FEB 27 1996 Stan 21 (2k)

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 606747

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	Characterization Monitoring Development	606747
5. Proj./Prog./Dept./Div.:	**6. Cog. Engr.:**	**7. Purchase Order No.:**
95C-EWW-451/Tank Characterization/75240/N2144	Cuong V. Vo	N/A

8. Originator Remarks:
(ETN-95-0033, USQ Screening #TF-95-0046)
This ATP is being transmitted for approval.

9. Equip./Component No.: Gas Charterization Sys.

10. System/Bldg./Facility: 241 General/105AN/101AW

11. Receiver Remarks:

12. Major Assm. Dwg. No.: H-4-100434

13. Permit/Permit Application No.: N/A

14. Required Response Date: 02/26/96

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-ATP-172	--	0	GAS CHARACTERIZATION SYSTEM SOFTWARE ACCEPTANCE TEST PROCEDURE	Q	1	1	1

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment 6. Receipt acknowledged

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1	1	Cog.Eng. CV Vo	Cuong Vo	2/26/96	L6-36	DD Tate	D Tate	2/26/96	L6-37	1	1
1	1	Cog. Mgr. RE Bauer	RE Bauer	2/26/96	L6-36	S Kanjilal	Sarbat Kanjilal	2/26/96	L6-37	1	1
						JR Bunch	JR Bunch	2/26/96	L6-37	1	1
						EK Straalsund		2/26/96	L6-37	1	1
		Env.									
1	1	QA CA Sams	C.A. Sams	2/26/96	S5-13						
1	1	TC Schneider	TC Schneider	2/26/96	L6-37						

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
CV Vo Cuong Vo 2/26/96 Signature of EDT Originator Date	N/A Authorized Representative for Receiving Organization Date	RE Bauer RE Bauer 2/26/96 Cognizant Manager Date	[] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (04/94) GEF097

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GAS CHARACTERIZATION SYSTEM SOFTWARE ACCEPTANCE TEST PROCEDURE

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

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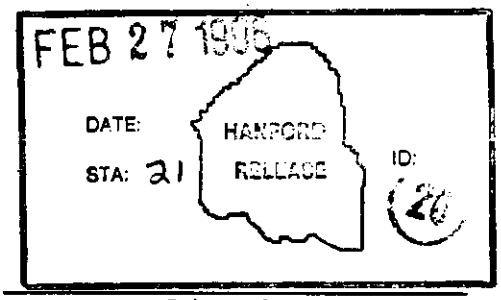
Key Words: Hydrogen, Ammonia, Nitrous Oxide, Methane, Gas Characterization, Software, Monitoring, Tanks, GCS.

Abstract: This document details the Software Acceptance Testing of gas characterization systems. The gas characterization systems will be used to monitor the vapor spaces of waste tanks known to contain measurable concentrations of flammable gases.



Release Approval — Date

Release Stamp

Approved for Public Release

GAS CHARACTERIZATION SYSTEM SOFTWARE ACCEPTANCE TEST PROCEDURE

(WHC-SD-WM-ATP-172)

APPROVAL DESIGNATOR Q

Issued by

Characterization Monitoring Development

February 1996

Westinghouse Hanford Company

TEST EXECUTION SHEET

TEST PERSONNEL				
TITLE	PRINT NAME	SIGNATURE	INITIAL	DATE
SYSTEM ENGINEER				
TEST DIRECTOR				
TEST ENGINEER				

TEST EXECUTION				
TITLE	PRINT NAME	SIGNATURE	INITIAL	DATE
SYSTEM ENGINEER				
TEST DIRECTOR				
TEST ENGINEER				

TEST APPROVAL AND ACCEPTANCE

_____Without Exception

_____With Exception - Resolved

_____With Exception - Outstanding

_____

System Engineer Date
Test Director

CONTENTS

GAS CHARACTERIZATION SYSTEM
SOFTWARE ACCEPTANCE TEST PROCEDURE

1.0 INTRODUCTION

1.1 PURPOSE

This document serves as both the software test plan and software acceptance test procedure for testing the software that was developed to operate the gas characterization system (GCS). Together with the forthcoming acceptance test report, this document satisfies the requirements in the EP (WHC-CM-6-1), "Design Verification Requirements". The selected method of design verification is qualification testing.

1.2 SCOPE

The testing described in this document covers the software that controls and acquires data for the gas characterization system. In addition to the software, this testing will verify and validate the data acquisition and control hardware for the GCS. Separate ATPs will be prepared for the hardware features not related to software.

