

*Sh 4. (2)*  
**MAR 10 1998**

**ENGINEERING DATA TRANSMITTAL**

Page 1 of 1  
 1. EDT **621176**

2. To: (Receiving Organization) <b>DISTROBUTION</b>		3. From: (Originating Organization) <b>DC LARSEN/SST TWRS LMH</b>		4. Related EDT No.: <b>606762</b>	
5. Proj./Prog./Dept./Div.: <b>241-SY-101/ MITIGATION</b>		6. Design Authority/ Design Agent/Cog. Engr.: <b>DC LARSEN</b>		7. Purchase Order No.: <b>N/A</b>	
8. Originator Remarks: This ATR documents completion of ATP HNF-1516, "Thermocouple Module Halt Failure Acceptance Test Procedure for Tank 241-SY-101".				9. Equip./Component No.: <b>N/A</b>	
11. Receiver Remarks: <b>N/A</b>				10. System/Bldg./Facility: <b>241-SY-101/DACS-1</b>	
11A. Design Baseline Document? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				12. Major Assm. Dwg. No.: <b>N/A</b>	
				13. Permit/Permit Application No.: <b>N/A</b>	
				14. Required Response Date: <b>N/A</b>	

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1	HNF-2351	-	0	Thermocouple Module Halt Failure Acceptance Test Report for Tank 241-SY-101	Q	1	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

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		Design Authority	WG Brown		T4-07						
		Design Agent	<i>Warren Brown</i>	3/9/98	T4-07						
		Cog. Eng.	DC LARSEN	<i>August McInnis</i>	3/9/98	T4-08					
		Cog. Mgr.	RE LARSON	<i>Richard E. Smith</i>	3/9/98	T4-08					
		QA R TRUE	<i>BR True</i>	3/9/98	T4-07						
		Safety									
		Env.									

18. Signature of EDT Originator <i>Richard E. Smith</i> 3/9/98		19. Authorized Representative for Receiving Organization <i>Warren Brown</i> 3/9/98		20. Design Authority/ Cognizant Manager <i>Warren Brown</i> 3/9/98		21. DOE APPROVAL (if required) Ctrl. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments	
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# THERMOCOUPLE MODULE HALT ACCEPTANCE TEST REPORT FOR TANK 241-SY-101 DACS-1

DOUGLAS C. LARSEN  
LMH, Richland, WA 99352  
U.S. Department of Energy Contract DE-AC06-96RL13200

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Org Code: 79460 Charge Code: N16B1  
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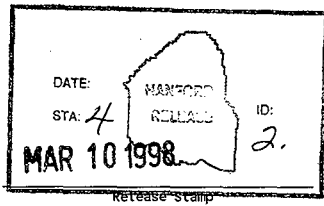
Key Words: 241-SY-101, DACS, SOFTWARE, MIXER PUMP, THERMOCOUPLE, MIT

Abstract: The following documents the acceptance test report for the 241-SY-101 modicon module software testing performed as a corrective action to communications problem.

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Release Approval \_\_\_\_\_ Date 3/10/98



Approved for Public Release

**THERMOCOUPLE MODULE HALT FAILURE  
ACCEPTANCE TEST REPORT FOR TANK 241-SY-101  
DACS-1**

**HNF-2351  
REVISION 0**

**MARCH 5, 1998**

**THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST REPORT FOR  
TANK 241-SY-101 DACS-1**

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST REPORT FOR TANK 241-SY-101 DACS-1

SUMMARY OF HNF-2351, Rev. 0, "THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST REPORT FOR TANK 241-SY-101 DACS-1".

Testing was started on February 24, 1998 and completed on February 25, 1998.

The completed procedure consists of 4 acceptance test sections, 6.1 through 6.4.

Three test exceptions were identified during the procedure. The first test exception was determined to be unrelated to the ATP and unfortunate that the instrument failed during the ATP. The next two test exceptions were disposition as acceptable because the alarming functions worked correctly in identifying a problem when software communications were interrupted. The test was completed satisfactorily over 2 days.

The remainder of the acceptance test report is the completed test procedure.

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## DISTRIBUTION SHEET

To	From			Page 1 of 1	
Distribution	SESC / Laboratory Services			Date	October 29, 1997
Project Title/Work Order				EDT No. 606762	
Thermocouple Module Halt Failure Acceptance Test Procedure for Tank 241-SY-101 DACS-1 / NF22Y				ECN No.	
Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
W. G. Brown	T4-07	X			
D. W. Crass	H6-11				X
J. A. Ellingsworth	R2-87	X			
A. M. Ermi	L6-37	X			
G. J. Gauck	T4-07	X			
L. S. Krogsrud	T4-07	X			
D. C. Larsen	T4-08	X			
D. D. Tate	L6-37				X
R. W. Truitt	L6-37	X			
R. R. True	T4-07	X			
R. P. Tucker	T4-08				X
S. O. Smith / A. C. Zuehlke	L6-37	X			
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Central Files	B1-07	X			

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5. Proj /Prog./Dept./Div.: 241SY101 Mitigation Project		6. Design Authority / Cog. Engr.: GJ Gauck		7. Purchase Order No.: N/A	
8. Originator Remarks: This ATP tests the 241SY101 DACS software following changes designed to monitor and prevent thermocouple module halt failures. (Reference: DACS change control board System Change Request #427)				9. Equip./Component No.: Software: TEST305, PLC306	
				10. System/Bldg./Facility: 241SY101 DACS Trailer	
11. Receiver Remarks: Reference USQ: TF-97-0929				12. Major Assm. Dwg. No.: N/A	
				13. Permit/Permit Application No.: N/A	
				14. Required Response Date: 11/7/97	

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1	HNF-1516		0	Thermocouple Module Halt Failure Acceptance Test Procedure for Tank 241-SY-101 DACS-1	SQ	I	I	

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	2. Release	5. Post-Review	6. Dist. (Receipt Acknow. Required)	2. Approved w/comment	5. Reviewed w/comment
	3. Information	6. Dist. (Receipt Acknow. Required)		3. Disapproved w/comment	6. Receipt acknowledged

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Design Authority	/	WG Ermi	<i>Walter Ermi</i>	11/18/97	LA-37						
Design Agent	/	AM Ermi	<i>AM Ermi</i>	10/29/97	LA-37						
Cog Eng	/	GJ Gauck	<i>GJ Gauck</i>	11/21/97	74-07						
Cog Mgr.	/	J.L. Homan	<i>J.L. Homan</i>	12-3-97	74-08						
QA	/	RR True	<i>RR True</i>	12-2-97	74-07						
Safety	/	LS Krogsrud	<i>LS Krogsrud</i>	12/2/97	74-07						
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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE FOR TANK 241-SY-101 DACS-1

**A. M. Ermi**

SGN Eurisys Services Corporation, P.O. Box 840, Richland, WA 99352  
U.S. Department of Energy Contract DE-AC06-96RL13200

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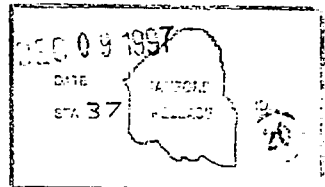
Key Words: DACS, DATA ACQUISITION AND CONTROL SYSTEM, 241SY101,  
ACCEPTANCE TEST PLAN, THERMOCOUPLE

Abstract: The readiness of the Tank 241-SY-101 Data Acquisition and Control System (DACS-1) to provide monitoring and alarms for a halt failure of any thermocouple module will be tested during the performance of this procedure. Updated DACS-1 "I/O MODULE HEALTH STATUS", "MININ1", and "MININ2" screens, which now provide indication of thermocouple module failure, will also be tested as part of this procedure.

