S

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 655998

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	M. J. Holm, Data Development and Interpretation, R2-12, 373-1098	[X] Yes [] No TF-99-0744	09/22/99
	6. Project Title/No./Work Order No.	7. Bldg./Sys./Fac. No.	8. Approval Designator
	Tank Monitor and Control System	2750E, B105	ESQ
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.)	10. Related ECN No(s).	11. Related PO No.
	HNF-3967, Rev. 3	N/A	N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change

13b. Design Baseline Document? [] Yes [X] No

The changes incorporated into the Acceptance Test Procedure will test Revision 11.2 of the Tank Monitor and Control System (TMACS) software.

14a. Justification (mark one)

Criteria Change	[X]	Design Improvement	[]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

14b. Justification Details

Changes to the Acceptance Test Procedure reflect changes incorporated into the software in Revision 11.2. These changes include modifying TMACS to read pressure sensors through the Communications Interface Unit device, changing some of the TMACS graphics and adding a report to indicate active sensors.

15. Distribution (include name, MSIN, and no. of copies)

See attached distribution.

RELEASE STAMP

DATE: NOV 09 1999

STA: 4

HANFORD RELEASE

ID: 2

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16. Design Verification Required	17. Cost Impact				18. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

21. Approvals

	Signature	Date
Design Authority	C. C. Scaief, III C. C. Scaief	11-3-99
Cog. Eng.	M. J. Holm	10-28-99
Cog. Mgr.	J. G. ~~Fisher~~ T. L. Bennington	11-8-99
QA	~~J. G. Sparks~~ P. L. Smith	11/8/99
~~Safety~~	~~L. E. Thomas~~ J. D. Gubersh.	11/8/99
Environ.	~~P. C. Miller~~ John D. Gubersh.	11/8/99
Other	R. P. Tucker	11-8-99
	D. A. Selle	11-8-99

	Signature	Date
Design Agent		
PE		
QA		
Safety		
Design		
Environ.		
Other		

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Data Development and Interpretation	Date 9/22/99
Project Title/Work Order Tank Monitor and Control System (TMACS) Acceptance Test Procedure (ATP) Revision 11.2		EDT No. N/A ECN No. 655998

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
D. A. Barnes	R2-12	X			
S. C. Cantrell	R3-47	X			
J. G. Field	R2-12	X			
M. J. Holm	R2-12	X			
P. C. Miller	R1-51	X			
D. A. Selle	S5-03	X			
~~J. S. Sparks~~ T.L. Bennington	~~S7-07~~ S5-15	X			
L. E. Thomas	R3-01	X			
R. P. Tucker	T4-07	X			
R. R. Wandling	R1-01	X			

Tank Monitor and Control System (TMACS) Acceptance Test Procedure

R. R. Wandling
Lockheed Martin Hanford Corporation, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

ECN: 655998 UC: 605
Org Code: 74B00 Charge Code: 102608/EB00
B&R Code: EW3120071 Total Pages: 92

Key Words: Acceptance Test Procedure, ATP, TMACS, Tank Monitor and Control System, Rev. 11.2.

Abstract: This document is used to validate Revision 11.2 of the Tank Monitor and Control System (TMACS) and verify its functions as intended by design.

11/8/99
Release Approval Date

DATE:
HANFORD RELEASE
STA: 4 ID: 2
NOV 09 1999
Release Stamp

Approved for Public Release

RECORD OF REVISION	(1) Document Number HNF-3967, Rev. 4	Page 1

(2) Title
Tank Monitor and Control System (TMACS) Acceptance Test Procedure for Revision 11.2.

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) HNF-3538 (EDT 625999)	M. J. Holm	N. W. Kirch
1	Complete revision per ECN 653556.	M. J. Holm	N. W. Kirch
2	Complete revision per ECN 654685.	M. J. Holm	K. M. Hall
3	Complete revision per ECN 654987.	M. J. Holm	K. M. Hall
4 RS	Complete revision per ECN 655998.	M. J. Holm	J. G. Field

TANK MONITOR AND CONTROL SYSTEM (TMACS) ACCEPTANCE TEST PROCEDURE

Prepared By
Ronald R. Wandling
Lockheed Martin Services Inc.

For

Lockheed Martin Hanford
For
US Department of Energy
Richland Operations Office
Richland, Washington

TABLE OF CONTENTS

1. INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe tests performed to validate Revision 11.2 of the TMACS Monitor and Control System (TMACS) and verify that the software functions as intended by design.

1.2 SCOPE

This document is intended to test the software portion of TMACS. The tests will be performed on the development system. The software to be tested is the TMACS knowledge bases (KB) and the I/O driver/services. The development system will not be talking to field equipment; instead, the field equipment is simulated using emulators or multiplexers in the lab.

1.3 SUPPORTING DOCUMENTS

- "Double-Shell Underground Waste Storage Tanks - Riser Survey," SD-RE-TI-093, Rev. 1, December 2, 1986.
- "Riser Configuration Document for Single-Shell Waste Tanks", SD-RE-TI-053, Rev. 8, August 22, 1991.
- "TMACS I/O Termination Point Listing", WHC-SD-WM-TI-594, Current Revision.
- "TMACS Data File Formats, Release 11.0," Lockheed Martin Services, Inc. External Letter, RGG-SDI-99-001.

1.4 SERVICE REQUESTS

The following are the services requests incorporated into the TMACS software for this release.

SR #	Abbreviated Description
103	Make the GSI Data Service Priority lower than the Processing Rule Priority
132	Add individual trend graphs for discrete sensors
166	Modify TMACS to display the color red for a K-Basin Communications Alarm
403	Modify TMACS to display the sensor limits for a sensor.
434	Modify TMACS To Read Pressure Sensors through ENRAF CIU device

SR #	Abbreviated Description
752	Modify The ENARF Driver To Properly Handle The "!" Commands
856	Devise A Method To Notify The Operator When An ENRAF Level Gauge Has A Status Other Than "-"
857	Correct Unknown Sensor Report To Display Only Sensors Associated With Tanks.
858	Modify The Suspect IO Station Report To Not Display Station With A Polling Frequency Of Zero.
860	Correct Problem Of Old Print Screen Button Being Displayed For Multiple Sensor Trends
862	Correct Problem Where Sensor With Alarm Processing Turn Off Do Not Restore To Correct Color When Communications Are Re-Established.
865	Set Polling Frequency Of Double Shell Tanks To 10 Minutes Or Less.
867	Add Ability To Place A Sensor Into Test Mode.
869	Configure TMACS To Have ENRAF Level Gauges For Tanks BY102 And S110
871	Change Gauge Addresses for ENRAF Level Devices in Tanks AP105-AP108
873	Create Report That Displays Active Sensors With Alarm Processing Disabled

2. RESPONSIBILITIES

Each organization participating in the conduct of this ATP will designate personnel to assume the responsibilities and duties as defined herein for their respective roles. Prior to the performance of this ATP these designees shall sign the ATP Participation Sheet.

2.1 TEST DIRECTOR

- Provides concurrence that the ATP may commence.
- Act as liaison between the test performance group and the test witnesses.
- Shall perform the test as described in this document.
- Record exceptions and test steps that are not performed on the ATP Exception Record sheets. Add additional Exception Record sheets as needed.
- Shall obtain final approval signatures and distribute copies of the ATP.

- Stop any test that, in the judgment of the Test Director, may cause damage to the system until the test procedure has been revised.

2.2 TEST PERFORMANCE GROUP

- Shall provide qualified personnel, tools and equipment required to perform test.

2.3 TEST WITNESS AND APPROVAL PERSONNEL

- Shall observe the testing and data recording to verify that their group's requirements are met.

If any representative of the witness and approval personnel objects to the results obtained during the acceptance test, he shall notify the Test Director. Any such notice, if not resolved directly to the representative's satisfaction, shall be recorded as an exception.

2.4 TEST RECORDER

- Get signatures on the Recorder's copy of the Acceptance Test Procedure Participation sheet prior to testing.
- Observe tests and record test data (if any).
- Initial every test step on the Recorder's copy as it is completed, next to the step number or table, when provided.
- Record exceptions and test steps, which are not performed on the Exception Sheet.
- Notify the Test Director of an exception at time the exception is made.
- Transfer Recorder's copy of the completed ATP with the final test results and signatures to the Test Director for Final Approval signatures and disposition.

2.5 FINAL APPROVAL

- Approval personnel shall indicate, by their signature on the ATP Acceptance Record Sheet that the ATP result's are accepted. Any questions or objections shall be referred to the Test Director for resolution.

If the approval personnel find an exception to the test that is of sufficiently small magnitude, a test approval may be given. In this case, a list of such exceptions shall be entered in the exception page as "Test Approved with Exceptions," signed and dated. **This signature shall**

indicate that the exceptions are of such a nature that a rerun of the ATP is not necessary to demonstrate that the exceptions have been adequately resolved.

2.6 OCCUPATIONAL SAFETY AND HEALTH

- Individuals shall perform their assigned tasks in a safe manner to protect themselves and others from undue hazards and to prevent damage to property and environment.

3. TEST PROCEDURE CHANGE CONTROL

Acceptance testing shall be conducted in accordance with the steps and requirements specified in this procedure. In the event minor changes are required to successfully complete the Acceptance Test Procedure the change shall be noted as an exception and testing continued, only if the change will not effect the test acceptance criteria. The exception shall be incorporated into this document in accordance with HNF-PRO-440, "Engineering Document Change Control, Requirements."

4. PREREQUISITES

This section describes the prerequisites required to perform this ATP. The section contains general prerequisites that apply to this test procedure as well as specific prerequisites for individual test procedures.

4.1 GENERAL

The following are the prerequisites for running any of the test sections described in this procedure.

1. The Test Director should bring up G2[1] with the TMACS_Main.KB and log in using the mode "t2-user" prior to running the formal test.

2. The Test Director should bring up a G2[∞] telewindows2 session and log in using the mode "t2-user" prior to running the formal test.

3. The Test Director should verify that following bridges/services are started as services on WindowsNT™.

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[1]G2 is a registered trademark of the Gensym Corporation.
[2]Telewindows is a registered trademark of the Gensym Corporation.

Common Name	Executable	Service Name
Acromag[3] I/O driver	Acromag_driver.exe	AcromagDriver 22200 AcromagDriver 22201 AcromagDriver 22202 AcromagDriver 22203 AcromagDriver 22204 AcromagDriver 22205
Alarm Printer driver	Tmacs_printer_driver.exe	TMACSPrtDriver 22300
Enraf® I/O driver	Enraf_driver.exe	EnrafDriver 22206
Panalarm[4] I/O driver	Panalm_driver.exe	PanalmDriver 22207
Westronic[5] I/O driver	Westronic.driver	WestronicDriver 22212
G2® ODBC Bridge		G2® ODBC Bridge

4. The Test Director shall have available the latest version of the following reference materials:

   - "TMACS I/O Termination Point Listing", (WHC-SD-WM-TI-594, current revision), document written by Instrument & Control (I&C). The electronic version is available at \\AP014\TMACS.

   - "Riser Configuration Document for Single-Shell Waste Tanks", (SD-RE-TI-053, Rev. 8).

   - Double-Shell Underground Waste Storage Tanks - Riser Survey", (SD-RE-TI-093, Rev. 1).

5. The serial multiplexers or emulators for the Acromag™, Enraf®, Panalarm,® and Westronic® devices are available. At least one serial multiplexer (or emulator) is attached to the test computer and that the appropriate driver can function through the appropriate serial port.

4.2 GRAPHICS

No additional prerequisites are needed.

4.3 TRENDING

To give a proper display of trending it is strongly advised that 1 or more days of history files be copied from production to the system to be tested (*give enough time for the files to be processed)* and run into the development TMACS.

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[3]Acromag is a trademark of Acromag Incorporated, Wixom, Michigan.
[4]Panalarm is a registered trademark of Ametek, Inc.
[5]Westronics is a registered trademark of Westronics, Inc.

4.4 REPORTS

No additional prerequisites are needed.

4.5 EXTERNAL INTERFACES

No additional prerequisites are needed.

4.6 POINT PROCESSING

1. This test requires the system to be in a state in which no other alarm activity is generated externally. The Test Director may need to disable the collection of sensor readings from the lab equipment and clear alarm messages generated by the system start up.

2. The individual Test Cases are built using tank "Test-201", which contains one discrete and one continuous sensor. The current values for these sensors are entered programmatically; the tests assume that the following parameters have been set for sensor Continuous-200001. Verify that the sensor has the parameters in Table 1.

Table 1. Parameters for Sensor Continuous-200001

Parameter	Value
High Instrument Limit	22
High Alarm Limit	15
Low Alarm Limit	10
Low Instrument Limit	4
Delta Band	0.0
Alarm Deadband	0.9
Rate of Change	1.2
ROC Limit	2.2

3. Verify that the discrete sensor, Discrete-200001, has the values for the parameters listed in Table 2.

Table 2. Parameters for Sensor Discrete-200001

State 0 = Normal	Color = Green	Annotation = OPEN
State 1 = Alarm	Color = Yellow	Annotation = CLOSING
State 2 = Alarm	Color = Red	Annotation = CLOSED
State 3 = Normal	Color = Green	Annotation = OPENING
High Instrument Limit > 3		Low Instrument Limit < 0

4. To set up the tests in this section the Test Director must:

- Load the testing knowledge base (KB)
- Bring up the Point Processing Functional Tests workspace
- Enter the test document revision number (i.e. 11.0).

5. The functional tests will be run individually in the test cases. The tester must be logged in to G2® in "administrator" mode.

4.7 PERFORMANCE

1. This purpose of this test section is to bench mark the production software using the development computer. The tests will be performed on the computer with the minimum TMACS processes running. The development computer will be running the following software during the test:

   - WindowsNT™ and related system programs that will be running in production
   - G2® with the production TMACS knowledge bases. There should be no data recovery operations in place during the test!!!
   - All driver services that would be running in production. None of these services should be receiving data from the field, lab, or emulators.