1.3 ACRONYMS

GCS	Gas Characterization System
ATP	Acceptance Test Procedure
ATR	Acceptance Test Report
EP	Standard Engineering Practice (WHC-CM-6-1)
SFR	Software Functional Requirements
WHC	Westinghouse Hanford Company
GC1	Gas Chromatograph #1
GC2	Gas Chromatograph #2
FTIR	Fourier Transform Infra-Red
NI	National Instrument
VI	Virtual Instrument
MTI	Microsensor Technology Inc.
HLAN	Hanford Local Area Network
QA	Quality Assurance

2.0 SOFTWARE TEST PLAN

The software acceptance test defined by this document will test the features of the software described in WHC-SD-WM-SFR-012, Rev.0, "Functional Requirements for Gas Characterization System Computer Software". A comprehensive software test will test every feature based on the functional details listed in Section 3. Related hardware will be indirectly tested.

2.1 PERSONNEL REQUIREMENTS

Each organization participating in the conduct of this test will designate personnel to assume the responsibilities and duties as defined within their respective roles. The names and signatures of these people shall be provided to the Test Engineer for listing on the Test Engineer's copy of the Test Execution Sheet prior to the performance of any part of this test.

2.1.1 System Engineer/Test Director

The System Engineer/Test Director's responsibilities are as follows:

- Assume responsibility for the performance, preparation, and adequacy of the test.
- Notify all interested parties when a change is made in the testing schedule.
- Take necessary action to clear exceptions to the ATP.
- Determine if the changes to ATP are classified as Major or Minor.
- Sign Test Execution Sheet when ATP is approved and accepted.
- Sign Exception Sheet when exception has been resolved.

2.1.2 Test Engineer

The Test Engineer's responsibilities are as follows:

- The engineer will perform the test. The System Engineer/Test Director may also serve as a Test Engineer.
- Verify the instruments are in current calibration.
- Perform the test as described in this document.
- Stop any test which, in the judgment of the Test Engineer, may cause damage to the system or present an unsafe condition.
- Coordinate efforts with all other assigned test performance team members.
- Observe the test and record test data.
- Record exceptions and test steps which are not performed.

- Sign Test Execution Sheet when ATP has been performed.

- Sign Exception Sheet when exceptionable retest has been performed or exception cleared.

2.1.3 WHC Quality Assurance

The WHC QA organization responsibilities are as follows:

- Review and approve ATP.

- Verify that all testing has been completed by review and approve the Acceptance Test Report (ATR).

- Review and approve any Major procedure changes. See section 2.3 for definition of Major and Minor procedure changes.

2.1.4 Others

No further witnesses are required during testing but interested observers will be allowed.

2.2 TEST CONDITIONS

2.2.1 Test Conditions

- All software testing will be performed in the WHC building 306E laboratory.

- HLAN network drop shall be available.

- AC power for the GCS shall be available.

2.2.2 Safety

A specific Job Hazard Analysis Checklist shall be prepared and approved prior to acceptance testing. A pre-job safety briefing shall also be conducted with all test personnel by the System Engineer/Test Director.

2.3 ACCEPTANCE TEST PROCEDURE CHANGE CONTROL

Acceptance testing shall be conducted in accordance with the steps and requirements specified in this procedure. Field changes may be incorporated into the test procedure and are designated as either Minor or Major.

2.3.1 Major Procedure Change

A major procedure change is defined as any change which affects the scope, intent or quality of the acceptance test procedure. Major field changes require written approval of

the System Engineer, Test Director, and WHC Quality Assurance. Major field changes shall also be recorded as a test exception.

2.3.2 Minor Procedure Change

A minor procedure change is defined as a change which does not affect the intent of the acceptance test procedure. Typically minor changes involve procedure clarifications or changes to the sequence of test steps to facilitate conduct of testing. Minor field changes can be made in pen and ink and require approval of the System Engineer/Test Director.

2.4 TEST EXECUTION

The acceptance test procedure detailed in Section 4 shall be performed in sequential steps starting with Section 4. The Test Director/System Engineer may direct performance of major sections of the procedure out of sequence if the testing does not compromise the intent of the ATP. The Test Engineer will check mark every test step and verify readings are recorded in the spaces provided as each step is completed.

It is the intent to perform this procedure uninterrupted from beginning to end. If the testing is terminated due to time constraints, the Test Director will determine the appropriate test termination point and the terminated test configuration will be noted in the Test Log. The test will restart at the next shift by reestablishing the noted test configuration. If testing is terminated due to a Test Exception, the system will be placed into a safe configuration and noted in the Test Log if testing cannot continue until the Test exception is resolved. If testing may continue, the initial conditions will be established per the next test section. Upon Test Exception Resolution, the test configuration noted in the Test Log will be reestablished and the appropriate sections of the test will be re-performed per the Test Exception Resolution requirements.