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*A. M. Ermi (Signature)* *12-9-97*  
Release Approval Date

Release Stamp

Approved for Public Release



HNF-1516  
Revision 0

**Thermocouple Module Halt Failure  
Acceptance Test Procedure  
For Tank 241-SY-101 DACS-1**

October 1997

Prepared by:

A. C. Zuehlke,  
PLCs Plus

Prepared for:

G. J. Gauck,  
Lockheed Martin Hanford Corporation

# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

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# THEMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

## 1.0 PURPOSE/SCOPE

The readiness of the Data Acquisition and Control System (DACS) to provide monitoring and alarms for a halt failure of any thermocouple module will be tested during the performance of this procedure.

Updated DACS "I/O MODULE HEALTH STATUS", "MININ1", and "MININ2" screens, which now provide indication of thermocouple module failure, will also be tested as a part of this procedure.

## 2.0 REFERENCES

- 2.1 HSR-CM, Rev. 2, Hanford Site Radiological Control Manual
- 2.2 LAUR-92-3196, "Safety Assessment for Proposed Pump Operation to Mitigate Episodic Gas Releases in Tank 241-SY-101"
- 2.3 Hanford Site Policies and Procedures, Occupational Safety and Health
- 2.4 HNF-PRO-423, Radiological Work Permit
- 2.5 HNF-PRO-440, Engineering Document Change Control Requirements
- 2.6 HNF-PRO-446, Testing Practices Requirements
- 2.7 WHC-IP-0263-TF, Westinghouse Hanford Company Building Emergency Plan, Appendix C, "S-Farm Complex"
- 2.8 HNF-IP-0842, Waste Tank Project Administration, Volume 2, Section 4.9.1, "Lockout-Tagout"
- 2.9 WHC-SD-WM-HSP-002, Tank Farm Health and Safety Plan

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# THEMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

## 3.0 RESPONSIBILITIES

The following personnel will be required for the performance of this procedure:

- **Cognizant Engineer:** The individual assigned direct responsibility for the preparation, performance, and adequacy of the test. Also responsible for final approval of resolutions for all exceptions on Attachment 1, "Exception List".
- **Test Director:** The engineer assigned shift responsibility for performance of the test.
- **Test Engineer:** The engineer assigned to assist and relieve the Test Director during the performance of the test.
- **Field Engineer:** A Test Director, Test Engineer, or Technician assigned to direct/verify testing activities outside of the DACS trailer.

Only personnel designated by the Shift Operations Manager are allowed to direct testing per this procedure, and perform operating and control functions using the DACS computer systems.

One engineer acting as either a Test Director or as a Test Engineer is required to be present in the DACS trailer. One engineer or technician acting as a Field Engineer and one or more Instrument Technicians and/or Electricians are required to inject test signals from outside of the DACS trailer.

If, during testing, any indicated parameter, control function, or screen display is not correct or appears to be malfunctioning, then the engineer conducting this test shall make a determination as to the feasibility of continuing testing. In most cases, since actual mixer pump motor operation will not occur during this test, there will be no safety impact to continuing the test and completing corrective actions later. A record of all noted deficiencies will be kept on Attachment 1, "Exception List".

At the completion of all testing, approval of all data collected and DACS system performance shall be documented on Attachment 3, "Final Procedure Acceptance Sheet".

All changes to this procedure shall be implemented by ECN, and shall receive the approval signatures appropriate to the approval designation of the change.

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## 4.0 DESCRIPTION OF THE SYSTEM

The DACS, which is housed in a trailer located just outside of the north fence at the SY tank farm, receives input signals from a variety of sensors located in and around the SY-101 tank. These sensors provide information such as:

- Tank vapor space and ventilation system  $H_2$  concentration
- Tank waste temperature
- Tank pressure
- Waste density
- Operating pump parameters such as speed, flow, rotational position, discharge pressure, and internal temperature
- Waste level

The output of these sensors is conditioned and transmitted to the DACS computers where these signals are displayed, recorded, and monitored for out-of-specification conditions.

This procedure will test signals transmitted to the DACS from various MIT and Tank Bottom and Side Thermocouples (TBST), and verify proper indication and alarms should the I/O modules associated with these thermocouples experience a "halt" failure.

## 5.0 TEST CONDITIONS AND EQUIPMENT REQUIRED

5.1 The provisions of the following manuals apply to all work performed under this procedure:

- HSR-CM, Rev. 2, Hanford Site Radiological Control Manual
- Hanford Site Policies and Procedures, Occupational Safety and Health
- HNF-PRO-423, Radiological Work Permit
- WHC-SD-WM-HSP-002, Tank Farm Health and Safety Plan

5.2 Lock and Tag Control

Locks and Tags shall be posted as required by HNF-TP-0842, Waste Tank Project Administration, Volume 2, Section 4.9.1, "Lockout/Tagout"

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

## 5.3 Jumpers and Lifted Leads

In this procedure, there are some occasions when leads will be lifted and landed at various terminals. Some of these leads will be energized. All required hand and eye protection shall be worn, and insulated tools shall be used, when working on energized circuits (< 50 Vac). Testing must be conducted with energized instrument leads to correctly simulate a sensor input signal from the sensor to the DACS computers.

## 5.4 Unexpected Alarms

If unexpected, non-DACS, tank farm equipment alarms or abnormal indications are received during testing at the DACS trailer or in the SY tank farm, then SY-101 testing evolutions shall be immediately suspended and actions, as prescribed in approved Tank Farms Alarm Response and Emergency Procedures, shall be taken by Tank Farms Operations personnel to place the equipment/farm in a safe, stable condition. When the reason for the unexpected condition is understood and resolved, then SY-101 testing activities may be resumed after permission to do so is received from the responsible West Area Shift Manager (WASM) and the Cognizant Engineer.

## 5.5 Prior to initiation of testing, the following items shall be verified:

5.5.1 The changed version of the software has been loaded on the DACS trailer computers and the software has been released for testing.