2. To set up the tests in this section the Test Director must:

   - Acknowledge all the alarms from the startup process
   - Load the testing knowledge base (KB)
   - Hide all the workspaces until only the G2® background bricks appear
   - Bring up the Point Processing Performance Tests workspace
   - Enter the test document revision number (i.e. 11.0).

4.8 LOGGING

The Test Director may want to start and have the TMACS system running overnight to create the automated data files for this test.

4.9 SERVICE REQUESTS

5. ACCEPTANCE CRITERIA

5.1 GENERAL

The system shall provide multiple security levels that are password protected.

5.2 GRAPHICS

The acceptance criteria for graphics is:

- Provide real-time display of numeric values of sensors
- Communicate with a minimum of 2 graphics CRTs
- Provide "PRINT" facility for graphic window displays.

5.3 TRENDING

The acceptance criteria trending is:

- Provide real-time trend graphs, with the following selected time intervals: 1 hour, 7 days.

5.4 REPORTS

The acceptance criteria is:

- Provide a list of active sensors that have not recorded a reading for the current day.
- Provide a list of sensors that are recording readings that are unreliable. (Status unknown)
- Provide a list of io-stations that are not reporting.

5.5 EXTERNAL INTERFACES

The system shall be capable of providing sensor information to the Surveillance Analysis Computer System (SACS) for sensors configured in both SACS and TMACS.

The acceptance criteria sensor conversion is:

- The system shall convert the data read by the field equipment in a user readable format.

5.6 POINT PROCESSING

The acceptance criteria trending is:

- Provide real-time alarming on high and low level for any analog point
- Provide alarm deadband filtering for analog points
- Display the following alarm colors: red for highest priority, requiring immediate action; yellow for an abnormal condition requiring attention but not an immediate hazard; white for status indication; green for normal condition

- Provide alarm summary display with date, time, tag, description, alarm status with color-coding (green for normal). Remove message from display upon acknowledgement and reset/return to normal

- Display tanks and sensors with unacknowledged alarms as blinking

- Provide operator alarm acknowledgement. Acknowledgement action shall cease blinking of alarmed item
- Provide logging of alarms, return to normal, and alarm acknowledgements, to printer and to disk

- Provide alarming when error codes are returned from data acquisition system.

5.7 PERFORMANCE

The acceptance criteria trending is:

- The TMACS G2® program shall process input from 50 points per second while using less than 80% of the CPU time.

5.8 LOGGING

The acceptance criteria trending is:

- The system shall have the capability to log any sensor value
- A sensor logging shall include the time stamp and the sensor's value.

5.9 SERVICE REQUESTS

The acceptance criteria for the service request (SR) are contained in the description of the SR. The test director will have available a copy of the service request for viewing.

6. TEST PROCEDURES

6.1 GENERAL

6.1.1 Startup

Note: The Test Director prior to witness testing may have completed this test.

Step	Perform	Verify	Initial
1.	Start TMACS On the TMACS screen, type Control-Y Edit the 'User' to be t2-user Edit the 'Password' to be the password for t2-user Edit the 'G2® user mode' to be t2-user	Verify the TMACS starts up (approximately ten minutes) and verify the following: • A message is displayed indicating what days worth of data is being recovered. • A status bar is displayed indicating what percentage of the days readings have been read into memory.	

6.1.2 Security (Telewindows® and Central Console)

Step	Action	Verify	Initial
1.	On the TMACS screen, type Control-Y.	Verify that the user mode selection workspace appears on the screen with "t2-user" in the name field.	
2.	Edit the 'G2® user mode' to be something other than t2-user or shut down. (i.e. "administrator".) Click on the END button in the user mode selection workspace.	Verify that TMACS does not enter selected mode.	
3.	Edit the 'G2® user mode' to be "t2-user" and click on the END button.	Verify that the user mode selection workspace disappears from the screen (indicating a successful login).	

6.2 GRAPHICS

This section is performed after the system has been started and the clock is functional. This test should be performed on both the main console and Telewindows®.

6.2.1 T2-User Abilities within TMACS

6.2.1.1 Central Console or Telewindows®

Step	Action	Verify	Initial
		Main Display	
1.	Click on the Show Main Display button on the Control Panel.	Verify that the following workspaces appear on the screen: • Control Panel. • Monitored Systems • Most Recent Alarm. • Hanford Tank Farm Facilities *Note: Working window (may appear if Data Recovery is still running)*	
2.	Attempt to move several objects chosen at random on the workspace by doing a click-and-drag.	Verify that they do not move.	
3.	Click anywhere in the empty space on each workspace.	Verify that no menus appear.	
		Tank Status Display	
4.	Click on the tank icon for any active tank.	Verify that the Tank Status workspace appears.	
5.	Click on the Shrink Window button on the Tank Status workspace.	Verify that the workspace size is reduced.	
6.	Move by dragging the Tank Status Window.	Verify that the workspace moves; verify that no part of the workspace can be moved off-screen.	
7.	Attempt to move several objects chosen at random on the Tank Status workspace by doing a click-and-drag.	Verify that none of the objects move.	
		Sensor Trend Display	
8.	Click on icon for any sensor. *Note: Reading and Label are not part of sensor icon.*	Verify that the trend workspace for that sensor appears.	

Step	Action	Verify	Initial
9.	Click at random at several places on the trend workspace.	Verify that no menu appears.	
10.	Attempt to move several objects chosen at random on the trend workspace.	Verify that none move.	
11.	Click on the Hide Workspace button on the trend workspace.	Verify that the workspace disappears.	
		Control Panel	
12.	Move Tank Status over a portion of the Control Panel workspace. Click on the background of the Control Panel workspace.	Verify that doing so brings the Control Panel to the top.	
13.	Click on the Hide Window button on the Tank Status workspace.	Verify that the workspace disappears.	
		Monitored Systems	
14.	Click on any button on the MONITORED SYSTEMS workspace.	Verify that the monitored system chosen workspace appears.	
15.	Click at random at several places on the workspace.	Verify that no menu appears.	
16.	Attempt to move several objects chosen at random on the workspace.	Verify that none move.	
17.	Click on the Hide Window button on the workspace.	Verify that the workspace disappears.	

6.2.1.2 Central Console Only

Step	Action	Verify	Initial
1.	Click on the Show Main Display button on the Control Panel.	Verify that the following workspaces appear on the screen: • Control Panel. • Monitored Systems • Most Recent Alarm. • Hanford Tank Farm Facilities *Note: Working window may appear if Data Recovery is still running.*	
2.	Click on the tank icon for any active tank.	Verify that the Tank Status workspace appears.	

Step	Action	Verify	Initial
	User Selectable Trends		
3.	Click on a TREND GRAPH button (located at the bottom of the Tank Workspace).	Verify that a User Configurable Trend Graph workspace appears.	
4.	Click at random at several places on the Trend Graph workspace.	Verify that no menu appears.	
5.	Attempt to move several objects chosen at random on the Trend Graph workspace	Verify that no objects move.	
6.	Click on the Hide Window button on the Trend Graph workspace.	Verify that the workspace disappears.	
7.	Click on the Hide Window button on the Tank Status workspace.	Verify that the workspace disappears.	
	Current Alarms		
8.	Click on the CURRENT ALARMS button on the Control Panel.	Verify that the Current Alarms workspace appears.	
9.	Click at random at several places on the Current Alarms workspace.	Verify that no menu appears.	
10.	Attempt to move several objects chosen at random on the Current Alarms workspace.	Verify that none move.	
11.	Click on the Hide Window button on the Current Alarms workspace.	Verify that the workspace disappears.	

6.2.2 Control Panel

6.2.2.1 Operation of the SHOW MAIN DISPLAY button

Step	Perform	Expected Result	Initial
1.	Click on any enabled Tank Icon in the Hanford Tank Farm Facilities. (The icon will not be gray.) *If the Tank Status Window is not already shrunk then click it's Shrink Window button*	Verify that a Tank Status workspace appears for the selected tank and that the Control Panel is visible.	

Step	Perform	Expected Result	Initial
	(an ▼ as a symbol).		
2.	**Click on the Show Main Display button on the Control Panel.**	Verify that the Tank Status workspace disappears. Verify that the following workspaces appear on the screen: • Hanford Tank Farm Facilities • Control Panel • Most Recent Alarm (may be partially covered by the Hanford Tank Farm Facilities workspace) • Monitored Systems *Note: Working window may appear if Data Recovery is still running.*	
3.	**Examine the TMACS display.**	Verify that the Control Panel workspace is located in the upper right-hand corner.	
		Verify that the following objects appear in the workspace in order, top to bottom: • Label "Control Panel" • SHOW MAIN DISPLAY button • CURRENT ALARMS button (Not available to Telewindows® sessions) • Number of Current Alarms digital display • Number of Sensor Testing digital display • HIDE SENSOR TRENDS button • REPORT MENU button • A date and time display	
		Verify that MONITORED SYSTEMS workspace is displayed on the middle right-hand side of the screen and is displaying the following: • AY/AZ Exhauster • C-106 Sluicing • K-Basins	
		Verify that the Most Recent Alarm workspace is in the lower right-hand corner and that the GOTO button appears at the top center of the workspace.	
		Verify that the Number of Current Alarms digital display is located at the top right of the Most Recent Alarm workspace.	
		Verify that the Hanford Tank Farm Facilities workspace occupies the left portion of the screen.	

Step	Perform	Expected Result	Initial
		Verify that a brown background appears behind these workspaces and that no other workspaces are visible.	

6.2.2.2 Operation of CURRENT ALARMS Button and Screen

Note: The CURRENT ALARMS button is not available in a Telewindows® session.

Step	Perform	Expected Result	Initial
1.	Click on the CURRENT ALARMS button on the Control Panel.	Verify that the Current Alarms workspace appears on the left-hand side of the screen and contains the following: • HIDE WINDOW (with an x as a symbol) • SHRINK WINDOW (*an ▼ as a symbol*) • EXPAND WINDOW (*an ▲ as a symbol*) • CURRENT-ALARMS title box • UP ONE ALARM • UP ONE PAGE • REFRESH ALARMS • DOWN ONE PAGE • DOWN ONE ALARM • GO TO TOP of LIST • GO TO END of LIST • ACKNOWLEDGE ALL WHITE ALARMS • ACKNOWLEDGE ALL BLUE MESSAGES	
Operation of the SHRINK WINDOW button			
2.	Note: If the Current Alarms workspace is already shrunk then expand first. Click on the SHRINK WINDOW button.	Verify the Current Alarms workspace: • Decreases in size • Moves to the left-hand side of the screen • Has space to show 10 alarms. (*Only 9 alarms will be visible if the first alarm in the list is visible.)*	
Operation of the EXPAND WINDOW button			
3.	Click on the EXPAND WINDOW button.	Verify the Current Alarms workspace: • Increases in size • Moves to the left-hand side of the screen • Has space to show 6 alarms. (*Only 5 alarms will be visible if the first alarm in the list is visible.)*	
Operation of the GO TO END of LIST WINDOW button			

Step	Perform	Expected Result	Initial
4.	Click on the GO TO END of LIST button	Verify the last page of current alarms is displayed	
	Operation of the UP ONE PAGE button		
5.	Click on the UP ONE PAGE button.	Verify the previous page of the current alarms is displayed.	
	Operation of the GO TO TOP of LIST button		
6.	Click on the GO TO TOP of LIST.	Verify the first page of current alarms is displayed.	
	Operation of the DOWN ONE PAGE button		
7.	Click on the DOWN ONE PAGE button.	Verify the next page of current alarms is displayed.	
	Operation of the UP ONE ALARM button		
8.	Click on the UP ONE ALARM button.	Verify that the alarm list is moved up one alarm.	
	Operation of the DOWN ONE ALARM button		
9.	Click on the DOWN ONE ALARM button.	Verify that the alarm list is moved down one alarm.	
	Operation of the REFRESH ALARMS button		
10.	Click on the REFRESH ALARMS button.	Verify the alarm display is updated.	
	Operation of the ALL WHITE ALARMS button		
11.	Click on the Acknowledge ALL WHITE ALARMS button. *(Note: May have to generate white alarms first)*	Verify the white alarms disappear from the alarm list and that the Number of Current Alarms is updated appropriately.	
	Operation of the ALL BLUE MESSAGES button		
12.	Click on the Acknowledge ALL BLUE MESSAGES button. *(Note: May have to generate blue alarms first)*	Verify the blue messages disappear from the alarm list.	
	Operation of the HIDE WINDOW button		
13.	Click on the HIDE WINDOW button	Verify that the workspace disappears	

6.2.2.3 Operation of the HIDE SENSOR TRENDS button

Step	Perform	Expected Result	Initial
1.	Click on an enabled Tank Icon on the Hanford Tank Farm Facilities workspace. (The icon will not be gray.)	Verify that the Tank Status workspace for this tank appears.	
2.	Click on several sensor trend icons selected at random.	Verify that Sensor Trend workspaces for the selected sensors appear.	
3.	Lift the Control Panel to the top by clicking in the blank background on the Control Panel workspace. Click on the HIDE SENSOR TRENDS button on the Control Panel.	Verify that the Tank Status workspace and any Sensor Trend workspaces are hidden.	