2.4.1 Without Exception

- Check applicable space on the test procedure to show that the ATP has been performed and no exceptions have been recorded.
- Sign and date Text Execution Sheet in the spaces provided.
- Distribute requisite copies and send master of ATP to the ATR preparer.

2.4.2 With Exception/Resolved

- Check applicable space on Test Execution Sheet to show that the ATP has been performed with exceptions recorded and resolved.
- Sign and date Test Execution Sheet in the spaces provided.
- Distribute requisite copies and send master of ATP to the ATR prepare.

2.4.3 With Exception/Outstanding

- Check applicable space on Test Execution Sheet to show that the ATP has been performed with exceptions recorded, part or all of which are presently outstanding, unresolved.
- Sign and date Test Execution Sheet in the spaces provided.
- Distribute requisite copies and send master of ATP to the ATR prepare.

2.5 RECORDING AND RESOLVING EXCEPTIONS

2.5.1 General

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

2.5.2 Recording

- Number each exception sequentially as it occurs and record it on an Test Exception Sheet.
- When action taken results in an acceptable retest, sign and date Retest Execution and Acceptance section of the Exception Sheet.
- When action taken does not involve an acceptable retest, strike out the Retest Execution and Acceptance section of the Exception Sheet. Resolve exception as shown under 2.5.3 below.

2.5.3 Approval and Acceptance

- The System Engineer provides final approval and acceptance of exception by checking one of the following on Exception Sheet:

- Retest Approved and Accepted: Applicable when Retest Execution and Acceptance section is completed.

- Exception Accepted-As-Is: Requires detailed explanation.

- Other: Requires detailed explanation.

- The System Engineer signs and dates the Exception Sheet and obtains other internal approval, if required.

2.5.4 Distribution

Distribute requisite copies of completed Exception Sheets to the ATR prepare.

3.0 SOFTWARE FUNCTIONS

The GCS computer System consists of several individual computer components necessary to provide control and data acquisition functions for the GCS analytical instruments. Two gas chromatograph instruments (GC1 computer and GC2 computer) are used to monitor Hydrogen, Nitrous Oxide, and Methane in the tank vapor space. The FTIR instrument (FTIR computer) monitors Ammonia content in the same gas stream.

The GC1, GC2 and FTIR computers are networked to the host computer GCS1HOST using the Microsoft Windows[1] NT multi-tasking operating system and networking software. (Note: Currently, for the two systems being installed, the Host computer for the first system will be designated GCS1HOST and the Host computer for the second system will be designated GCS2HOST. This document will refer to the Host computer as GCS1HOST). This allows the system components to function in parallel to control the instruments, sensors, and electric valves. Additionally, the computers must perform mathematical functions (i.e. integrate the area under the curve) to produce "Calculated Concentrations". Controlling the instruments with these microcomputers, requires not only vendor supplied software, but also configuration, automation, and integration programming. Integration software consists of several systems. LabView[2] VI system provides process data acquisition and control of the automatic calibration feature for the gas chromatograph instruments. GC1 and GC2 software systems provide an automated process for data configuration and handling. A modified vendor supplied software version (Win-IR) gives the FTIR the capabilities of continuous sampling and data configuration.

[1]Windows is a trademark of Microsoft Corporation

[2]LabView is a trademark of National Instruments Corporation

3.1 LabView DATA ACQUISITION CONTROL SYSTEM

3.1.1 Operator Interface Control and Indicator Function

- Provide real time display on front panel for process data such as pressure, flow, and temperature.

- Accept control inputs from front panel for data file recording and gas chromatographs calibration. Details to these control inputs will be described in section 3.2.2 and 3.2.4

3.1.2 Data File Recording and Archiving Function

- Data files will be logged based on the file configuration control inputs as follows:
  - Requires complete archive path.
  - Data frequency.
  - Toggle button to Save or Not Save to file.

- The process data file will be automatically generated once at the beginning of each day and uniquely named using a date stamp.

- At the beginning of each day, the data file of the previous day will be archived across the HLAN per the predefined archive path.

3.1.3 HLAN network failure mode

- Data will be preserved by saving locally.

- Provide adequate data storage for a minimum of one week.

3.1.4 GCs Calibration Control Function

- Accept calibration control inputs on front panel as follows:
  - Time start
  - Duration

- Provide signals to control auto calibration valves.

- Mark data file to identify calibration sample.