Verified by: D. L. [Signature] 12/27/88  
(Test Director) Date

## 5.6 Prior to initiation of testing, the following equipment shall be available for use:

5.6.1 Insulated hand tools normally required for accessing equipment cabinets and terminal boards

5.6.2 Any anti-contamination clothing and/or other personnel safety equipment required for access to the SY tank farm, and to perform work on energized equipment (< 50 Vac)

5.6.3 Radios (2 minimum) or other means of communications, for communicating between the DACS trailer and the SY tank farm

5.7 Omega CL-24, Thermocouple Calibrator, capable of generating a 0.397 to 3.819 mV DC (50 °F to 200 °F) signal, required for providing input signals for thermocouple sensor channels to be tested

5.8 MIT Type K Thermocouple Test Box

5.9 Attachment 2, "Measurement and Test Equipment Record Sheet", is included in Section 8.0 for recording data associated with M & TE used during the performance of this procedure.

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

## 6.0 ACCEPTANCE TEST

### 6.1 Thermocouple Module "Halt" Failure Initiation Test

- 6.1.1 If any discrepancy is noted during testing, then record a description of the condition in Attachment 1.
- 6.1.1.1 For each discrepancy recorded, enter an identifying number in the "EXCEPTION NUMBER" Column of Attachment 1.
- 6.1.1.2 Reproduce Attachment 1 as needed, and attach the additional pages to this procedure, to record all discrepancies noted during testing.

**NOTE:** The thermocouple module "halt" failure condition was caused by two successive, complete loss-of-power evolutions to both the Primary and Standby PLCs in the DACS trailer. The software changes being tested by this ATP prevent the condition from happening again, regardless of the number of loss-of-power evolutions which could occur in the future. Testing per this procedure will cause two successive loss-of-power evolutions and verify that the thermocouple module "halt" failure does not occur.

- 6.1.2 At Station #5, display the "ALARM/EVENT SUMMARY" screen.
- 6.1.3 At Station #6, display the "I/O HEALTH STATUS" screen.
- 6.1.4 At Station #7, display the "MININ1" screen.
- 6.1.5 At Station #1, access the Modsoft program and verify that the displayed status for the following tags is "0":
- TC1CFGERR: Address: 438
  - TC2CFGERR: Address: 447
  - TC3CFGERR: Address: 456
  - TC4CFGERR: Address: 467
  - TC5CFGERR: Address: 476
  - TC6CFGERR: Address: 485
  - TC7CFGERR: Address: 236
  - TC8CFGERR: Address: 565
  - TC9CFGERR: Address: 574
- 6.1.6 Verify that no I/O module health status alarms are displayed on the "ALARM/EVENT SUMMARY" screen.
- 6.1.7 At the instrumentation rack in the back of the DACS trailer, turn-off the power to the Primary PLC and, within one second, turn-off power to the Standby PLC.

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

- 6.1.8 After 30 seconds, turn-on power to the Primary PLC and, within one second, turn-on power to the Standby PLC.
- 6.1.9 After 30 seconds, turn-off the power to the Primary PLC and, within one second, turn-off power to the Standby PLC.
- 6.1.10 After 30 seconds, turn-on power to the Primary PLC and, within one second, turn-on power to the Standby PLC.
- 6.1.11 Observe the DACS screens at Stations 5, 6, and 7 for a minimum of 1 minute and verify that no I/O module health status alarms are received.
- 6.1.12 At Station #1, verify that the displayed status for the following tags is "0":
- TC1CFGERR: Address: 438
  - TC2CFGERR: Address: 447
  - TC3CFGERR: Address: 456
  - TC4CFGERR: Address: 467
  - TC5CFGERR: Address: 476
  - TC6CFGERR: Address: 485
  - TC7CFGERR: Address: 236
  - TC8CFGERR: Address: 565
  - TC9CFGERR: Address: 574

Testing as directed by this procedure section has been completed, and discrepancies, if any, have been listed on Attachment 1, Exception List.

Test Engineer: D.C. Lusk Date: 2/24/98

## 6.2 DACS Display Screen Checks

- 6.2.1 If any discrepancy is noted during testing, then record a description of the condition in Attachment 1.
- 6.2.1.1 For each discrepancy recorded, enter an identifying number in the "EXCEPTION NUMBER" Column of Attachment 1.
- 6.2.1.2 Reproduce Attachment 1 as needed, and attach the additional pages to this procedure, to record all discrepancies noted during testing.
- 6.2.2 At Station #7, verify on the "MININ1" and "MININ2" screens that all 22 of the "TIR17BXX" tags (associated with the 17B MIT) are displayed in WHITE letters.
- 6.2.3 At Station #1, disable tag "TC1CFGERR" and change the tag status to "1".
- 6.2.4 At Station #5, verify that the "DIG 17CTCERR MIT17C I/O MODULE HALT ERROR" alarm is displayed.

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

- 6.2.5 At Station #6, verify that a GREEN "OK" and a YELLOW "E" are displayed in the status block for Drop 4, Rack 2, Slot 4. ✓
- 6.2.6 At Station #1, enable tag "TC1CFGERR" and verify that the status returns to "0". ✓
- 6.2.7 At Station #5, verify that the "DIG 17CTCERR MIT17C I/O MODULE HALT ERROR" alarm is clear. ✓
- 6.2.8 At Station #6, verify that the YELLOW "E" is no longer visible in the block for Drop 4, Rack 2, Slot 4. ✓
- 6.2.9 At Station #1, disable tag "TC2CFGERR" and change the tag status to "1". ✓
- 6.2.10 At Station #5, verify that the "DIG 17CTCERR MIT17C I/O MODULE HALT ERROR" alarm is displayed. ✓
- 6.2.11 At Station #6, verify that a GREEN "OK" and a YELLOW "E" are displayed in the status block for Drop 4, Rack 2, Slot 5. ✓
- 6.2.12 At Station #1, enable tag "TC2CFGERR" and verify that the status returns to "0". ✓
- 6.2.13 At Station #5, verify that the "DIG 17CTCERR MIT17C I/O MODULE HALT ERROR" alarm is clear. ✓
- 6.2.14 At Station #6, verify that the YELLOW "E" is no longer visible in the block for Drop 4, Rack 2, Slot 5. ✓
- 6.2.15 At Station #1, disable tag "TC3CFGERR" and change the tag status to "1". ✓
- 6.2.16 At Station #5, verify that the "DIG 17CTCERR MIT17C I/O MODULE HALT ERROR" alarm is displayed. ✓
- 6.2.17 At Station #6, verify that a GREEN "OK" and a YELLOW "E" are displayed in the status block for Drop 4, Rack 2, Slot 6. ✓
- 6.2.18 At Station #1, enable tag "TC3CFGERR" and verify that the status returns to "0". ✓
- 6.2.19 At Station #5, verify that the "DIG 17CTCERR MIT17C I/O MODULE HALT ERROR" alarm is clear. ✓
- 6.2.20 At Station #6, verify that the YELLOW "E" is no longer visible in the block for Drop 4, Rack 2, Slot 6. ✓