6.2.2.4 Operation of the REPORTS button

Step	Perform	Expected Result	Initial
1.	Click on the REPORT MENU button on the Control Panel.	Verify that the Report Menu workspace is displayed with a list of report buttons that includes the following: • Suspect Sensor Report • Suspect IO-Station Report • Unknown Sensor Report • ENRAF Non-Operating Mode Report • Sensor Disable Alarm Report • Sensor Enabled Test Report	
2.	Select a report at random. Click on the Title of the report.	Verify the Help workspace for the chosen report is displayed.	
3.	Click on the hide button.	Verify the workspace disappears.	
4.	Select a report at random Click on the button for the chosen report.	Verify the chosen report's workspace is displayed. *(Note: The verification of the report is performed elsewhere in this document.)*	
5.	Click on the hide button.	Verify the workspace disappears.	

Step	Perform	Expected Result	Initial
6.	Click on the hide button on Report Menu workspace.	Verify the workspace disappears.	

6.2.3 Hanford Tank Farm Facility

6.2.3.1 Operation of a TANK ICON button

Step	Perform	Expected Result	Initial
1.	Click any enabled Tank Icon in the Hanford Tank Farm Facilities. *(The icon will not be gray.)*	Verify that the Tank Status workspace appears on the screen and contains the following: • TITLE (correctly identifying the tank) • HIDE WINDOW button (x as a symbol) • SHRINK WINDOW button (an▼ as a symbol) • EXPAND WINDOW button (an ▲ as a symbol) • ACK ALARMS button	
		• UPDATE button (if available, not all tanks have discrete sensors). • Riser Location Drawing (Refer to the appropriate Tank Riser Configuration Documents for correct location) • Print Screen button • Riser Identifier(s) (displayed over the riser(s)) • Sensor Icons (i.e. thermocouple, level) • User Selectable Trend button(s).	
		Thermocouple Operation	
2.	Use the document "TMACS I/O Termination Point Listing" (Tag list) as a reference. Choose a thermocouple for the tank.	Verify the following: • The thermocouple is positioned on the tank display in a way that approximates the physical location in the tank. • Sensor label and current value are displayed next to the thermocouple icon • Sensor icon is overlaid with the sensor alarm status color	

Step	Perform	Expected Result	Initial
		Operation of Tank Level Indication	
3.	Use the document "TMACS I/O Termination Point Listing" (Tag list) as a reference. Choose a surface level sensor for the tank.	Verify the following: • The surface level icon(s) is positioned proportionally to the maximum tank height and at the current level displayed by the reading. • Sensor label and current value are displayed next to the surface level icon. *The label should identifying the source of this reading. (ENRAF® or SACS)* • Sensor icon is overlaid with the sensor alarm status color	
		Operation of Print button Not available in a Telewindows® session	
4.	Click on the PRINT SCREEN button.	Verify that the tank workspace prints.	
		Operation of Shrink Window button	
5.	Click on the SHRINK WINDOW button (*an ▼ as a symbol*).	Verify that the workspace shrinks.	
6.	Drag the Tank Status workspace to the upper right hand corner.	Verify that the Tank Status workspace stops at the edge of the screen when dragged to the top or to the right.	
		Operation of Expand Window button	
7.	Click on the EXPAND WINDOW button (*an ▲ as a symbol*).	Verify that the workspace enlarges.	
		Operation of the HIDE button	
8.	Click on the HIDE WINDOW.	Verify that the workspace is hidden.	
Note: Operation of the Acknowledge Alarm button is performed in section 6.6.7 (Miscellaneous Alarm Tests)			
Note: Operation of the Trends is performed in section 6.3 (Trending).			

6.2.4 Operation Of The HTFF Print Button

Note: The CURRENT ALARMS button is not available in a Telewindows® session.

Step	Perform	Expected Result	Initial
1.	Click on the PRINT SCREEN button in the lower right hand corner of workspace. *(May have to*	Verify that the workspace is printed.	

Step	Perform	Expected Result	Initial
	click on HTTF workspace to see button)		

6.2.5 Monitored Systems

6.2.5.1 Operation Of The Monitored System Button

Step	Perform	Expected Result	Initial
1.	Click on the any system displayed on the MONITORED SYSTEMS workspace.	Verify that a workspace is displayed representing the monitored system.	
2.	Click on the sensor objects.	Verify that no graphic workspaces or menu boxes are displayed.	
3.	For alarm panels, click on any graphic "borders".	Verify that no graphic workspaces or menu boxes are displayed.	
	Operation of Shrink Window button		
	Click on the SHRINK WINDOW button (*an ▼ as a symbol*).	Verify that the workspace shrinks.	
	Drag the workspace to the upper right hand corner.	Verify that the workspace stops at the edge of the screen when dragged to the top or to the right.	
	Operation of Expand Window button		
	Click on the EXPAND WINDOW button (*an ◢ as a symbol*).	Verify that the workspace enlarges.	
	Operation of the HIDE button		
	Click on the HIDE WINDOW.	Verify that the workspace is hidden.	

6.3 TRENDING

This section describes the test cases for both the individual and user selectable trends.

Have the Test Director verify that the TMACS is running in Development Mode of operation and is generating variable sensor data. Note: G2® will only display trend data that varies over time.

6.3.1 Operation of Individual Sensor Trends

This section describes the test cases for the individual selectable trends.

6.3.1.1 Operation of Trend Chart

Step	Perform	Expected Result	Initial
1.	Click any enabled Tank Icon in the Hanford Tank Farm Facilities. *(The icon will not be gray.)* Click on the portion of any sensor icon that looks like a little chart.	Verify that a Sensor Trend workspace for the sensor chosen and contains the following. • Chart • HIDE WINDOW *(X)* button • DETAIL *(D)* button. • PRINT *(P)* button	
2.	Examine the Chart.	Verify the following: • The values line color is black. • Lines for the low and high alarm limits appear at roughly one-tenth (1/10) and nine tenths (9/10) of the distance on the vertical axis. *Note: Only if trend is within limits.* • Alarm limit bands match the alarm color (Yellow or Red). • The trend title (above) and label (below) agree with the sensor tag name and descriptor. • The time scale of the horizontal time axis is 7 days and that some dates are shown.	
3.	Click on the Print button.	Verify the Sensor Trend workspace is printed.	
4.	Click on the HIDE WINDOW button.	Verify that the workspace is hidden.	

6.3.1.2 Operation of Sensor Details

Step	Perform	Expected Result	Initial
1.	Select a continuous sensor that has polling enabled at random. Display the individual sensor trend chart for the chosen sensor.	Verify the trend chart is displayed and the tag name is displayed above the trend chart	
2.	Click on the Details (**D**) button.	Verify the Sensor Details workspace for the chosen sensor is displayed with the following information:	

Step	Perform	Expected Result		Initial
		• **Hide** *(X)* button • **Print** (P) button • **Update** *(U)* button • **Test** *(T)* button • *(Note: Sensor must have point processing enabled for the Test buttons to be displayed.)* And depending on the sensor type one of the following sensor information groups.		
		Temperature Sensor		
		Current Reading Last Good Reading Quality Status Units High Alarm Limit Low Alarm Limit Deadband Point Processing ROC Processing Station Status Polling Freq. Index Validity Interval Expiration Time Formula Expression Formula Parameter	Last Update Method Test Processing Type Upper Instrument Limit Lower Instrument Limit Delta Alarm Processing Logging Raw Value Polling. Freq. Sec.	
		SACS LEVEL Sensor		
		Current Reading Last Good Reading Quality Status Units High Alarm Limit Low Alarm Limit Deadband Point Processing ROC Processing Suspect Status Sensor Type Name Slvl_dttm	Last Update Method Test Processing Upper Instrument Limit Lower Instrument Limit Delta Alarm Processing Logging	
		ENRAF LEVEL Sensor		
		Current Reading Last Good Reading Quality Status Units	Last Update Method Test Processing Upper Instrument Limit	

Step	Perform	Expected Result		Initial
		High Alarm Limit Low Alarm Limit Deadband Point Processing ROC Processing Station Status Polling Freq. Index Displacer Position Level Status Alarm Status Validity Interval Expiration Time Formula Expression Formula Parameter	Lower Instrument Limit Delta Alarm Processing Logging Raw Value Polling. Freq. Sec. Waste Level Level Status Mode Alarm Status Mode	
		Other Sensors		
		Current Reading Last Good Reading Quality Status Units High Alarm Limit Low Alarm Limit Deadband Point Processing ROC Processing Station Status Polling Freq. Index Validity Interval Expiration Time Formula Expression Formula Parameter	Last Update Method Test Processing Upper Instrument Limit Lower Instrument Limit Delta Alarm Processing Logging Raw Value Polling. Freq. Sec.	
3.	Click the **Update** button. Wait for the workspace to be updated *(approximately 5 seconds).*	Verify the following: • The date and time displayed in the **Readout Last Good Reading At** is updated. • Reading displayed in the **Current Reading** is updated. • RPC is displayed in the readout labeled **Last Update Method** *Note: The readout labeled Last Update Method will change to poll when next poll is taken.* *Note: An alarm could be generated if the reading for the sensor is an alarm range.* *Note: the current Reading may or may not change depending if the value being read has changed.*		

Step	Perform	Expected Result	Initial
		Note: If sensor has point-processing disabled then only the RAW VALUE and the EXPIRATION TIME will be updated.	
4.	Wait until the next time the sensor is polled. *Note: The SACS_LEVEL sensors are only polled once a day at approximately 8:00 PM*	Verify the following: • The date and time displayed in the **Readout Last Good Reading At** is updated. • Reading displayed in the **Current Reading** is updated. • POLL is displayed in the readout labeled **Last Update Method** *Note: An alarm could be generated if the reading for the sensor is an alarm range.* *Note: the current Reading may or may not change depending if the value being read has changed.* *Note: The Readout Last Good Reading At will only be updated if the reading value changes by more than the delta.*	
5.	Using the emulator change the value that is read for the sensor. Press the **Update** button. Wait for the workspace to be updated *(approximately 5 seconds).*	Verify the following: • The date and time displayed in the **Readout Last Good Reading At** is updated. • Reading displayed in the **Current Reading** is updated to the value issued by the emulator. • RPC is displayed in the readout labeled **Last Update Method** *Note: The readout labeled Last Update Method will change to poll when next poll is taken.* *Note: An alarm could be generated if the reading for the sensor is an alarm range.*	
6.	Wait until the next time the sensor is polled.	Verify the following: • The date and time displayed in the **Readout Last Good Reading At** is updated. • Reading displayed in the **Current Reading** is updated. • POLL is displayed in the readout labeled **Last Update Method** *Note: The Readout Last Good Reading At will only be updated if the reading value changes by more than the delta.*	

Step	Perform	Expected Result	Initial
7.	Click the **TEST** button.	Verify the following on the Sensor Details workspace: • Quality Status is set to TEST *(Note: Unless the status is UNKNOWN)* • Testing Processing is set to true Verify on the Current Alarms workspace that a blue message is generated with the following information • Date and Time when place in test mode • Sensor Tag Name • Description – The TESTING PROCESS of [Tag Name] has been ENABLED Verify on the Control Panel that the Number of Sensors Testing increase by 1.	
8.	Click on the Update button a few times (more than once) Examine the appropriate sensor history file. *To examine the file it may be necessary to stop G2®. The directory is located at f:\BackedUp\TMACSData\Current.*	Verify the Quality Status for the readings chosen sensor while in test mode is indicated as TEST.	
9.	Click the **TEST** button.	Verify the following on the Sensor Details workspace: • Quality Status is set to GOOD *(Note: Unless the status is UNKNOWN)* • Testing Processing is set to false Verify on the Current Alarms workspace that a blue message is generated with the following information • Date and Time when place taken out of test mode • Sensor Tag Name	

Step	Perform	Expected Result	Initial
		• Description – The TESTING PROCESS of [Tag Name] has been DISABLED Verify on the Control Panel that the Number of Sensors Testing decreases by 1.	
10.	Click on the Print button.	Verify the Sensor Details workspace is printed.	
11.	Click on the Hide button	Verify the Sensor Details workspace disappears.	

6.3.1.3 Operation of Sensor History

Step	Perform	Expected Result	Initial
1.	Select a continuous sensor at random that has history. Display the individual sensor trend chart for the chosen sensor.	Verify the trend chart is displayed and the tag name is displayed above the trend chart	
2.	Click on the trend chart.	Verify the History Table is displayed with the following: • Hide *(X)* button • Print *(P)* button • Sensor tag name at top of workspace • Table displaying the data (Point (PT), Value and the Date/Time value was taken) for the sensor over the displayed time period or 1000 points which ever comes first. • High Button (*High value for selected time period*) • Low Button (*Low value for selected time period*) • Point (*Used to go directly to a specific point*) Button • Top of Table button (|◄) • Previous page button (◄) • Next page button (►) • End of table button (►|)	
3.	Click on the High button	Verify the position of the table displayed contains the sensor point with the highest value.	
4.	Click on the Low button	Verify the position of the table displayed	

Step	Perform	Expected Result	Initial
		contains the sensor point with the lowest value.	
5.	Chose a sensor point at random. Enter this point in the text box associated with the Point button. Click on the Point button.	Verify the position of the table displayed contains the sensor point chosen.	
6.	Click on the top of table button (|◄).	Verify that the portion of the table displayed is the first page in the table.	
7.	Click on the end of table button (►|).	Verify the portion of the table displayed is the last page in the table.	
8.	Click the previous page button (◄)	Verify the portion of the table displayed is the previous page.	
9.	Click the next page button (►)	Verify the portion of the table displayed is the next page.	
10.	Click on the Print button.	Verify the Sensor History workspace is printed.	

