)				
1.8.3.4	Same as prior?	Yes				
1.8.3.5	Point No. 572	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.3.5	Point No. 641	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				

Test Data Sheets

Date of test:			TEST DATA			
Procedure Step Number	Item	Expected Result	Value	(A/R)	Comment	QA
1.8.3.5	Point No. 741	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.3.5	Point No. 785	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.3.5	Point No. 810	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.3.5	Point No. 920	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.3.5	Point No. 939	Record Value				
		Changed? (Yes)				
	Same as prior?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 552	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 546	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				

Test Data Sheets

Date of test:			TEST DATA			
Procedure Step Number	Item	Expected Result	Value	(A/R)	Comment	QA
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 542	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 540	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 538	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 536	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 672	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 666	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				

Test Data Sheets

Date of test:			TEST DATA			
Procedure Step Number	Item	Expected Result	Value	(A/R)	Comment	QA
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 662	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 660	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 658	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 656	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 792	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 786	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				

Test Data Sheets

Date of test:			TEST DATA			
Procedure Step Number	Item	Expected Result	Value	(A/R)	Comment	QA
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 782	Record TDS Value				
		Record MUX Value				
	Diff $\leq$ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 780	Record TDS Value				
		Record MUX Value				
	Diff $\leq$ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 778	Record TDS Value				
		Record MUX Value				
	Diff $\leq$ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 776	Record TDS Value				
		Record MUX Value				
	Diff $\leq$ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 912	Record TDS Value				
		Record MUX Value				
	Diff $\leq$ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 906	Record TDS Value				
		Record MUX Value				
	Diff $\leq$ 7 deg F?	Yes				

Test Data Sheets

Date of test:			TEST DATA			
Procedure Step Number	Item	Expected Result	Value	(A/R)	Comment	QA
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 902	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 900	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 898	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				
1.8.4.1 1.8.4.2 1.8.4.3	Point No. 896	Record TDS Value				
		Record MUX Value				
	Diff ≤ 7 deg F?	Yes				

Test Director

Date

Quality

Date

Recorder

Date

WHC-SD-WM-ATP-184
Revision 0

APPENDIX B TEST EXCEPTION SHEET
(Copy as needed)

WHC-SD-WM-ATP-184
Revision 0

TEST EXCEPTION # _____

Test Title: WHC-SD-WM-ATP-184, REV 0			
EXCEPTIONS			
Procedure Step Number	Description	Initials/Date	
		Project Engineer	Quality

OBJECTING PARTY _____ Date _____

ACCEPTABLE RETEST PERFORMED: YES ____ NO ____ N/A ____

Quality _____ Date _____ Test Director _____ Date _____

Retest Approved and Accepted ____ Exception Accepted As Is ____ Other ____

Explanation _____

EXCEPTION RESOLVED:

____ Yes _____ Project Engineer _____ Date _____

____ Yes, deferred
to Test Exception # _____ Quality _____ Date _____

____ No

WHC-SD-WM-ATP-184
Revision 0

APPENDIX C TEST LOG SHEET
(Copy as needed)

WHC-SD-WM-ATP-184
Revision 0

TEST LOG: WHC-SD-WM-ATP-184, REV 0

DATE/TIME	COMMENTS

WHC-SD-WM-ATP-184
Revision 0

APPENDIX D TEST EXECUTION SHEET

WHC-SD-WM-ATP-184
Revision 0

TEST EXECUTION SHEET

Date:

Document Number: WHC-SD-WM-ATP-184, REV 0

Test Unit Number:

TEST PERSONNEL

Project Engineer:

Test Director:

Recorder:

Quality:

TEST EXECUTION

Test Director

Date

Recorder

Date

Quality

Date

TEST APPROVAL AND ACCEPTANCE

Without
Exception

With
Exception/Resolved

With
Exception/Outstanding

Project Engineer

Date

Quality

Date

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Control Systems Engineering	Date Oct 16, 1996
Project Title/Work Order		EDT No. 157980
WHC-SD-WM-ATP-184, Rev. 0, Acceptance Test Procedure for the AP Farm Temperature Display Upgrade		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
BD Biddle	S5-14	X			
DJ Born	H6-11	X			
JL Dowell	E6-21	X			
RJ Nickalus	R1-43				X
CC Scaief III	R1-56	X			
CM Towne	R1-43	X			
KA White	S5-09	X			
Central Files	A3-88	X			
TFIC	R1-20	X			