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

- 6.2.21 At Station #1, disable tag "TC4CFGERR" and change the tag status to "1". ✓
- 6.2.22 At Station #5, verify that the "DIG TBSTCERR TBS I/O MODULE HALT ERROR" alarm is displayed. ✓
- 6.2.23 At Station #6, verify that a GREEN "OK" and a YELLOW "E" are displayed in the status block for Drop 13, Rack 1, Slot 4. ✓
- 6.2.24 At Station #1, enable tag "TC4CFGERR" and verify that the status returns to "0". ✓
- 6.2.25 At Station #5, verify that the "DIG TBSTCERR TBS I/O MODULE HALT ERROR" alarm is clear. ✓
- 6.2.26 At Station #6, verify that the YELLOW "E" is no longer visible in the block for Drop 13, Rack 1, Slot 4. ✓
- 6.2.27 At Station #1, disable tag "TC5CFGERR" and change the tag status to "1". ✓
- 6.2.28 At Station #5, verify that the "DIG TBSTCERR TBS I/O MODULE HALT ERROR" alarm is displayed. ✓
- 6.2.29 At Station #6, verify that a GREEN "OK" and a YELLOW "E" are displayed in the status block for Drop 13, Rack 1, Slot 5. ✓
- 6.2.30 At Station #1, enable tag "TC5CFGERR" and verify that the status returns to "0". ✓
- 6.2.31 At Station #5, verify that the "DIG TBSTCERR TBS I/O MODULE HALT ERROR" alarm is clear. ✓
- 6.2.32 At Station #6, verify that the YELLOW "E" is no longer visible in the block for Drop 13, Rack 1, Slot 5. ✓
- 6.2.33 At Station #1, disable tag "TC6CFGERR" and change the tag status to "1". ✓
- 6.2.34 At Station #5, verify that the "DIG TBSTCERR TBS I/O MODULE HALT ERROR" alarm is displayed. ✓
- 6.2.35 At Station #6, verify that a GREEN "OK" and a YELLOW "E" are displayed in the status block for Drop 13, Rack 1, Slot 6. ✓
- 6.2.36 At Station #1, enable tag "TC6CFGERR" and verify that the status returns to "0". ✓

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

- 6.2.37 At Station #5, verify that the "DIG TBSTCERR TBS I/O MODULE HALT ERROR" alarm is clear. ✓
- 6.2.38 At Station #6, verify that the YELLOW "E" is no longer visible in the block for Drop 13, Rack 1, Slot 6. ✓
- 6.2.39 At Station #1, disable tag "TC7CFGERR" and change the tag status to "1". ✓
- 6.2.40 At Station #5, verify that the "DIG 17BTCERR MIT17B I/O MODULE HALT ERROR" alarm is displayed. ✓
- 6.2.41 At Station #6, verify that a GREEN "OK" and a YELLOW "E" are displayed in the status block for Drop 4, Rack 1, Slot 7. ✓

**NOTE:** In order to check the display screens for all of the MIT17B thermocouple tags, the "MININ2" screen must be accessed at Station #7 also.

- 6.2.42 At Station #7, verify that the information for the following MIT17B tags is displayed in RED letters: ✓
- TIR17B01
  - TIR17B04
  - TIR17B07
  - TIR17B10
  - TIR17B13
  - TIR17B16
  - TIR17B19
  - TIR17B22
- 6.2.43 Verify that the information for the other MIT17B tags is displayed in WHITE letters. ✓
- 6.2.44 At Station #1, enable tag "TC7CFGERR" and verify that the status returns to "0". ✓
- 6.2.45 At Station #5, verify that the "DIG 17BTCERR MIT17B I/O MODULE HALT ERROR" alarm is clear. ✓
- 6.2.46 At Station #6, verify that the YELLOW "E" is no longer visible in the block for Drop 4, Rack 1, Slot 7. ✓
- 6.2.47 At Station #1, disable tag "TC8CFGERR" and change the tag status to "1". ✓
- 6.2.48 At Station #5, verify that the "DIG 17BTCERR MIT17B I/O MODULE HALT ERROR" alarm is displayed. ✓
- 6.2.49 At Station #6, verify that a GREEN "OK" and a YELLOW "E" are displayed in the status block for Drop 4, Rack 2, Slot 3. ✓

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

- 6.2.50 At Station #7, verify that the information for the following MIT17B tags is displayed in RED letters:
- TIR17B02
  - TIR17B11
  - TIR17B20
  - TIR17B05
  - TIR17B14
  - TIR17B08
  - TIR17B17
- 6.2.51 Verify that the information for the other MIT17B tags is displayed in WHITE letters. ✓
- 6.2.52 At Station #1, enable tag "TC8CFGERR" and verify that the status returns to "0". ✓
- 6.2.53 At Station #5, verify that the "DIG 17BTCERR MIT17B I/O MODULE HALT ERROR" alarm is clear. ✓
- 6.2.54 At Station #6, verify that the YELLOW "E" is no longer visible in the block for Drop 4, Rack 2, Slot 3. ✓
- 6.2.55 At Station #1, disable tag "TC9CFGERR" and change the tag status to "1". ✓
- 6.2.56 At Station #5, verify that the "DIG 17BTCERR MIT17B I/O MODULE HALT ERROR" alarm is displayed. ✓
- 6.2.57 At Station #6, verify that a GREEN "OK" and a YELLOW "E" are displayed in the status block for Drop 4, Rack 2, Slot 7. ✓
- 6.2.58 At Station #7, verify that the information for the following MIT17B tags is displayed in RED letters:
- TIR17B03
  - TIR17B12
  - TIR17B21
  - TIR17B06
  - TIR17B15
  - TIR17B09
  - TIR17B18
- 6.2.59 Verify that the information for the other MIT17B tags is displayed in WHITE letters. ✓
- 6.2.60 At Station #1, enable tag "TC9CFGERR" and verify that the status returns to "0". ✓
- 6.2.61 At Station #5, verify that the "DIG 17BTCERR MIT17B I/O MODULE HALT ERROR" alarm is clear. ✓
- 6.2.62 At Station #6, verify that the YELLOW "E" is no longer visible in the block for Drop 4, Rack 2, Slot 7. ✓

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

6.2.63

At Station #7, verify on the "MININ1" and "MININ2" screens that all 22 ✓  
of the "TIR17BXX" tags (associated with the 17B MIT) are displayed in  
WHITE letters.

Testing as directed by this procedure section has been completed, and discrepancies, if any, have  
been listed on Attachment 1, Exception List.

Test Engineer: *[Signature]* Date: 2/24/90

## 6.3 Instrumentation End-To-End Checks (17B MIT)

**NOTE:** Performance of the steps in this procedure section requires that no other conflicting activities are  
taking place in the Control Area of the DACS trailer in conjunction with the testing to be  
performed, and that the computers and monitors at Stations #5, #6, and #7 are available to  
support this test section.