11.	Click on the table.	Verify the history details workspace is displayed with the following information:
		
		• Hide (X) button
		• Print (P) button
		• Sensor Tag Name at top of workspace
		• Total Point Count (*signifies the total number of points in history)*
		• Time Interval Point Count *(signifies the number of points display in history table and trend chart for the selected time period)*
		• High Point Number
		• High Value
		• High Date/Time
		• Low Point Number
		• Low Value
		• Low Date/Time
		• Select Time Interval
		  • 1 hour
		  • 8 hours
		  • 24 hours
		  • 7 days
		  • 31 days	

12.	Select a time interval at random.	Verify the following workspaces are updated:	

Step	Perform	Expected Result	Initial
		• Individual Sensor Trend Chart • History Table • History Details	
13.	Click on the Print button.	Verify the History Details workspace is printed.	
14.	Click on the Hide button for the Individual Sensor Trend workspace.	Verify the following workspaces disappear: • Individual Sensor Trend Chart • History Table • History Details	

6.3.2 Operation of User Selectable trends

This section describes the test cases for the individual selectable trends.

Note: User selectable sensor trends cannot be performed in a Telewindows® session.

Step	Perform	Expected Result	Initial
1.	Click any enabled Tank Icon in the Hanford Tank Farm Facilities. *(The icon will not be gray.)* Click on a USER SELECTABLE TRENDS button. *(located at the bottom of the Tank Status workspace.)*	Verify that the USER SELECTABLE TRENDS workspace appears and contains the following. • Title (identifying what Tank trend is associated with) • Trend graph or chart. • HIDE WINDOW button (with an x as a symbol) • SHRINK WINDOW button (an▼ as a symbol) • EXPAND WINDOW button (an ▲ as a symbol) • PRINT SCREEN button • UPDATE GRAPH button (below the graph). • SELECT TIME INTERVAL OPTIONS • 1 hour • 8 hours • 24 hours • 7 days • 31 days. • List of sensors associated with user selectable trend with the following • Check box (indicates if sensor is displayed on graph/chart) • Sensor symbol (identifies sensor on graph/chart)	

Step	Perform	Expected Result	Initial
		• Current, Low, and High readings (based on the SELECT TIME INTERVAL chosen.) • Sensor Reading Description containing the following information • Type of readings (i.e. temperature) • Time period of readings (based on the SELECT TIME INTERVAL chosen) • Units of readings (i.e. Degrees Fahrenheit) • Date and Time	
2.	Click on the UPDATE GRAPH button	Verify the Graph/Chart has the following: • The current value for each sensor on the trend graph approximates the current value on the digital display. • The values line matches the symbol for each sensor. • Trend graph label *(below the x-axis of the graph)* reads: "TANK xx-yyy SELECTED SENSORS INDICATED BY X" Where "**xx-yyy**" represents the name of the tank. • The time scale of the horizontal time axis is based on the SELECT TIME INTERVAL chosen.	
Operation of Sensor Check Box			
3.	Click on the box of any sensor that contains an X.	Verify that the X is removed from the box.	
4.	Click on the UPDATE GRAPH button below the graph.	Verify the trend graph displays only lines for the sensors that are checked.	
5.	Click on the box of any sensor that does not contain an X.	Verify that the X is displayed in the box.	
6.	Click on the UPDATE GRAPH button below the graph.	Verify the trend graph displays only lines for the sensors that are checked.	
Operation of Sensor Time Interval Options ***Note: May want to repeat using different time intervals.***			
7.	Click any "SELECT TIME INTERVAL" option.	Verify the following: • A black dot appears in the circle of the time interval selected. • The Sensor Reading Description is	

Step	Perform	Expected Result	Initial
		modified according to the SELECT TIME INTERVAL chosen. (Note: Trend graph is not updated automatically)	
8.	Click on the UPDATE GRAPH button below the graph.	Verify the horizontal time scale of the trend graph is reset to the SELECT TIME INTERVAL chosen.	
		Operation of Shrink Window button	
9.	Click on the SHRINK WINDOW button (*an ▼ as a symbol*).	Verify that the workspace shrinks.	
10.	Drag the workspace to the upper right hand corner.	Verify that the workspace stops at the edge of the screen when dragged to the top or to the right.	
		Operation of Expand Window button	
11.	Click on the EXPAND WINDOW button (*an ▲ as a symbol*).	Verify that the workspace enlarges.	
		Operation of Print button. Not available in a Telewindows® session	
12.	Click on the PRINT SCREEN button.	Verify that the User Selectable Trend workspace prints.	
		Operation of the HIDE button	
13.	Click on the HIDE WINDOW.	Verify that the workspace is hidden.	

6.4 REPORTS

6.4.1 Suspect Sensor Report

Prior to performing this test case set up sensors that have not reported a value within the current day. *(Note: Emulator is required to get the quality status of sensors equal to good. Also need a large amount of sensors to display continuous/discrete and SACS level sensors)*

Step	Perform	Expected Result	Initial
1.	Select the **Suspect Sensor Report** button from the Reports Menu workspace.	Verify the Suspect Sensor Report is displayed with the following information: • **Hide** (X) Button • **Minimize** button (▼) • **Maximize** button (▲) • **Print** button (P) • **Date of Report** • **Number of Suspect Sensors**	

Step	Perform	Expected Result	Initial

		• **Sensor Insert Count** *(Signifies the number of sensors displayed in report table.)*
		• **Table Processing Status** *(i.e. Done)*
		• **Include Continuous** check box *(default is checked)*
		• **Include Discrete** check box *(default is unchecked)*
		• **Include SACS Levels** check box *(default is unchecked)*
		• **Sort** Report check box. (Sorted by TAG NAME; default is unchecked)
		• **Update** button
		• **Abort Report** button
		• **Top of Table** button (|◄)
		• **Previous** page button (◄)
		• **Next** page button (►)
		• **End of Table** button (►|)
		• Report table containing the following columns:
		  • NO *(Signifies the line/row number)*
		  • TAG_NAME
		  • LAST-GOOD-READING
		  • IO-STATION	

2.	Click the **Update** button Wait until **Table Processing Status** displays DONE.	Verify the following: • Report Table is updated • Date of Report is updated. • Sensor Insert Count is equal to the number of sensor in the table. • Number of Suspect Sensor is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done.*	
3.	Click each combination of the following check boxes. • Include Continuous • Include Discrete • Include SACS Levels Click the **Update** button. Wait until **Table**	Verify the following: • The appropriate check box (s) is checked. • Report Table is updated with the appropriate data • Date of Report is updated. • Sensor Insert Count is equal to the number of sensor in the table. • Number of Suspect Sensors is equal to the Sensor Insert Count.	

Step	Perform	Expected Result	Initial
	Processing Status displays DONE.	*Note the Table Processing Status will change from Done to Active back to Done.*	
4.	Click the Sort check box so the box is checked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is checked. • Report Table is updated and the data is sorted by TAG_NAME. • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table. • Number of Suspect Sensors is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done.*	
5.	Click the Sort check box so the box is unchecked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is unchecked. • Report Table is updated *(Note the data may or may not be sorted depending on how the data was read in)*. • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table. • Number of Suspect Sensors is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
6.	Click the **Update** button immediately followed by the **Abort Report** button.	Verify the following: • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table. • Number of Suspect Sensors is not equal to the Sensor Insert Count. • Table Processing Status changes to Abort *Note the Table Processing Status will change from Done to Active to Abort*	
7.	Click on the Title block of the report table.	Verify the help workspace for this report is displayed.	
8.	Click the Maximize button.	Verify the workspace is maximized.	

Step	Perform	Expected Result	Initial
9.	Click the Minimize button	Verify the workspace is minimized	
10.	Click on the **Top of report** button (|◄).	Verify that the portion of the report displayed is the first page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
11.	Click on the **End of report** button (►|).	Verify the portion of the report displayed is the last page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
12.	Click the **Previous** page button (◄)	Verify the portion of the report displayed is the previous page. *(Note: Report may fit on one page and therefore no change is seen.)*	
13.	Click the **Next** page button (►).	Verify the portion of the report displayed is the next page. *(Note: Report may fit on one page and therefore no change is seen.)*	
14.	Click on the **Print** button (P). *(Note: Not functional on the remote stations at this time.)*	Verify the portion of the workspace displayed is printed to the printer.	
15.	Click on the **Hide** button (X).	Verify the report workspace is hidden.	

6.4.2 Suspect IO-Station Report

Prior to performing this test case set up IO stations that are not reporting.

Step	Perform	Expected Result	Initial
1.	Select the **Suspect I/O – Station Report** button from the Reports Menu workspace.	Verify the Suspect IO-Station Report is displayed with the following information: • **Hide** (X) Button • **Minimize** button (▼) • **Maximize** button (▲) • **Print** button (P) • **Date of Report** • **Number of Suspect Stations** • **Station Insert Count** *(Signifies the number of stations displayed in report table.)* • **Table Processing Status** *(i.e. Done)* • **Sort** Report Check box. *(Sorted by IO-STATION)* • **Update** button • **Abort** Report button • **Top of Table** button (|◄) • **Previous** page button (◄) • **Next** page button (►)	

Step	Perform	Expected Result	Initial

		• **End of Table** button (▶|)
		• Report table containing the following columns:
		  • NO *(Signifies the line/row number)*
		  • IO-STATION
		  • EXPIRATION TIME
		  • POLLING-FREQ	

2.	Click the **Update** button Wait until **Table Processing Status** displays DONE.	Verify the following: • Report Table is updated • Date of Report is updated. • Station Insert Count is equal to the number of station in the table. • Number of Suspect Stations is equal to the Station Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
3.	Click the Sort check box so it is checked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is checked. • Report Table is updated and the data is sorted by IO-STATION. • Date of Report is updated • Station Insert Count is equal to the number of station in the table. • Number of Suspect Stations is equal to the Station Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
4.	Click the Sort check box so it is unchecked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is unchecked. • Report Table is updated *(Note the data may or maynot be sorted depending on how the data was read in)*. • Date of Report is updated • Station Insert Count is equal to the number of stations in the table. • Number of Suspect Stations is equal to the Station Insert Count. *Note the Table Processing Status will change*	

Step	Perform	Expected Result	Initial
		from Done to Active back to Done	
5.	Click the **Update** button immediately followed by the **Abort** Report.	Verify the following: • Date of Report is updated • Table Processing Status changes to Abort • Station Insert Count is equal to the number of station in the table. • Number of Suspect Stations is not equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active to Abort*	
6.	Click on the Title block of the report table.	Verify the help workspace for this report is displayed.	
7.	Click the Maximize button.	Verify the workspace is maximized.	
8.	Click the Minimize button	Verify the workspace is minimized	
9.	Click on the **Top of report** button (|◄).	Verify that the portion of the report displayed is the first page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
10.	Click on the **End of report** button (►|).	Verify the portion of the report displayed is the last page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
11.	Click the **Previous** page button (◄)	Verify the portion of the report displayed is the previous page. *(Note: Report may fit on one page and therefore no change is seen.)*	
12.	Click the **Next** page button(►).	Verify the portion of the report displayed is the next page. *(Note: Report may fit on one page and therefore no change is seen.)*	
13.	Click on the **Print** button (P). *(Note: Not functional on the remote stations at this time.)*	Verify the portion of the workspace displayed is printed to the printer.	
14.	Click on a row in the table.	Verify the Suspect IO-Station Detail Report is displayed with the following information: • **Hide** (X) Button • **Minimize** button (▼) • **Maximize** button (▲) • **Print** button (P) • **Date of Report** • **Number of Suspect Sensors** • **Sensor Insert Count** *(Signifies the number of sensors displayed in report table that are associated with the selected station.)*	

Step	Perform	Expected Result	Initial

		• **Table Processing Status** *(i.e. Done)*
		• **Sort** Report Check box. *(Sorted by IO-STATION)*
		• **Update** button
		• **Abort** Report button
		• **Top of Table** button (|◄)
		• **Previous** page button (◄)
		• **Next** page button (►)
		• **End of Table** button (►|)
		• Report table containing the following columns:
		  • NO *(Signifies the line/row number)*
		  • TAG NAME
		  • LAST-GOOD-READING
		  • IO-STATION
		  •
		Note: The Top of Table, Previous page, Next Page and End of Table are included for future use. There currently is no station that has more than 25 (Table Size) sensors connected to it.	

15.	Click the **Update** button Wait until **Table Processing Status** displays DONE.	Verify the following: • Report Table is updated • Date of Report is updated. • Sensor Insert Count is equal to the number of sensors in the table. • Number of Sensors is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
16.	Click the Sort check box so it is checked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is checked. • Report Table is updated and the data is sorted by TAG_NAME. • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table. • Number of Suspect Sensors is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
17.	Click the Sort check box so	Verify the following:	

Step	Perform	Expected Result	Initial
	it is unchecked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	• Sort check box is unchecked. • Report Table is updated *(Note the data may or may not be sorted depending on how the data was read in).* • Date of Report is updated • Sensor Insert Count is equal to the number of stations in the table. • Number of Suspect Sensors is equal to the Station Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
18.	Click the **Update** button immediately followed by the **Abort** Report.	Verify the following: • Date of Report is updated • Table Processing Status changes to Abort • Station Insert Count is equal to the number of station in the table. • Number of Suspect Sensors is not equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active to Abort*	
19.	Click the Maximize button.	Verify the workspace is maximized.	
20.	Click the Minimize button	Verify the workspace is minimized	
21.	Click on the **Print** button (P). *(Note: Not functional on the remote stations at this time.)*	Verify the portion of the workspace displayed is printed to the printer.	
22.	Click on the **Hide** (X) **button** on the Suspect IO-Station Detail Report workspace.	Verify the report workspace is hidden.	
23.	Click on the **Hide** (X) **button** on the Suspect IO-Station Report workspace.	Verify the report workspace is hidden.	

6.4.3 Unknown Sensor Report

Prior to performing this test case set the quality status of a few sensors to unknown.