- 6.3.1 If any discrepancy is noted during testing, then record a description of the condition  
in Attachment 1.
- 6.3.1.1 For each discrepancy recorded, enter an identifying number in the  
"EXCEPTION NUMBER" Column of Attachment 1.
- 6.3.1.2 Reproduce Attachment 1 as needed, and attach the additional pages to this  
procedure, to record all discrepancies noted during testing.
- 6.3.2 At Station #5, display the "MIT17B" screen.
- 6.3.3 At Station #6, display the "TEMPALM" screen.
- 6.3.4 At Station #7, display the "SUMMARY" screen.

**NOTE:** Steps for testing sensors in this section are written generically. Steps shall be repeated as  
necessary until required testing is complete.

Sensors shall be tested one at a time, until all have been tested.

Test signals shall be applied to the cable connector going to the I/O Module or DACS trailer,  
NOT back to the sensor.

- 6.3.5 Establish communications between field personnel in the SY tank farm and the Test  
Engineer in the DACS trailer.

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## THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

✓ 6.3.6

If testing in this section requires more than one shift to complete, then perform Steps 6.3.45 through 6.3.49 at the end of each shift.

**NOTE:** The Test Engineer in the DACS trailer shall direct the performance of the activities in this section.

✓ 6.3.7

If necessary to complete testing, disable the ABORT coils associated with any 101-SY instruments that are sending erratic signals, are out-of-service, or are inoperable, at Station #1.

**NOTE:** Sensors may be tested in any order, at the discretion of the Test Director.

✓ 6.3.8

Record the current value displayed for all 17B MIT sensors on Station #7, in the "B:" block in the "DACS READING" Column, on the appropriate data sheet.

✓ 6.3.9

Direct field personnel to disconnect the 17B MIT 55-pin connector at the MIT, ensure that the MIT Type K Thermocouple Test Box (test box) selector switch is in the OFF position, and connect the test box to the cable going to the GMS shack.

6.3.10

Direct field personnel to connect the thermocouple calibrator to the test box input jack.

6.3.11

Refer to the "DACs Tag" Column of the data sheets to locate the tag # of the sensors to be tested.

6.3.12

Locate the DACs tag # of the sensor to be tested at Stations #5, #6, and #7.

6.3.13

Refer to the "SELECTOR SWITCH POSITION #" Column of the data sheets, to direct field personnel in determining the correct switch position for the sensor to be tested.

6.3.14

Direct field personnel to position the selector switch for the sensor to be tested.

6.3.15

Direct field personnel to set the output of the thermocouple calibrator to the value listed in the "F:" block in the "LOW END READING" Column, on the respective data sheet.

6.3.16

Observe the current value displayed at Station #7 for the sensor being tested, and record the reading in the "D:" block of the "LOW END READING" Column.

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## THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

- 6.3.17 Direct field personnel to slowly increase the output of the thermocouple calibrator to the value listed in the "F:" block in the "MID RANGE READING" Column of the respective data sheet.
- 6.3.18 Observe the current value displayed at Station #7 for the sensor being tested, and record the reading in the "D:" block in the "MID RANGE READING" Column of the respective data sheet.
- 6.3.19 Direct field personnel to slowly increase the output of the thermocouple calibrator to the value listed in the "F:" block in the "HIGH END READING" Column of the respective data sheet.
- 6.3.20 Observe the current value displayed at Station #7 for the sensor being tested, and record the reading in the "D:" block in the "HIGH END READING" Column of the respective data sheet.

**NOTE:** Expected alarm and abort setpoints are listed in parenthesis in the "AL:" and "AB:" blocks respectively, in the ALARM/ABORT VALUES (DACS) column of the respective data sheet.

- 6.3.21 Direct field personnel to slowly reduce the output of the thermocouple calibrator to a value below the alarm setpoint (AL:), listed in the ALARM/ABORT VALUES (DACS) column of the respective data sheet for the sensor being tested.
- 6.3.22 At Station #5, ensure that any alarms associated with the sensor being tested are clear ("ALARM/EVENT SUMMARY" screen).
- 6.3.23 Direct field personnel to slowly increase the output of the thermocouple calibrator until the associated alarm is actuated.
- 6.3.24 If the setpoint at which the alarm actuated is uncertain, then repeat Steps 6.3.21 through 6.3.23 until the alarm setpoint has been satisfactorily determined, then goto Step 6.3.25.
- 6.3.25 At Station #5 verify:
- The displayed value for the sensor being tested is approximately equal to the value listed for the sensor in parenthesis in the "AL:" block on the data sheet.
  - The displayed value is enclosed by a flashing YELLOW box.
  - A visual and audible alarm have been received for the sensor being tested.

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

- 6.3.26 Acknowledge the alarm to silence the audible horn.
- 6.3.27 At Station #6 verify:
- The displayed value for the sensor being tested is approximately equal to the value listed for the sensor in parenthesis in the "AL:" block on the data sheet.
  - The DACS tag # for the sensor being tested is displayed in RED letters.
- 6.3.28 At Station #7 verify that the displayed value for the sensor being tested is approximately equal to the value listed for the sensor in parenthesis in the "AL:" block on the data sheet.
- 6.3.29 Record the value at which the alarm actuated in the "AL:" block on the respective data sheet.
- 6.3.30 At Station #1, ensure that the abort coil associated with the sensor being tested is enabled.
- 6.3.31 Ensure that the E Stop circuitry is reset.
- 6.3.32 Direct field personnel to slowly increase the output of the thermocouple calibrator until the associated abort is actuated.
- 6.3.33 If the setpoint at which the abort actuated is uncertain, then reduce the output of the thermocouple calibrator to a value below the abort setpoint.
- 6.3.34 Repeat Steps 6.3.31 through 6.3.33 until the abort setpoint has been satisfactorily determined, then goto Step 6.3.35.
- 6.3.35 At Station #5 verify:
- The displayed value for the sensor being tested is approximately equal to the value listed for the sensor in parenthesis in the "AB:" block on the data sheet.
  - The displayed value is enclosed by a flashing YELLOW box.
  - A visual and audible alarm have been received for the sensor being tested.
- 6.3.36 Acknowledge the alarm to silence the audible horn.

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

- 6.3.37 At Station #6 verify:
- The displayed value for the sensor being tested is approximately equal to the value listed for the sensor in parenthesis in the "AB:" block on the data sheet.
  - The DACS tag # for the sensor being tested is displayed in RED letters.
  - A RED box is displayed to the left of the DACS tag # for the sensor being tested.
- 6.3.38 At Station #7 verify that the displayed value for the sensor being tested is approximately equal to the value listed for the sensor in parenthesis in the "AB:" block on the data sheet.
- 6.3.39 Verify that an E Stop trip has been actuated.
- 6.3.40 Record the value at which the abort actuated in the "AB:" block on the respective data sheet.
- 6.3.41 Direct field personnel to decrease the output of the thermocouple calibrator to a value below the sensor alarm setpoint.
- 6.3.42 At Station #5, verify that all alarms associated with the sensor that was tested are clear.
- 6.3.43 Initial the "INITIALS" column for the sensor that was tested, if the test was completed satisfactorily.
- 6.3.44 Repeat Steps 6.3.11 through 6.3.43, as necessary, until all 17B MIT sensors listed on the data sheets have been tested, then goto Step 6.3.45.
- ✓ 6.3.45 Direct field personnel to ensure that the test box selector switch is in OFF and that the thermocouple calibrator has been disconnected from the test box.
- ✓ 6.3.46 Direct field personnel to disconnect the test box from the MIT 55-pin connector and to reinstall the 55-pin connector onto the 17B MIT.
- ✓ 6.3.47 Record the current value displayed on Station #7, for each sensor that was tested, in the "A:" block in the "DACs READING" Column on the appropriate data sheet.
- ✓ 6.3.48 Compare the pre-test (B:) and post-test (A:) readings taken in Step 6.3.8 and 6.3.47.

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

6.3.48.1 If the pre-test and post-test readings are NOT consistent, then record a description of the inconsistency in Attachment 1.

6.3.49 Ensure that the data sheets have been initialed for all sensors that have been tested.

Testing as directed by this procedure section has been completed, and discrepancies, if any, have been listed on Attachment 1, Exception List.

Test Engineer: A. Gauck Date: 2-25-98

## 6.4 Selected MIT17C and TBST Thermocouple End-To-End Checks

6.4.1 If any discrepancy is noted during testing, then record a description of the condition in Attachment 1.

6.4.1.1 For each discrepancy recorded, enter an identifying number in the "EXCEPTION NUMBER" Column of Attachment 1.

6.4.1.2 Reproduce Attachment 1 as needed, and attach the additional pages to this procedure, to record all discrepancies noted during testing.

6.4.2 Enter Level 3 passwords at Stations #5, #6, and #7.

**NOTE:** Station #8 will NOT be used during testing per this section. Mixer pump motor and directional drive system motor power supply circuit breakers may remain danger tagged OFF for performance of this test section.

6.4.3 At Station #5, display the "MIT17C" screen.

6.4.4 At Station #6, display the "SUMMARY" screen.

6.4.5 At Station #7, display the "TBSTC" screen.

**NOTES:** Steps for testing instruments in this section are written generically. Steps shall be repeated as necessary until required testing is complete.

Instruments shall be tested one at a time, until all have been tested.

In general, test signals should be applied to a lifted lead, and should be verified to be applied to the cable going to the I/O Module or DACS trailer, NOT back to the sensor.

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

- 6.4.6 Establish communications between field personnel in the SY tank farm and the Test Engineer in the DACS trailer.

**NOTES:** The Test Engineer at the DACS console shall direct the performance of the activities in this section.

Checks in this section may be performed in any order, by selecting the sensor to be tested and following the appropriate steps to establish the necessary prerequisite conditions.

- 6.4.7 Refer to the "DACs Tag" Column of the Test Data Sheets and locate the tag number of the sensor to be tested.
- 6.4.8 Refer to the "Input Signal Connectn Points" Column of the Data Sheets, to direct field personnel in locating the correct terminal(s) for the sensor to be tested.

## WARNING

All required hand and eye protection shall be worn, and insulated tools shall be used, when working on or near energized electrical circuits (<50 Vdc).

- 6.4.9 Direct field personnel to access the proper terminal board and locate the associated signal lead(s) for the sensor to be tested.
- 6.4.10 At Station #5 or #7, press the F2 key to display a "TAG" block in the lower portion of the screen.
- 6.4.11 Type in the DACS tag number for the sensor being tested.
- 6.4.12 Record the readout value displayed in the "AIN" block, in the "B:" block in the "DACs READING" Column, on the appropriate Data Sheet.
- 6.4.13 Direct field personnel to lift the lead(s) from the terminal board if necessary and connect the thermocouple calibrator.
- 6.4.14 Direct field personnel to set the output of the thermocouple calibrator to the value listed in the "F:" block in the "LOW END READING" Column, on the respective Data Sheet.
- 6.4.15 Observe the "AIN" value displayed at Station #5 or #7 for the sensor being tested, and record the reading in the "D:" block of the "LOW END READING" Column.

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

- 6.4.16 Direct field personnel to slowly increase the output of the thermocouple calibrator to the value listed in the "F:" block in the "MID RANGE READING" Column of the respective Data Sheet.
- 6.4.17 Observe the "AIN" value displayed at Station #5 or #7 for the sensor being tested, and record the reading in the "D:" block in the "MID RANGE READING" Column of the respective Data Sheet.
- 6.4.18 Direct field personnel to slowly increase the output of the thermocouple calibrator to the value listed in the "F:" block in the "HIGH END READING" Column of the respective Data Sheet.
- 6.4.19 Observe the "AIN" value displayed at Station #5 or #7 for the sensor being tested, and record the reading in the "D:" block in the "HIGH END READING" Column of the respective Data Sheet.
- 6.4.20 Direct field personnel to reconnect the sensor lead(s) to the proper terminal(s), if necessary.
- 6.4.21 Record the post-test sensor readout from the "Current Value" displayed on Station #5 or #7, for the instrument that was tested, in the "A:" block in the "DACS READING" Column on the appropriate Data Sheet.
- 6.4.22 Compare the pre-test (B:) and post-test (A:) readings taken in Steps 6.4.12 and 6.4.21.
- 6.4.22.1 If the pre-test and post-test readings are not consistent, then record a description of the inconsistency in Attachment 1.
- 6.4.23 Repeat Steps 6.4.7 through 6.4.22.1 to complete testing for sensors listed in the Test Data Sheets, then goto Step 6.4.24.
- 6.4.24 Direct field personnel to ensure that all leads are properly restored, and that all panels and covers have been restored to normal.
- 6.4.25 Initial all Data Sheets for sensors that have been successfully tested.

Testing as directed by this procedure section has been completed, and discrepancies, if any, have been listed on Attachment 1, Exception List.

Test Engineer: *J. Smith* Date: 2-25-98.