Step	Perform	Expected Result	Initial

24.	Select the **Unknown Sensor Report** button from the Reports Menu workspace.	Verify the Unknown Sensor Report is displayed with the following information:
		
		• **Hide** (X) Button
		• **Minimize** button (▼)
		• **Maximize** button (▲)
		• **Print** button (P)
		• **Date of Report**
		• **Number of Unknown Sensors**
		• **Sensor Insert Count** *(Signifies the number of sensors displayed in report table.)*
		• **Table Processing Status** *(i.e. Done)*
		• **Sort** Report Check box. *(Sorted by TAG NAME)*
		• **Update** button
		• **Abort Report** button
		• **Top of Table** button (|◄)
		• **Previous** page button (◄)
		• **Next** page button (►)
		• **End of Table** button (►|)
		• Report table containing the following columns:
		  • NO *(Signifies the line/row number)*
		  • TAG_NAME
		  • LAST-GOOD-READING	

25.	Click the **Update** button Wait until **Table Processing Status** displays DONE.	Verify the following: • Report Table is updated • Date of Report is updated.	
26.	Click the Sort check box so it is checked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is checked. • Report Table is updated and the data is sorted by TAG_NAME. • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table.	

Step	Perform	Expected Result	Initial
		• Number of Sensor is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
27.	Click the Sort check box so it is unchecked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is unchecked. • Report Table is updated *(Note the data may or maynot be sorted depending on how the data was read in).* • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table. • Number of Sensor is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
28.	Click the **Update** button immediately followed by the **Abort** Report.	Verify the following: • Date of Report is updated • Table Processing Status changes to Abort • Sensor Insert Count is equal to the number of sensor in the table. • Number of Sensor is not equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active to Abort*	
29.	Click on the Title block of the report table.	Verify the help workspace for this report is displayed.	
30.	Click the Maximize button.	Verify the workspace is maximized.	
31.	Click the Minimize button	Verify the workspace is minimized	
32.	Click on the **Top of report** button (|◄).	Verify that the portion of the report displayed is the first page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
33.	Click on the **End of report** button (►|).	Verify the portion of the report displayed is the last page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
34.	Click the **Previous** page button (◄)	Verify the portion of the report displayed is the previous page. *(Note: Report may fit on one page and therefore no change is seen.)*	
35.	Click the **Next** page	Verify the portion of the report displayed is the	

Step	Perform	Expected Result	Initial
	button(▶).	next page. *(Note: Report may fit on one page and therefore no change is seen.)*	
36.	Click on the **Print** button (P). *(Note: Not functional on the remote stations at this time.)*	Verify the portion of the workspace displayed is printed to the printer.	
37.	Click on the **Hide** button (X).	Verify the report workspace is hidden.	

6.4.4 ENRAF Non-Operating Mode Report

Step	Perform	Expected Result	Initial

1.	Select the **ENRAF Non-Operating Mode Report** button from the Reports Menu workspace.	Verify the ENRAF Non-Operating Mode Report is displayed with the following information:
		
		• **Hide** (X) Button
		• **Minimize** button (◤)
		• **Maximize** button (▲)
		• **Print** button (P)
		• **Date of Report**
		• **Number of Enraf Sensors**
		• **Sensor Insert Count** *(Signifies the number of sensors displayed in report table.)*
		• **Table Processing Status** *(i.e. Done)*
		• **Sort** Report Check box. *(Sorted by TAG NAME)*
		• **Update** button
		• **Abort Report** button
		• **Top of Table** button (|◄)
		• **Previous** page button (◄)
		• **Next** page button (▶)
		• **End of Table** button (▶|)
		• Report table containing the following columns:
		  • NO *(Signifies the line/row number)*
		  • TAG_NAME
		  • LEVEL STATUS MODE	

2.	Using the ENRAF emulator generate	Verify the following: • Report Table is updated with the	

Step	Perform	Expected Result	Initial
	ENRAF messages that have a level status other than "-" Click the **Update** button Wait until **Table Processing Status** displays DONE.	appropriate sensors • Date of Report is updated. • Number of Enraf Sensors is updated • Sensor Insert Count	
3.	Click the Sort check box so it is checked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is checked. • Report Table is updated and the data is sorted by TAG_NAME. • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table. • Number of Enraf Sensors is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
4.	Click the Sort check box so it is unchecked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is unchecked. • Report Table is updated *(Note the data may or may not be sorted depending on how the data was read in).* • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table. • Number of Enraf Sensor is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
5.	Click the **Update** button immediately followed by the **Abort** Report.	Verify the following: • Date of Report is updated • Table Processing Status changes to Abort • Sensor Insert Count is equal to the number of sensor in the table.	

Step	Perform	Expected Result	Initial
		• Number of Enraf Sensors is not equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active to Abort*	
6.	Using the ENRAF emulator generate ENRAF messages that have a level status of "-" Click the **Update** button Wait until **Table Processing Status** displays DONE.	Verify the following: • Report Table is updated with the appropriate sensors • Date of Report is updated. • Number of Enraf Sensors is updated • Sensor Insert Count	
7.	Click on the Title block of the report table.	Verify the help workspace for this report is displayed.	
8.	Click the Maximize button.	Verify the workspace is maximized.	
9.	Click the Minimize button	Verify the workspace is minimized	
10.	Click on the **Top of report** button (|◄).	Verify that the portion of the report displayed is the first page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
11.	Click on the **End of report** button (►|).	Verify the portion of the report displayed is the last page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
12.	Click the **Previous** page button (◄)	Verify the portion of the report displayed is the previous page. *(Note: Report may fit on one page and therefore no change is seen.)*	
13.	Click the **Next** page button(►).	Verify the portion of the report displayed is the next page. *(Note: Report may fit on one page and therefore no change is seen.)*	
14.	Click on the **Print** button (P). *(Note: Not functional on the remote stations at this time.)*	Verify the portion of the workspace displayed is printed to the printer.	
15.	Click on the **Hide** button (X).	Verify the report workspace is hidden.	

6.4.5 Sensor Disable Alarm Report

Step	Perform	Expected Result	Initial

1.	Select the **Sensor Disable Alarm Report** button from the Reports Menu workspace.	Verify the Sensor Disable Alarm Report is displayed with the following information:
		• **Hide** (X) Button
		• **Minimize** button (◤)
		• **Maximize** button (▲)
		• **Print** button (P)
		• **Date of Report**
		• **Count of Disabled Sensors**
		• **Sensor Insert Count** *(Signifies the number of sensors displayed in report table.)*
		• **Table Processing Status**
		• **Sort** Report Check box. *(Sorted by TAG NAME)*
		• **Update** button
		• **Abort Report** button
		• **Top of Table** button (|◄)
		• **Previous** page button (◄)
		• **Next** page button (►)
		• **End of Table** button (►|)
		• Report table containing the following columns:
		  • NO *(Signifies the line/row number)*
		  • TAG_NAME
		  • LAST-GOOD-READING
		  • IO-STATION	

2.	Disable Alarm processing for one or more sensor(s). Click the **Update** button Wait until **Table Processing Status** displays DONE.	Verify the following: • Report Table is updated with the appropriate sensors. • Date of Report is updated.	
3.	Click on a row in the Report Table that	Verify the tank workspace associated with the chosen test sensor is displayed.	

Step	Perform	Expected Result	Initial
	contains a sensor record.	*Note: Hide the tank workspace when through with this test.*	
4.	Click the Sort check box so it is checked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is checked. • Report Table is updated and the data is sorted by TAG_NAME. • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table. • Number of Disabled Sensors is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
5.	Click the Sort check box so it is unchecked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is unchecked. • Report Table is updated *(Note the data may or may not be sorted depending on how the data was read in).* • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table. • Number of Disabled Sensors is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
6.	Click the **Update** button immediately followed by the **Abort** Report.	Verify the following: • Date of Report is updated • Table Processing Status changes to Abort • Sensor Insert Count is equal to the number of sensor in the table. • Number of Disabled Sensors is not equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active to Abort*	
7.	Enable Alarm	Verify the following:	

Step	Perform	Expected Result	Initial
	processing for one or more sensors that was disabled previously. Click the **Update** button Wait until **Table Processing Status** displays DONE.	• Report Table is updated with the appropriate sensors • Date of Report is updated.	
8.	Click on the Title block of the report table.	Verify the help workspace for this report is displayed.	
9.	Click the Maximize button.	Verify the workspace is maximized.	
10.	Click the Minimize button	Verify the workspace is minimized	
11.	Click on the **Top of report** button (|◄).	Verify that the portion of the report displayed is the first page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
12.	Click on the **End of report** button (►|).	Verify the portion of the report displayed is the last page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
13.	Click the **Previous** page button (◄)	Verify the portion of the report displayed is the previous page. *(Note: Report may fit on one page and therefore no change is seen.)*	
14.	Click the **Next** page button(►).	Verify the portion of the report displayed is the next page. *(Note: Report may fit on one page and therefore no change is seen.)*	
15.	Click on the **Print** button (P). *(Note: Not functional on the remote stations at this time.)*	Verify the portion of the workspace displayed is printed to the printer.	
16.	Click on the **Hide** button (X).	Verify the report workspace is hidden.	

6.4.6 Sensor Enabled Test Report

Step	Perform	Expected Result	Initial
1.	Select the **Sensor Enabled Test Report** button from the Reports	Verify the Sensor Enabled Test Report is displayed with the following information:	

Step	Perform	Expected Result	Initial

	Menu workspace.	• **Hide** (X) Button
		• **Minimize** button (▼)
		• **Maximize** button (▲)
		• **Print** button (P)
		• **Date of Report**
		• **Count of Enabled Sensors**
		• **Sensor Insert Count** *(Signifies the number of sensors displayed in report table.)*
		• **Table Processing Status**
		• **Sort** Report Check box. *(Sorted by TAG NAME)*
		• **Update** button
		• **Abort Report** button
		• **Top of Table** button (|◄)
		• **Previous** page button (◄)
		• **Next** page button (►)
		• **End of Table** button (►|)
		• Report table containing the following columns:
		  • NO *(Signifies the line/row number)*
		  • TAG_NAME
		  • LAST-GOOD-READING
		  • IO-STATION	

2.	Place a one or more sensor(s) in the test mode. Click the **Update** button Wait until **Table Processing Status** displays DONE.	Verify the following: • Report Table is updated with the appropriate sensors • Date of Report is updated.	
3.	Click on a row in the Report Table that contains a test sensor record.	Verify the tank workspace associated with the chosen test sensor is displayed. *Note: Hide the tank workspace when through with this test.*	
4.	Click the Sort check box so it is checked. Click the **Update**	Verify the following: • Sort check box is checked. • Report Table is updated and the data is	

Step	Perform	Expected Result	Initial
	button. Wait until **Table Processing Status** displays DONE.	sorted by TAG_NAME. • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table. • Number of Enabled Sensors is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
5.	Click the Sort check box so it is unchecked. Click the **Update** button. Wait until **Table Processing Status** displays DONE.	Verify the following: • Sort check box is unchecked. • Report Table is updated *(Note the data may or may not be sorted depending on how the data was read in).* • Date of Report is updated • Sensor Insert Count is equal to the number of sensor in the table. • Number of Enabled Sensors is equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active back to Done*	
6.	Click the **Update** button immediately followed by the **Abort** Report.	Verify the following: • Date of Report is updated • Table Processing Status changes to Abort • Sensor Insert Count is equal to the number of sensor in the table. • Number of Enabled Sensors is not equal to the Sensor Insert Count. *Note the Table Processing Status will change from Done to Active to Abort*	
7.	Take one or more sensor out of the test mode. Click the **Update** button Wait until **Table Processing Status** displays DONE.	Verify the following: • Report Table is updated with the appropriate sensors • Date of Report is updated.	

Step	Perform	Expected Result	Initial
8.	Click on the Title block of the report table.	Verify the help workspace for this report is displayed.	
9.	Click the Maximize button.	Verify the workspace is maximized.	
10.	Click the Minimize button	Verify the workspace is minimized	
11.	Click on the **Top of report** button (|◄).	Verify that the portion of the report displayed is the first page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
12.	Click on the **End of report** button (►|).	Verify the portion of the report displayed is the last page in the report. *(Note: Report may fit on one page and therefore no change is seen.)*	
13.	Click the **Previous** page button (◄)	Verify the portion of the report displayed is the previous page. *(Note: Report may fit on one page and therefore no change is seen.)*	
14.	Click the **Next** page button(►).	Verify the portion of the report displayed is the next page. *(Note: Report may fit on one page and therefore no change is seen.)*	
15.	Click on the **Print** button (P). *(Note: Not functional on the remote stations at this time.)*	Verify the portion of the workspace displayed is printed to the printer.	
16.	Click on the **Hide** button (X).	Verify the report workspace is hidden.	

6.5 EXTERNAL INTERFACES

6.5.1 Acromag™

The tests in this section require the use of an Acromag™ emulator. The test should be run on the development machine.

6.5.1.1 Conversion of Acromag™ Temperature Output to Engineering Units

Step	Perform	Expected Result	Initial
1.	From the tag list, choose an Acromag™ temperature sensor at random. Display the Sensor Details for the chosen sensor. Press the Update button then use the Formula expression and Raw Value to calculate the current reading for the sensor.	Write the value here _____	
2.	Compare the Current Reading with the reading in Step 1.	Verify that the readings are the same.	
3.	Display the history details for this sensor.	Verify that the value is displayed and matches the value recorded in Step 1. *(Note: It is possible for the value to be displayed more than once in the history details if it crosses a limit boundary.)*	

6.5.1.2 Conversion of Acromag™ 4 to 20 ma Output to Engineering Units

Step	Perform	Expected Result	Initial
1.	From the tag list, choose an Acromag™ non-temperature sensor at random, e.g., pressure, flow, surface level, ... Display the Sensor Details for the chosen sensor. Press the Update button then use the Formula expression and Raw Value to calculate the current reading for the sensor.	Write the value here _____	
2.	Compare the Current Reading with the reading in Step 1.	Verify that the readings are the same.	