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

## 7.0 TEST DATA SHEETS

DACS TAG	FIELD TAG NUMBER	DESCRIPTION	SCALE/RANGE	SELECTOR SWITCH POSITION #	DACS READING	LOW END READING	MID RANGE READING	ALARM/ABORT VALUES (DACS)	HIGH END READING	INITIALS
TIR17B01	TE-101-SY-17B-01	TANK TEMP RISER 17B, LEVEL 4"	12.5 - 325 °F	1	B: 111.80	F: 71	F: 105	AL: 130.50 (130)	F: 139	A
					A: 111.40	D: 71.20	D: 105.50	AB: (135) 135.80	D: 139.60	
TIR17B02	TE-101-SY-17B-02	TANK TEMP RISER 17B, LEVEL 16"	12.5 - 325 °F	2	B: 114.40	F: 71	F: 105	AL: 130.40 (130)	F: 139	A
					A: 113.90	D: 71.70	D: 105.30	AB: (135) 135.90	D: 140.00	
TIR17B03	TE-101-SY-17B-03	TANK TEMP RISER 17B, LEVEL 28"	12.5 - 325 °F	3	B: 115.80	F: 71	F: 105	AL: 130.50 (130)	F: 139	A
					A: 115.30	D: 70.40	D: 104.40	AB: (135) 134.50	D: 139.70	
TIR17B04	TE-101-SY-17B-04	TANK TEMP RISER 17B, LEVEL 52"	12.5 - 325 °F	4	B: 117.30	F: 71	F: 105	AL: 130.50 (130)	F: 139	A
					A: 116.90	D: 71.9	D: 105.70	AB: (135) 134.00	D: 138.20	
TIR17B05	TE-101-SY-17B-05	TANK TEMP RISER 17B, LEVEL 76"	12.5 - 325 °F	5	B: 117.50	F: 71	F: 105	AL: 131.10 (130)	F: 139	A
					A: 117.20	D: 71.40	D: 105.30	AB: (135) 136.00	D: 138.60	

# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

DACS TAG	FIELD TAG NUMBER	DESCRIPTION	SCALE/RANGE	SELECTOR SWITCH POSITION #	DACS READING	LOW END READING	MID RANGE READING	ALARM/ABORT VALUES (DACS)	HIGH END READING	INITIALS
TIR17B06	TE-101-SY-17B-06	TANK TEMP RISER 17B, LEVEL 100"	12.5 - 325 °F	6	B: 117.20	F: 71	F: 105	AL: 130.30 (130)	F: 139	L
					A: 117.00	D: 71.00	D: 104.50	AB: 135.90 (135)	D: 140.00	
TIR17B07	TE-101-SY-17B-07	TANK TEMP RISER 17B, LEVEL 112"	12.5 - 325 °F	7	B: 117.20	F: 71	F: 105	AL: 130.80 (130)	F: 139	L
					A: 116.80	D: 71.80	D: 105.30	AB: (135) 134.80	D: 139.20	
TIR17B08	TE-101-SY-17B-08	TANK TEMP RISER 17B, LEVEL 124"	12.5 - 325 °F	8	B: 117.40	F: 71	F: 105	AL: (130) 131.00	F: 139	L
					A: 117.20	D: 71.70	D: 104.80	AB: (135) 135.40	D: 140.00	
TIR17B09	TE-101-SY-17B-09	TANK TEMP RISER 17B, LEVEL 148"	12.5 - 325 °F	9	B: 117.30	F: 71	F: 105	AL: 130.00 (130)	F: 139	L
					A: 117.00	D: 70.50	D: 105.80	AB: 134.60 (135)	D: 139.50	
TIR17B10	TE-101-SY-17B-10	TANK TEMP RISER 17B, LEVEL 172"	12.5 - 325 °F	10	B: 117.30	F: 71	F: 105	AL: 130.90 (130)	F: 139	L
					A: 116.90	D: 71.60	D: 105.00	AB: 134.90 (135)	D: 139.80	
TIR17B11	TE-101-SY-17B-11	TANK TEMP RISER 17B, LEVEL 196"	12.5 - 325 °F	11	B: 117.70	F: 71	F: 105	AL: 130.50 (130)	F: 139	L
					A: 117.40	D: 70.90	D: 104.90	AB: 134.90 (135)	D: 139.50	

# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

DACS TAG	FIELD TAG NUMBER	DESCRIPTION	SCALE/RANGE	SELECTOR SWITCH POSITION #	DACS READING	LOW END READING	MID RANGE READING	ALARM/ABORT VALUES (DACS)	HIGH END READING	INITIALS
TIR17B12	TE-101-SY-17B-12	TANK TEMP RISER 17B, LEVEL 208"	12.5 - 325 °F	12	D: 117.40	F: 71	F: 105	AL: (130) 130.5	F: 139	g
					A: 117.10	D: 71.40	D: 105.20	AB: (135) 135.5	D: 139.60	
TIR17B13	TE-101-SY-17B-13	TANK TEMP RISER 17B, LEVEL 220"	12.5 - 325 °F	13	B: 117.60	F: 71	F: 105	AL: (130) 131.20	F: 139	g
					A: 117.40	D: 71.80	D: 105.90	AB: (135) 135.80	D: 139.80	
TIR17B14	TE-101-SY-17B-14	TANK TEMP RISER 17B, LEVEL 232"	12.5 - 325 °F	14	B: 117.80	F: 71	F: 105	AL: (130) 130.9	F: 139	g
					A: 117.50	D: 71.80	D: 105.70	AB: (135) 135.0	D: 139.80	
TIR17B15	TE-101-SY-17B-15	TANK TEMP RISER 17B, LEVEL 244"	12.5 - 325 °F	15	B: 117.40	F: 71	F: 105	AL: (130) 130.70	F: 139	g
					A: 116.90	D: 71.6	D: 105.30	AB: (135) 134.70	D: 139.10	
TIR17B16	TE-101-SY-17B-16	TANK TEMP RISER 17B, LEVEL 268"	12.5 - 325 °F	16	B: 116.60	F: 71	F: 105	AL: (130) 130.70	F: 139	g
					A: 116.30	D: 70.70	D: 104.70	AB: (135) 135.40	D: 139.40	
TIR17B17	TE-101-SY-17B-17	TANK TEMP RISER 17B, LEVEL 292"	12.5 - 325 °F	17	B: 117.30	F: 71	F: 105	AL: (130) 130.20	F: 139	g
					A: 117.10	D: 71.30	D: 105.10	AB: (135) 134.80	D: 139.50	

# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

DACS TAG	FIELD TAG NUMBER	DESCRIPTION	SCALE/RANGE	SELECTOR SWITCH POSITION #	DACS READING	LOW END READING	MID RANGE READING	ALARM/ABORT VALUES (DACS)	HIGH END READING	INITIALS
TIR17B18	TE-101-SY-17B-18	TANK TEMP RISER 17B, LEVEL 326"	12.5 - 325 "F"	18	B: 117.10	F: 71	F: 105	AL: 130.20 (130)	F: 139	J
					A: 116.90	D: 71.20 <del>71.40</del>	D: 104.80	AD: 132.30 (135)	D: 139.2	
TIR17B19	TE-101-SY-17B-19	TANK TEMP RISER 17B, LEVEL 340"	12.5 - 325 "F"	19	B: 116.70	F: 71	F: 105	AL: 130.40 (130)	F: 139	J
					A: 116.50	D: 71.20	D: 105.10	AB: 135.30 (135)	D: 138.40 <del>135.30</del>	
TIR17B20	TE-101-SY-17B-20	TANK TEMP RISER 17B, LEVEL 364"	12.5 - 325 "F"	20	B: 110.70	F: 71	F: 105	AL: 130.20 (130)	F: 139	J
					A: 110.30	D: 71.30	D: 105.50	AB: 135.5 (135)	D: 139.40	
TIR17B21	TE-101-SY-17B-21	TANK TEMP RISER 17B, LEVEL 392"	12.5 - 325 "F"	21	B: 88.90	F: 71	F: 105	AL: 130.20 (130)	F: 139	J
					A: 88.50	D: 71.80	D: 105.30	AB: 135.30 (135)	D: 139.30	
TIR17B22	TE-101-SY-17B-22	TANK TEMP RISER 17B, LEVEL 402"	12.5 - 325 "F"	22	B: 81.30	F: 71	F: 105	AL: 130.70 (130)	F: 139	J
					A: 81.10	D: 71.40	D: 105.80	AB: 134.70 (135)	D: 139.00	



# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

DACS TAG	FIELD TAG NUMBER	DESCRIPTION	SCALE/RANGE	SIGNAL INPUT CONNECTN POINTS	DACS READING	LOW END READING	MID RANGE READING	ALARM/ABORT VALUES (DACS)	HIGH END READING	INITIALS
TIR17C07	TE-101-SY-17C-07	TANK TEMP RISER 17C, LEVEL 112"	70 - 140 °F	GMS1 TB 4 TERMS 7, 8	B: 117.30	F: 71	F: 105	AL: N/A	F: 139	L
					A: 117.00	D: 70.60	D: 104.20	AB: N/A	D: 138.80	
TIR17C18	TE-101-SY-17C-18	TANK TEMP RISER 17C, LEVEL 340"	70 - 140 °F	GMS1 TB 6 TERMS 16, 17	B: 116.30	F: 71	F: 105	AL: N/A	F: 139	L
					A: 115.80	D: 71.60	D: 104.90	AB: N/A	D: 138.80	
TIR17C20	TE-101-SY-17C-20	TANK TEMP RISER 17C, LEVEL 392"	70 - 140 °F	GMS1 TB 5 TERMS 19, 20	B: 87.60	F: 71	F: 105	AL: N/A	F: 139	L
					A: 87.10	D: 71.30	D: 105.30	AB: N/A	D: 138.40	
TBSTC10	TE-101 Pr 10	TANK BOTTOM THERMOCOUPLE	50-200 °F	TBX-101 +10 & -10	B: 80.0	F: 55	F: 125	AL: N/A	F: 195	L
					A: 80.0	D: 55.3	D: 125.3	AB: N/A	D: 193.6	
TBSTC17	TE-101 Pr 17	TANK BOTTOM THERMOCOUPLE	50-200 °F	TBX-101 +17 & -17	B: 96.2	F: 55	F: 125	AL: N/A	F: 195	L
					A: 96.3	D: 55.9	D: 124.4	AB: N/A	D: 194.8	
TBSTC24	TE-101 Pr 24	TANK BOTTOM THERMOCOUPLE	50-200 °F	TBX-101 +24 & -24	B: 140.0	F: 55	F: 125	AL: N/A	F: 195	L
					A: 140.0	D: 57.4	D: 124.8	AB: N/A	D: 195.5	

# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

## 8.0 ATTACHMENTS

Attachment 1, Exception List

Attachment 2, Measurement and Test Equipment Record Sheet

Attachment 3, Final Procedure Acceptance Sheet

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# THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

EXCEPTION NUMBER	STEP NUMBER	EXCEPTION DESCRIPTION	EXCEPTION RESOLUTION	RESOLUTION APPROVED BY:	DATE RESOLVED
①	6.1.6	2IMPE14Z in ABORT STATE, LOW PRESS DRE	① Unrelated to Software ATP Outside of Bounds of ATP Routine Work Requesting	L. Smith	2-25-98
		1.6PST - could be related to Software Change			
②	6.1.11	Received TBSTCERR I/O HALT ERROR.	② Alarm worked properly and performed as expected. Therefore resolution not required.	L. Smith	2-25-98
③	6.1.12	ERROR ON DES 485 = 1 TIED TO TE # 2	Step Numbers 6.1.11 and 6.1.12 results interpreted to include to note any/all alarms received during power cycling.	L. Smith	2-25-98.
④ STEPS 6.1.11 & 6.1.12 THE SYSTEM PERFORMED PROPERLY PROVIDING AN ALARM TO OPERATOR IF COMMUNICATIONS WITH THE MODULE ARE LOST DUE TO POWER CYCLING. THE SYSTEM <sup>250</sup> <del>PERFORMED PROPERLY</del> WOULD HAVE BEEN NO ALARMS AS OBSERVED IN THE SOFTWARE DEVELOPMENT LABORATORY. DURING PERFORMANCE OF ATP THE COMMUNICATION DISTANCES WERE MUCH GREATER IN THE FIELD AND COMMUNICATIONS WERE DISRUPTED BY THE ATP. THIS DISRUPTION WAS IDENTIFIED BY THE ALARM AS EXPECTED.					

J. C. Lemay 3/13/98

Attachment 1: Exception List

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# THEMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST PROCEDURE

Completion of this procedure has demonstrated that:

- The Data Acquisition and Control System (DACS) provides satisfactory monitoring and alarming of the thermocouple module halt failure.
- The modified DACS screens provide a satisfactory operator interface.
- A record of all noted deficiencies was kept on Attachment 1, Exception List, and all recorded exceptions have been resolved and the resolutions approved.

Approved by:

G.J. Gaudy 2-25-98  
G.J. Gaudy, Cognizant Engineer Date

Jeff A. Ranschaen  
Jeff Ranschaen for L.S. Krogsrud 2-25-98  
L.S. Krogsrud, Nuclear Safety Date

R.B. True 2/25/98  
R.B. True, Quality Assurance Date

Attachment 3: Final Procedure Acceptance Sheet

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## DISTRIBUTION SHEET

To	From LOCKHEED MARTIN HANFORD CORPORATION	Page 1 of 1
		Date MARCH 5, 1998
Project Title/Work Order THERMOCOUPLE MODULE HALT FAILURE ACCEPTANCE TEST REPORT FOR TANK		EDT No. 621176
		ECN No.

Name	MSIN	Text With All Attach.	Text Only	Attach./Appendix Only	EDT/ECN Only
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W. G. Brown	T4-07	X			
D. W. Crass	H6-11			X	
J. A. Ellingsworth	R2-87	X			
A. M. Ermi	L6-37	X			
G. J. Gauck	T4-08	X			
L. S. Krogsrud	T4-07	X			
D. C. Larsen	T4-08	X			
R. E. Larsen	T4-07	X		X	
D. D. Tate	L6-37			X	
R. W. Truitt	L6-37	X			
R. R. True	T4-07	X			
R. P. Tucker	T4-08			X	
S. O. Smith / A. C. Zuehlke	L6-37	X			
DACS Project File	L6-37	X			
Central Files	B1-07	X			