Step	Perform	Expected Result	Initial
3.	Display the history details for this sensor.	Verify that the value is displayed and matches the value recorded in Step 1. *(Note: It is possible for the value to be displayed more than once in the history details if it crosses a limit boundary.)*	

6.5.1.3 Conversion of Acromag™ Digital Data to Discrete States

The Acromag™ emulator does not directly support digital input for the Acromag™. A digital value of 0 may be simulated with a temperature value of 32.0 F. A digital 1 is simulated with a temperature of 32.18 F. Any other value will be an unknown state.

Step	Perform	Expected Result	Initial
1.	Using the tag list, choose an enabled Acromag™ digital sensor at random. Use the emulator to simulate a value of digital 0 for this sensor. *After an appropriate delay for the TMACS to poll the emulator for this sensor.*	Verify that the sensor is in alarm.	
2.	Use the emulator to simulate a value of digital 1 for this sensor. *After an appropriate delay for the TMACS to poll the emulator for this sensor.*	Verify that the sensor is reset.	

6.5.2 Enraf®

The tests in this section require the use of an Enraf® emulator. The test should be run on the development machine.

6.5.2.1 Conversion of Enraf® CIU Level Sensor Output to Engineering Units

Step	Perform	Expected Result	Initial
1.	From the tag list, choose an Enraf® CIU level sensor at random. Display the Sensor Details for the chosen sensor. Press the Update button then use the Formula expression and Raw Value to calculate the current reading for the sensor.	Write the value here _____	
2.	Compare the Current Reading with the reading in Step 1.	Verify that the readings are the same.	
3.	Display the history details for this sensor.	Verify that the value is displayed and matches the value recorded in Step 1. *(Note: It is possible for the value to be displayed more than once in the history details if it crosses a limit boundary.)*	

6.5.2.2 Conversion of Enraf® CIU Pressure Sensor Output to Engineering Units

Step	Perform	Expected Result	Initial
4.	From the tag list, choose an Enraf® CIU pressure sensor at random. Display the Sensor Details for the chosen sensor. Press the Update button then use the Formula expression and Raw Value to calculate the current reading for the sensor.	Write the value here _____	
5.	Compare the Current Reading with the reading in Step 1.	Verify that the readings are the same.	

Step	Perform	Expected Result	Initial
6.	Display the history details for this sensor.	Verify that the value is displayed and matches the value recorded in Step 1. *(Note: It is possible for the value to be displayed more than once in the history details if it crosses a limit boundary.)*	

6.5.2.3 Conversion of Enraf® CIU Alarm Status to Discrete States

Step	Perform	Expected Result	Initial
1.	From the tag list, choose an Enraf® CIU discrete sensor at random. Use the emulator to simulate a High Alarm for this sensor. *After an appropriate delay for the TMACS to poll the emulator for this sensor or use the update button on the sensor details*	Verify that the sensor is in High alarm.	
2.	Use the emulator to simulate a Normal for this sensor. *After an appropriate delay for the TMACS to poll the emulator for this sensor or use the update button on the sensor details*	Verify that the sensor is in Reset (Normal).	
3.	Use the emulator to simulate a Low Alarm for this sensor. *After an appropriate delay for the TMACS to poll the emulator for this sensor or use the update button on the sensor details.*	Verify that the sensor is in Low alarm.	

Step	Perform	Expected Result	Initial
4.	Use the emulator to simulate a Normal for this sensor. *After an appropriate delay for the TMACS to poll the emulator for this sensor or use the update button on the sensor details*	Verify that the sensor is in Reset (Normal).	

6.5.3 Westronics®

The tests in this section require the use of a Westronics® emulator. The test should be run on the development machine.

6.5.3.1 Conversion of Westronics® Temperature Output to Engineering Units

Step	Perform	Expected Result	Initial
1.	From the tag list, choose a Westronics® temperature sensor at random. Display the Sensor Details for the chosen sensor. Press the Update button then use the Formula expression and Raw Value to calculate the current reading for the sensor.	Write the value here _____	
2.	Compare the Current Reading with the reading in Step 1.	Verify that the readings are the same.	
3.	Display the history details for this sensor.	Verify that the value is displayed and matches the value recorded in Step 1. *(Note: It is possible for the value to be displayed more than once in the history details if it crosses a limit boundary.)*	

6.5.4 Panalarm®

The tests in this section require the use of a Panalarm® emulator. The test should be run on the development machine.

6.5.4.1 Conversion of Panalarm® Output to Digital Data to Discrete States

Step	Perform	Expected Result	Initial
1.	Using the tag list, choose a Panalarm® sensor at random. Use the emulator to simulate a value of digital 1 for this sensor. *After an appropriate delay for the TMACS to poll the emulator for this sensor.*	Verify that the sensor is in alarm.	
2.	Use the emulator to simulate a value of digital 0 for this sensor. *After an appropriate delay for the TMACS to poll the emulator for this sensor.*	Verify that the sensor is reset.	
3.	Return to the main screen.		

6.5.5 SACS

TMACS retrieves surface level data from SACS whenever TMACS starts and at 2000 every evening thereafter. The "last SACS reading" will be the last reading taken and marked good (the quality status was set to "G") before TMACS retrieves that data.

Step	Perform	Expected Result	Initial
1.	Select a surface-level sensor has been configured for polling from SACS.	Record the sensor and tank names. Sensor _____ Tank _____	
2.	On the Hanford Tank Farm Facilities workspace, click on the tank icon for the selected tank. Click on the surface-level icon.	Verify that the Sensor Trend workspace appears.	
3.	Click on the detail button. (Upper right-hand corner of the Sensor Trend workspace.) Click on the Update (U) button.	Verify that the details about the surface-level sensor appear. Record the: Current Reading _____ Last Good Reading _____ Sensor Type Name _____ slvl_dttm _____	

Step	Perform	Expected Result	Initial
4.	Close the Sensor Trend workspace.		
5.	Obtain the last SACS database reading for the selected tank. *(Note: This will be on the UDO server most likely.)* This may be obtained from the system administrator using the following code: lp_LastSLVLReading '[Tank Name]' select * from TMACS_LASTSLVLREADING	Verify that the values obtained in this step match the values recorded in Step 3.	

6.6 POINT PROCESSING

6.6.1 Continuous Sensor (Non Rate of Change) Automated Functional Test

This procedure automatically tests the state changes for a continuous sensor.

Step	Perform	Expected Result	Initial
1.	On the POINT PROCESSING FUNCTIONAL TEST workspace click on the **Point Processing for Continuous Point – All Function excepts Rate of Change** button	Verify the CONTINUOUS FUNCTIONAL TEST (*Except ROC*) workspace appears.	
2.	On the CONTINUOUS FUNCTIONAL TEST (*Except ROC*) workspace: • Set the Step Mode to "Off." • Set Print Results to "Last" Activate the "Run Point Processing" button.	Verify that the process continues to completion	
3.	Examine the results	Verify no errors are reported.	

Step	Perform	Expected Result	Initial
4.	Print the final workspace.	Keep printout for project files.	

6.6.2 Continuous Sensor (Rate of Change) Automated Functional Test

Step	Perform	Expected Result	Initial
1.	On the POINT PROCESSING FUNCTIONAL TEST workspace click on the **Point Processing for Continuous Point –Rate of Change** button.	Verify the CONTINUOUS FUNCTIONAL TEST (*With ROC*) workspace appears.	
2.	On the ROC FUNCTIONAL TEST workspace: Set the Step Mode to "Off." Set Print Results to "Last" Activate the "Run Point Processing" button.	Verify that the process continues to completion.	
3.	Examine the workspace.	Verify no errors are reported.	
4.	Print the final workspace.	Keep printout for project files.	

6.6.3 Discrete Sensor Automated Functional Test

This procedure automatically tests the state changes of a discrete sensor.

Step	Perform	Expected Result	Initial
1.	On the POINT PROCESSING FUNCTIONAL TEST workspace click on the **Point Processing for Discrete Points – All Functions** button	Verify the DISCRETE FUNCTIONAL TEST workspace appears.	
2.	On the Discrete Functional Test workspace: Set the Step Mode to "Off." Set Print Results to "Last" Activate the " Run Point Processing " button.	Verify that the process continues to completion.	
3.	Examine the workspace.	Verify no errors are reported.	
4.	Print the final workspace.	Keep printout for project files.	

6.6.4 Operation of MOST RECENT ALARM and CURRENT ALARMS

Prior to running this test the administrator should do the following:

1. Acknowledge all alarms so Current Alarm count goes to zero. Note: if this is not done, then note the number of current alarms.

2. Verify the following workspaces are visible:

   - DISCRETE FUNCTIONAL TEST
   - MOST RECENT ALARM
   - CONTROL-PANEL
   - CURRENT ALARM

Step	Perform	Expected Result	Initial
1.	On the Discrete Functional Test Workspace Set the Step Mode in ON. Activate the RUN POINT PROCESSING button. Examine the Current Alarm box.	Note the number of current alarms _____	
2.	Enter **4** in Dip-switch type-in box on the **Discrete Functional Test Workspace.**	Verify the following: • A white message for the discrete alarm is generated in the MOST RECENT ALARM workspace. • Sensor Icon Blinking = false • Tank Icon Blinking = false • No Current Alarms = 1 more than Step 1 on the following workspaces: 1. CURRENT ALARMS 2. CONTROL PANEL 3. MOST RECENT ALARM	
3.	Enter **-1** in Dip-switch type-in box on the **Discrete Functional Test Workspace.**	Verify the following: • Sensor Icon Blinking = false • Tank Icon Blinking = false • No Current Alarms = 1 more than Step 1 on the following workspaces: 1. CURRENT ALARMS 2. CONTROL PANEL 3. MOST RECENT ALARM	
4.	Enter **2** in Dip-switch type-in box on the **Discrete Functional Test Workspace.**	Verify the following: • A discrete alarm message is generated in the MOST RECENT ALARM workspace. • Sensor Icon Blinking = true	

Step	Perform	Expected Result	Initial
		• Tank Icon Blinking = true • No. Current Alarms = 2 more than in Step 1 on the following workspaces: 1. CURRENT ALARMS 2. CONTROL PANEL 3. MOST RECENT ALARM	
5.	On the Most Recent Alarm workspace activate the GOTO button	Verify the following: • TANK TEST-201 STATUS workspace is brought to the top of the screen. • The sensor is in alarm.	
6.	Enter **0** in Dip-switch type-in box on the **Discrete Functional Test Workspace.**	Verify the following: • Discrete alarm message is reset. • No. Current Alarms = 2 more than Step 1 on the following workspaces: 1. CURRENT ALARMS 2. CONTROL PANEL 3. MOST RECENT ALARM	
7.	Acknowledge alarm message in MOST RECENT ALARM Window by clicking on it.	Verify the following: • Alarm Message disappears. • Sensor Icon Blinking = false • Tank Icon Blinking = false • No. Current Alarms = 1 more than Step 1 on the following workspaces: 1. CURRENT ALARMS 2. CONTROL PANEL 3. MOST RECENT ALARM	
8.	Acknowledge the White alarm message	Verify the following: • Alarm Message disappears • Sensor Icon Blinking = false • Tank Icon Blinking = false • No. Current Alarms = the same as in Step 1 on the following workspaces: 1. CURRENT ALARMS 2. CONTROL PANEL 3. MOST RECENT ALARM	

6.6.5 Operation of Sensor Delta Band and Alarm Deadband

This test will verify that the operation of the sensor band and the alarm deadband for continuous sensors.

Prior to running this test the administrator should do the following:

1. Verify that the Rate of Change processing is disabled for Sensor Continuous-200001.

2. Verify that the parameters for Sensor Continuous-200001 are set to match the parameters in Table 1. (See Prerequisites)

3. Verify that the following workspaces are visible.

   - CONTINUOUS FUNCTIONAL TEST
   - MOST RECENT ALARM

Step	Action	Verify the Alarm Condition is:	Initial
1.	On the Continuous Functional Test Workspace • Set the Step Mode in ON. • Activate the RUN POINT PROCESSING button. • Enter **14.8** in milli-amps type-in box	NORMAL	
2.	Enter **14.4** in milli-amps type-in box	NORMAL	
3.	Enter **14.3** in milli-amps type-in box	NORMAL	
4.	Enter **14.8** in milli-amps type-in box	NORMAL	
5.	Enter **15.2** in milli-amps type-in box	ALARM-HIGH	
6.	Enter **15.3** in milli-amps type-in box	ALARM-HIGH	
7.	Enter **14.9** in milli-amps type-in box	ALARM-HIGH	
8.	Enter **14.6** in milli-amps type-in box	ALARM-HIGH	
9.	Enter **14.0** in milli-amps type-in box	NORMAL	
10.	Enter **13.5** in milli-amps type-in box	NORMAL	
11.	Enter **15.0** in milli-amps type-in box	ALARM-HIGH	
12.	Enter **10.6** in milli-amps type-in box	NORMAL	
13.	Enter **15.0** in milli-amps type-in box	ALARM-HIGH	
14.	Enter **9.9** in milli-amps type-in box	ALARM-LOW	
15.	Enter **10.2** in milli-amps type-in box	ALARM-LOW	
16.	Enter **10.5** in milli-amps type-in box	ALARM-LOW	
17.	Enter **11.0** in milli-amps type-in box	NORMAL	
18.	Enter **11.5** in milli-amps type-in box	NORMAL	

6.6.6 Operation of Enable/Disable Procedures

Verify that the following workspaces are visible.

- Continuous Function Test
- Tank Test-201
- Enable/Disable Point Processing
- Most Recent Alarm
- Discrete-200001 Sensor

Step	Perform	Expected Result	Initial
1.	On the Continuous Functional Test workspace enter 17 in the "milliamps" type-in box.	Verify the following: • Alarm message is displayed • Number of Current Alarms increases by one.	
2.	Position the enable/disable pointer over the Continuous-200001 sensor and activate the button "Toggle Point".	Verify that the following conditions occur: • Blue message is displayed: "The POINT-PROCESSING of CONTINUOUS-200001 has been DISABLED", with the timestamp of this change. • Previous alarm message disappears and the total "Number of Current Alarms" remains the same. • Point processing attribute of sensor changes to false. • Sensor turns gray. • Tank color is the same as the DISCRETE-200001 sensor color.	
3.	With the enable/disable pointer still over the Continuous-200001 sensor, activate the button "Toggle Point".	Verify that the following conditions occur: • Blue message is displayed: "The POINT-PROCESSING of CONTINUOUS-200001 has been ENABLED", with the timestamp of this change. • "Number of Current Alarms" remains the same. • Point processing attribute of sensor changes to true. • Sensor turns white. • Tank color will be based on the alarm precedence of the sensors associated with the tank.	
4.	Select a tank on the HTFF workspace that has a good mix of sensor types. Enter the chosen tank in the type-in box labeled "Tank on which to enable / disable point processing". Without moving the enable/disable pointer activate the button "Toggle Point".	Verify that the following conditions occur: • Blue message is displayed: "The POINT-PROCESSING of [the nearest sensor to the pointer—frequently the level sensor] has been DISABLED", with the timestamp of this change; • Point processing attribute of sensor changes to false; • Sensor turns gray; • Tank color is the same as the highest priority sensor alarm	

Step	Perform	Expected Result	Initial
5.	Activate the button "Toggle Point" again.	Verify that the following conditions occur: • Blue message is displayed: "The POINT-PROCESSING of [the nearest sensor to the pointer] has been ENABLED", with the timestamp of this change; • Point processing attribute of sensor changes to true; • Sensor turns white; • Tank icon turns white or the color of the highest priority sensor alarm.	
6.	Activate the button "All points in tank off".	Verify that the following conditions occur: • Blue messages are displayed: "The POINT-PROCESSING of [each sensor monitoring this tank] has been DISABLED" with the time of this change; • Point processing attribute of sensors changes to false; • Sensors turn gray; • All sensor alarms associated with this tank are cleared; • Tank color turns gray.	
7.	Activate the button "All points in tank on".	Verify that the following conditions occur: • Blue messages are displayed: "The POINT-PROCESSING of [each sensor monitoring this tank] has been ENABLED" with the time of this change; • Point processing attribute of sensors changes to true; • Sensors turn white; • Tank turns white.	
8.	On the Current Alarms workspace click on the Clear All Blue Messages button.	Verify the Blue Messages disappear from the Current Alarms list.	
9.	Hide the following workspaces: • Tank (selected in test) • Enable/Disable Point Processing • Discrete-200001 Sensor	Verify the workspaces are hidden.	

6.6.7 Miscellaneous Alarm Tests

The purpose of this test is to verify the relationships between the sensor icons, tank icon, Current Alarms Workspace and the annuciator.

Prior to running this test the administrator should do the following:

1. Make sure the following workspaces visible.

   - Functional Test Selection Workspace (Only to see the TANK-ICON-TEST-201 icon)
   - Continuous Functional Test Workspace. Also perform following:
     1. Set Step Mode On
     2. Activate the Run Point Processing button
   - Discrete Functional Test Workspace. Also perform following:
     1. Set Step Mode On
     2. Activate the Run Point Processing button
   - TANK TEST-201 workspace.
   - MOST RECENT ALARM workspace
   - Discrete-200001 Sensor

2. Make sure the enunciator is enabled. This is done by the following:

   - Bring up the TMACS-LIB workspace and its subworkspace labeled STARTUP-WS and Activate the "TOGGLE-AUDIBLE" button and verify that the display of the alarm-audible symbol changes from false to true.

Step	Perform	Expected Result	Initial
1.	Enter 1 in Dip-switch type-in box on the **Discrete Functional Test Workspace.** Enter a 11 in Milli-amp type-in box on the **Continuous Functional Test Workspace** *Note: May have to click on the Run Point Process button on both the Discrete and Continuous Function Test Workspaces.*	**Beep** Beep = true **Most Recent Alarm** • Message Status = Closing • Display Color = Yellow • Text Color = Red **Discrete Functional Test Workspace** **Discrete - 2001** • Discrete Icon Blinking = true • Display Color = YELLOW • Blink-off Color = GRAY • Alarm Aux Color = YELLOW	

Step	Perform	Expected Result	Initial
		Tank Icon Test-201 • Icon Blinking = true • Display Color = YELLOW • Blink-off Color = GRAY **Latest Alarm Message** • Display Color = Yellow --- **Continuous Functional Test Workspace** ***Continuous -2001*** • Cont. Icon Blinking = false • Display Color = GREEN • Blink-off Color = (N/A - skip) • Alarm Aux Color = TRANSPARENT **Tank Icon Test-201** • Icon Blinking = true • Display Color = YELLOW • Blink-off Color = GRAY **Latest Alarm Message** • Display Color = Yellow	
2.	Activate **ACK ALARMS** Button on Tank Test 201 status	**Beep** Beep = false --- **Most Recent Alarm** • Message Status = Acknowledged • Display Color = Yellow • Text Color = Black --- **Discrete Functional Test Workspace** **Discrete - 2001** • Discrete Icon Blinking = false • Display Color = YELLOW • Blink-off Color = (N/A - skip) • Alarm Aux Color = YELLOW	

Step	Perform	Expected Result	Initial
		Tank Icon Test-201 • Icon Blinking = false • Display Color = YELLOW • Blink-off Color = (N/A - skip) **Latest Alarm Message** • Display Color = Yellow --- **Continuous Functional Test Workspace** **Continuous -2001** • Cont. Icon Blinking = false • Display Color = GREEN • Blink-off Color = (N/A - skip) • Alarm Aux Color = TRANSPARENT **Tank Icon Test-201** • Icon Blinking = false • Display Color = YELLOW • Blink-off Color = (N/A - skip) **Latest Alarm Message** • Display Color = Yellow	
3.	*Enter 0 in Dip-switch type-in box* on the **Discrete Functional Test Workspace.**	*Beep* Beep = false --- ***Most Recent Alarm*** • Message Status = Alarm Disappears --- **Discrete Functional Test Workspace** **Discrete - 2001** • Discrete Icon Blinking = false • Display Color = GREEN • Blink-off Color = (N/A - skip) • Alarm Aux Color = TRANSPARENT **Tank Icon Test-201** • Icon Blinking = false • Display Color = GREEN • Blink-off Color = (N/A - skip)	

Step	Perform	Expected Result	Initial
		Latest Alarm Message • Display Color = YELLOW **Continuous Functional Test Workspace** **Continuous -2001** • Cont. Icon Blinking = false • Display Color = GREEN • Blink-off Color = (N/A - skip) • Alarm Aux Color = TRANSPARENT **Tank Icon Test-201** • Icon Blinking = false • Display Color = GREEN • Blink-off Color = (N/A - skip) **Latest Alarm Message** • Display Color = YELLOW	
4.	Enter a 17 in Milli-amp type-in box on the **Continuous Functional Test Workspace**	Beep Beep = true **Most Recent Alarm** • Message Status = ALARM HIGH • Display Color = RED • Text Color = YELLOW **Discrete Functional Test Workspace** **Discrete – 2001** • Discrete Icon Blinking = false • Display Color = GREEN • Blink-off Color = (N/A - skip) • Alarm Aux Color = TRANSPARENT **Tank Icon Test-201** • Icon Blinking = true • Display Color = RED • Blink-off Color = GRAY **Latest Alarm Message**	

Step	Perform	Expected Result	Initial
		• Display Color = YELLOW **Continuous Functional Test Workspace** **Continuous -2001** • Cont. Icon Blinking = true • Display Color = RED • Blink-off Color = GRAY • Alarm Aux Color = RED **Tank Icon Test-201** • Icon Blinking = true • Display Color = RED • Blink-off Color = GRAY **Latest Alarm Message** • Display Color = RED	
5.	Enter 1 in Dip-switch type-in box on the **Discrete Functional Test Workspace.**	Beep Beep = true **Most Recent Alarm** • Message Status = CLOSING • Display Color = YELLOW • Text Color = RED **Discrete Functional Test Workspace** **Discrete - 2001** • Discrete Icon Blinking = true • Display Color = YELLOW • Blink-off Color = GRAY • Alarm Aux Color = YELLOW **Tank Icon Test-201** • Icon Blinking = true • Display Color = RED • Blink-off Color = GRAY **Latest Alarm Message**	

Step	Perform	Expected Result	Initial
		• Display Color = YELLOW **Continuous Functional Test Workspace** **Continuous -2001** • Cont. Icon Blinking = true • Display Color = RED • Blink-off Color = GRAY • Alarm Aux Color = RED **Tank Icon Test-201** • Icon Blinking = true • Display Color = RED • Blink-off Color = GRAY **Latest Alarm Message** • Display Color = RED	
6.	Enter a **25** in Milli-amp type-in box on the **Continuous Functional Test Workspace**	Beep Beep = true **Most Recent Alarm** • Message Status = Reading Out Of Range • Display Color = WHITE • Text Color = BLACK **Discrete Functional Test Workspace** **Discrete – 2001** • Discrete Icon Blinking = true • Display Color = YELLOW • Blink-off Color = GRAY • Alarm Aux Color = YELLOW **Tank Icon Test-201** • Icon Blinking = true • Display Color = YELLOW • Blink-off Color = WHITE **Latest Alarm Message**	

Step	Perform	Expected Result	Initial
		• Display Color = YELLOW **Continuous Functional Test Workspace** **Continuous – 2001** • Cont. Icon Blinking = true • Display Color = WHITE • Blink-off Color = RED • Alarm Aux Color = RED **Tank Icon Test-201** • Icon Blinking = true • Display Color = YELLOW • Blink-off Color = WHITE **Latest Alarm Message** • Display Color = WHITE	
7.	Enter 3 in Dip-switch type-in box on the **Discrete Functional Test Workspace.**	Beep Beep = true **MOST RECENT ALARM** • Message Status = Reading Out Of Range • Display Color = WHITE • Text Color = BLACK **CURRENT ALARM SCREEN** • Message Status = Discrete 200001 Resets • Display Color = GREEN • Text Color = BLACK **Discrete Functional Test Workspace** **Discrete – 2001** • Discrete Icon Blinking = true • Display Color = GREEN	

Step	Perform	Expected Result	Initial
		• Blink-off Color = GRAY • Alarm Aux Color = TRANSPARENT **Tank Icon Test-201** • Icon Blinking = true • Display Color = WHITE • Blink-off Color = RED **Latest Alarm Message** • Display Color = WHITE **Continuous Functional Test Workspace** **Continuous – 2001** • Cont. Icon Blinking = true • Display Color = WHITE • Blink-off Color = RED • Alarm Aux Color = RED **Tank Icon Test-201** • Icon Blinking = true • Display Color = WHITE • Blink-off Color = RED **Latest Alarm Message** • Display Color = WHITE	
8.	Acknowledge alarm messages and hide the Point Processing Functional Test workspaces.	Verify the following: beep is silenced Point Processing Functional Test workspaces are hidden.	

6.7 LOGGING

6.7.1 Current

The data files in this section are created upon system startup and then around midnight are closed and moved to the history directory and another file with the current date is created.

6.7.1.1 Alarm Logging

Step	Perform	Expected Result	Initial
1.	Examine the almhst_YYYY_MM_DD_HHmm.dat. Where YYYY = the year MM = the month DD = the day HH = the hour mm = the minute *To examine the files it may be necessary to stop G2®. The directory is located at f:\BackedUp\TMACSData\Current.*	Verify the following: • High/low alarm conditions and resets recorded • Format match the description given in the LMSI External Letter, RGG-SDI-99-001, *TMACS Data File Formats, Release 11.0.*	
2.	Examine the equip_fail_YYYY_MM_DD_HHmm.dat. Where YYYY = the year MM = the month DD = the day HH = the hour mm = the minute *To examine the files it may be necessary to stop G2®. The directory is located at f:\BackedUp\TMACSData\Current.*	Verify the following • Loss of communication messages are recorded • Format match the description given in the LMSI External Letter, RGG-SDI-99-001, *TMACS Data File Formats, Release 11.0.*	

6.7.1.2 Discrete Sensor Data Logging

Step	Perform	Expected Result	Initial
1.	Examine the discrete_sensor_history_YYYY_MMDD.ascii. Where YYYY – is the year created MM – is the month created DD – is the day created *To examine the file it may be necessary to stop G2®. The directory is located at f:\BackedUp\TMACSData\Current.*	Verify the following: • Reading messages are being recorded properly. • Format match the description given in the LMSI External Letter, RGG-SDI-99-001, *TMACS Data File Formats, Release 11.0.*	

6.7.1.3 Continuous Sensor Data Logging

Continuous sensor history is recorded in the continuous_sensor_history_YYYY_MMDD.ascii file where

YYYY – is the year that the file was created.
MM – is the month that the file was created.
DD – is the day that the file was created.

To examine the file it may be necessary to stop G2®. The directory is:

- f:\BackedUp\TMACSData\Current.

Step	Perform	Expected Result	Initial
1.	Examine the continuous_sensor_history _YYYY_MMDD.ascii. Where YYYY – is the year created MM – is the month created DD – is the day created *To examine the file it may be necessary to stop G2®. The directory is located at f:\BackedUp\TMACSData\Current.*	Verify the following: • Reading messages are being recorded properly. • Format match the description given in the LMSI External Letter, RGG-SDI-99-001, *TMACS Data File Formats, Release 11.0.*	

6.7.2 Nightly File Creations

Eight files are created nightly by TMACS (*rdbms files are created around 4:00 AM, all others created around 12:00 AM)*

Step	Perform	Verify	Initial
1.	Let the system run over night. (*Note: Test Director may opt to change the system clock to simulate overnight. This requires time periods around midnight and 4 AM)* Check the location f:\BackedUp\TMACSData\History to determine if the files have been created.	Verify that the following flat files are created: • almhst_yyyy_mmdd_mmss.dat • continuous_sensor_history yyyy_mmdd.ascii • discrete_sensor_history_yyyy_mmdd.ascii • equip_fail_yyyy_mmdd_mmss.dat • perf_data_yyyy_mmdd.dat • dst_data_yyyy_mmdd_mmss.rdbms • sst_data_yyyy_mmdd_mmss.rdbms where: yyyy = the year mm = the month dd = the day hh = the hour mm = the minute Verify that the fields in the files match the description given in the LMSI External Letter, RGG-SDI-99-001, *TMACS Data File Formats, Release 11.0.*	

6.8 PERFORMACE

6.8.1 CPU Use Vs Number of Continuous Points/Sec Performance Test

Step	Perform	Expected Result	Initial
1.	On the Point Processing Performance Test workspace click on the "**CPU Use Versus Number of Continuous Points/Sec**" button.	Verify the correct workspace is shown.	
2.	Click on the "Start Performance Test" button. After the **Test Running** box turns to FALSE examine the results. (*The test will take about **20 minutes** to run*)	Verify the test runs and that the %CPU/pt/sec values are less than 0.94 for all values of points/second.	

Step	Perform	Expected Result	Initial
3.	Click on the "Print" button.	Verify that the workspace prints. Attach the printout to this test procedure.	
4.	Hide the Performance Test workspace(s)	Verify the workspace(s) is hidden.	

6.8.2 CPU Use Vs Number of Discrete Points/Sec Performance Test

Step	Perform	Expected Result	Initial
1.	On the Point Processing Performance Test workspace click on the "**CPU Use Versus Number of Discrete Points/Sec**" button.	Verify the correct Performance Test workspace is shown.	
2.	Click on the "Start Performance Test" button. After the **Test Running** box turns to FALSE examine the results. (*The test will take about **20 minutes** to run*)	Verify that the test runs and that the %CPU/pt/sec values are less than 0.82 for all values of points/second.	
3.	Click on the "Print" button.	Verify that the workspace prints. Attach the printout to this test procedure.	
4.	Hide the Performance Test workspace(s)	Verify the workspace(s) is hidden.	

6.8.3 CPU Use Vs Pt-Processing Function for Continuous Points Performance Test

Step	Perform	Expected Result	Initial
1.	On the Point Processing Performance Test workspace click on the Click on the "**CPU Use Versus Point-Processing Function for Continuous Points**" button.	Verify the correct Performance Test workspace is shown.	

Step	Perform	Expected Result	Initial
2.	Click on the "Start Performance Test" button. After the **Test Running** box turns to FALSE examine the results. (*The test will take about **20 minutes** to run*)	Verify that the test runs and that for each Point Processing Breakdown that the following criteria are met. Update Pt. the %CPU per points/sec < 0.23 Delta Check the %CPU per points/sec < 0.15 Alarm Check the %CPU per points/sec < 0.07 ROC Check the %CPU per points/sec < 0.12 Log to Disk the %CPU per points/sec < 0.57	
3.	Click on the "Print" button.	Verify that the workspace prints. Attach the printout to this test procedure.	
4.	Hide the Performance Test workspace	Verify the workspace is hidden.	

6.8.4 CPU Use Vs Point-Processing Function for Discrete Points Performance Test

Step	Perform	Expected Result	Initial
1.	On the Point Processing Performance Test workspace click on the Click on the "**CPU Use Versus Point-Processing Function for Discrete Points**" button.	Verify the correct Performance Test workspace is shown.	
2.	Click on the "Start Performance Test" button. After the **Test Running** box turns to FALSE examine the results. (*The test will take about **20 minutes** to run*)	Verify that the test runs and that for each Point Processing Breakdown that the following criteria are met. for Update Pt. the %CPU per points/sec < 0.28 for Alarm Check the %CPU per points/sec < 0.07 for Log to Disk the %CPU per points/sec < 0.57	
3.	Click on the "Print" button.	Verify that the workspace prints. Attach the printout to this test procedure.	
4.	Hide the Performance Test workspace	Verify the workspace is hidden.	

6.9 SERVICE REQUESTS

6.9.1 SR 103 – Make the GSI Data Service Priority Lower Than The Processing Rule Priority

Step	Perform	Expected Result	Initial
1.	Display the priority for the GSI Data Service Display the priority for the Processing Rule	Verify the GSI Data Service priority is lower than the Processing Rule priority	

6.9.2 SR 132 – Add Individual Trend Graphs For Discrete Sensors

Step	Perform	Expected Result	Initial
1.	Select a Discrete Sensor at random *(Note: Only discrete sensor displayed to the TMACS operator can be displayed by the operator.)* Click on the portion of any sensor icon that looks like a little chart.	Verify that a Sensor Trend workspace for the sensor chosen and contains the following. • Chart • HIDE WINDOW *(X)* button • DETAIL *(D)* button. • PRINT (P) button	
2.	Examine the Chart.	Verify the following: • The values line color is black.. • The time scale of the horizontal time axis is 7 days and that some dates are shown.	
3.	Click on the Print button.	Verify the Sensor Trend workspace is printed.	
4.	Click on the HIDE WINDOW button.	Verify that the workspace is hidden.	

Step	Perform	Expected Result	Initial
5.	Click on the Details (**D**) button.	Verify the Sensor Details workspace for the chosen sensor is displayed with the following information: • **Hide** *(X)* button • **Print** (P) button • **Update** *(U)* button • And the following sensor information groups.	

Current Reading	Last Update Method
Last Good Reading	
Quality Status	Test Processing
Upper Instrument Limit	Alarm Processing
Lower Instrument Limit	Logging
Point Processing	Raw Value
ROC Processing	Polling Freq. Sec.
Station Status	Waste Level
Polling Freq. Index	Level status mode
Displacer Postion	Alarm status mode
Level Status	
Alarm Status	
Validity Interval	
Expiration Time	
Formula Expression	
Formula Parameter	

6.9.3 SR 166 – Modify TMACS To Display the K-Basin Communications Alarm As Red

Step	Perform	Expected Result	Initial
1.	Generate a K-Basin Communications failure.	Verify the K-Basin Communications Alarm displayed on the Monitored Systems – K Basin workspace is shown in red.	

6.9.4 SR 403 – Modify TMACS To Generate A Sensor Limits List

Step	Perform	Expected Result	Initial
1.	Log onto TMACS in the administrator mode. Generate a Sensor Limits	Verify the report shows the limits for the define sensor.	

Step	Perform	Expected Result	Initial
	Report.		

6.9.5 SR 434 – Modify TMACS To Read Pressure Sensors through ENRAF CIU device.

This service request is completed upon successful completion of section 6.5.2.2 "Conversion of Enraf® CIU Pressure Sensor Output to Engineering Units"

6.9.6 SR 752 – Modify ENRAF Driver To Properly Handle "!" Commands

Step	Perform	Expected Result	Initial
1.	Using the ENRAF emulator generate several of the "! " Commands	Verify that a white message is generated for each of the "!" command emulated and that the message identifies the appropriate command.	

6.9.7 SR 856 – Devise Method To Notify The Operator When An ENRAF Level Gauge Has A Status Other Than "-"

This service request is completed upon successful completion of section 6.4.4 "ENRAF Non-Operating Mode Report"

6.9.8 SR 857 – Correct Unknown Sensor Report To Display Only Sensors Associated With Tanks.

Step	Perform	Expected Result	Initial
1.	Display the Unknown Sensor Report	Verify the only sensors associated with tanks are displayed..	

6.9.9 SR 858 – Modify The Suspect Sensor IO Station Report To Not Display Stations With A Polling Frequency of Zero

Step	Perform	Expected Result	Initial
2.	Select 1 or 2 IO Stations at random. Set the Polling Frequency for the Stations to be 0. Display the Suspect Sensor IO Station Report.	Verify the Stations with the polling frequency set to 0 are not displayed.	

6.9.10 SR 860 – Correct Problem of Old Print Workspace Being Displayed For Multiple Sensor Trends

Step	Perform	Expected Result	Initial
1.	Run and inspect command that displays the buttons that invoke the Old Print Workspace.	Verify that there is none listed.	
2.	Select 1 or 2 Multiple Sensor Trends at random. Select the **Print** button.	Verify the Old Print Workspace is not displayed and that the workspace is printed properly.	

6.9.11 SR 862 – Correct Problem Where Sensor With Alarm Processing Turned Off Does Not Restore To Correct Color When Communications Are Re-Established

Step	Perform	Expected Result	Initial
1.	Select an active sensor at random. Disable alarm processing for the chosen sensor. Using the emulator transmit a value that is in the alarm range for the chosen sensor	Verify an Alarm Message is not generated.	
2.	Using the emulator transmit a value that is out of instrument range for the chosen sensor.	Verify a white alarm message is generated for the chosen sensor and that the sensor color turns to white.	
3.	Using the emulator transmit a value that is in the normal operating range for the chosen sensor.	Verify the chosen sensor color turns to green.	

6.9.12 SR 865 – Set Polling Frequency Of Double Shell Tanks To 10 Minutes Or Less

Step	Perform	Expected Result	Initial
1.	Run an inspect command that displays the Double Shell Tanks with a polling frequency of more than 10 minutes.	Verify that there is none displayed.	

6.9.13 SR 867 – Add Ability To Place A Sensor Into Test Mode

This service request is completed upon successful completion of section 6.3.1.2 "Operation of Sensor Details"

6.9.14 SR 869 – Configure Enraf Of Tanks BY102 and S110

Step	Perform	Expected Result	Initial
1.	Display Tank BY-102 workspace.	Verify the ENRAF for this tank is displayed.	
2.	Display the sensor details for the ENRAF sensor	Verify the following: • data source is from an ENRAF CIU • sensor tag name is BY102-LI-R005-01	
3.	Repeat steps 1 and 2 for Tank S-110	Verify the following: • data source is from an ENRAF CIU • sensor tag name is S110-LI-R003-01	

6.9.15 SR 871 – Change Gauge Addresses for ENRAF Level Devices in Tanks AP105-AP108

Step	Perform	Expected Result	Initial
1.	Display the sensor details for the ENRAF level device in tank AP105	Verify the sensor is configured for gauge 31. *(Note the gauge address is the last digit of the Formula Parameter)*	
2.	Display the sensor details for the ENRAF level device in tank AP106	Verify the sensor is configured for gauge 32. *(Note the gauge address is the last digit of the Formula Parameter)*	
3.	Display the sensor details for the ENRAF level device in tank AP107	Verify the sensor is configured for gauge 33. *(Note the gauge address is the last digit of the Formula Parameter)*	
4.	Display the sensor details for the ENRAF level device in tank AP108	Verify the sensor is configured for gauge 34. *(Note the gauge address is the last digit of the Formula Parameter)*	

6.9.16 SR 873 – Create Report That Displays Active Sensors With Alarm Processing Disabled

This service request is completed upon successful completion of section 6.4.5 "Sensor Disable Alarm Report".

6.10 TMACS SHUTDOWN

6.10.1 Telewindows® Session

Step	Action	Verify	Initial
1.	On the TMACS screen, type Control-Y.	Verify that the user mode selection workspace appears on the screen.	
2.	Edit the 'G2® user mode' to be "shutdown" and click on the END.	Verify that a warning message appears indicating that this function is not available. Verify the 'G2® user mode' has reverted back to "t2-user".	

6.10.2 Central Console

Step	Action	Verify	Initial
1.	On the TMACS screen, type Control-Y.	Verify that the user mode selection workspace appears on the screen.	
2.	Edit the 'G2® user mode' to be "shutdown" and click on the END.	Verify that G2® terminates.	
3.	As part of the shutdown process TMACS creates the following files in the directory F:\BackedUp\TMACS\Data\Current: • Continuous_Shutdown_History_ YYYY_MMDD.ascii. • Discrete_Shutdown_History_ YYYY_MMDD.ascii. Where: YYYY – is the year that the file was created. MM – is the month that the file was created. DD – is the day that the file was created.	Verify that the files were created and the format match the description given in the LMSI External Letter, RGG-SDI-99-001, *TMACS Data File Formats, Release 11.0.*	

7. EXCEPTION SHEETS

The following page is an example of the form used to describe exceptions found during the running of this Acceptance Test Procedure. If exceptions are found, copies of this sheet should be completed and included in the Acceptance Test Report.

Acceptance Test Procedure
Exception Record

Exception No.	Step No.	Date
Originator/Organization		
Description:		
Resolution:		
Resolution Date:		

Title/Organization	Signature	Date
Test Director		
Cognizant Engineer		
QA		
ESH		
Safety		

8. PARTICIPATION RECORD SHEET

The following page is the form used to record the participants involved in the running of this Acceptance Test Procedure. This sheet should be completed and included in the Acceptance Test Report.

Acceptance Test Procedure
Participation Record

_____ _____

TEST DIRECTOR

TEST PERFORMANCE GROUP

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

TEST WITNESS

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

9. ACCEPTANCE RECORD SHEET

The following page is the form used record the participants involved in the running of this Acceptance Test Procedure. This sheet should be completed and included in the Acceptance Test Report.

Acceptance Test Procedure
Acceptance Record

CERTIFICATION OF SATISFACTORY EXECUTION

All of the test cases for this test procedure have been tested and all exceptions for this test procedure have been resolved.

_____ _____
Test Director

_____ _____
Cognizant Engineer

_____ _____
Quality Assurance

_____ _____
Safety

_____ _____
Environmental Health