3.2 GAS CHROMATOGRAPH 1 AND 2 DATA SYSTEMS

The GC1 and GC2 data systems are design to have the same funtionality except that GC1 measures hydrogen gas and GC2 measures methane and nitrous oxide gases.

3.2.1 EZChrom 200 Data System Function

- Controls and aquires data from MTI Gas Chromatograph. Software is vendor suppied.

- User defined method programs are used to analyze chromatogram data and calculate component concentrations.

3.2.2 Organize and Format EZChrom Data

- Custom software (GC1APP32.EXE and GC2APP32.EXE) collects and organizes EZChrom data.

  - Organized by date
  - Organized by run or index number

3.2.3 Organize Data Following a System Outage or Date Change

- Software automatically indexes filenames following a system outage or upon date change.

3.2.4 Interface with Labview VI

- Data from GCs is passed to and displayed in Labview.

- Calibation data is flagged based upon external valve operation initiated from Labview.

3.2.5 Data Compression and HLAN Transfer

- At a pre-defined time each day, all GC data will be compressed and sent to archive over HLAN connection.

3.2.6 Data Handling During Network Outage

- System is required to store archive data locally in the event of a network failure or interruption.

3.3. FTIR DATA SYSTEM

3.3.1 Win-IR Data System Function

- Controls and aquires data from BIO-RAD Infra-Red Spectrometer. Software is vendor suppied.

- User defined method programs are used to analyze interferogram data and calculate component concentrations.

3.3.2 Organize and Format Win-IR Data

- Custom software with modified vendor supplied software continuous collects and organizes data.
  - Organized by date
  - Organized by index number in sequential order

3.3.3 Organize Data Following a System Outage or Date Change

- Software automatically indexes filenames following a system outage or upon date change.

3.3.4 Data Compression and HLAN Transfer

- At a pre-defined time each day, all FTIR data will be compressed and sent to archive over HLAN connection.

3.3.5 Data Handling During Network Outage

- System is required to store archive data locally in the event of a network failure or interruption.

4.0 ACCEPTANCE TEST PROCEDURE

The Test Engineer is expected to be familiar with Windows operating system, WindowsNT operating system, LabView VI, EZChrom data system, and Win-IR data system.

The following procedure defines the testing that will be performed. If any step cannot be successfully performed or results in an abnormal condition, record a description of the condition in the test log and prepare a Test Exception to track the probem resolution.

For each test exception recorded, enter an identifying number in the "EXCEPTION NUMBER" Column of the Test Exception sheet attached.

Reproduce Test Exception sheet as needed, and attach the additional pages to this procedure, to record all test exceptions noted during testing.

4.1 INITIAL SETUP

The following procedure describes steps for setting up the GCS systems. Since all data is transferred via HLAN to the 300 Area Data Server (LABHOST), a prerequisite to this procedure is to ensure that LABHOST is ON and connected to the network.

STEP 1:

[] Ensure that all instruments (GC1, GC2, FTIR, and Process

Instruments) are powered up. Power up all computer systems in the following sequence GC1, GC2, GCS1HOST, and FTIR.

NOTE: Sequence of Start-Up of these computer systems is critical to ensure proper establishment of network communications.

With the exception of GCS1HOST all systems share a common monitor/keyboard/mouse which is activated by depressing the buttons on the switching module.

STEP 2:

[] Log-On to all computer systems. Logon scripts are required. Contact system administrator or test engineer for password list.

STEP 3:

[] On the GCS1HOST computer, verify that the following shares and network drives are connected.

NOTE: The name and location these drives is critical to proper system operation.

[]	SHARE	Drive D:\	AS	FTIR
[]	CONNECT	Drive F:	TO	\\GC1\GC1
[]	CONNECT	Drive G:	TO	\\GC2\GC2
[]	CONNECT	Drive H:	TO	\\LABHOST\GCS1DATA

If shares and network drives do not exist and network shares cannot be establish or network drives cannot be connected, please consult with System Administrator or System Engineer to resolve these problems.

STEP 4:

[] On the FTIR computer, verify that the following network drive is connected.

[] CONNECT Drive D: \\GCS1HOST\FTIR

If shares and network drives do not exist and network shares cannot be establish or network drives cannot be connected, please consult with System administrator or System engineer to resolve these problems.

NOTE: The name and location these drives is critical to proper system operation.

STEP 5:

[] Synchronize GCS1HOST, GC1, GC2, and the FTIR computer systems to the current time and date.

STEP 6:

[] Instrumentation and computer equipment involved in the test

is at ambient operating temperature between 20°C and 25°C.

4.2 LabView VIRTUAL INSTRUMENT DATA SYSTEM

NOTE: EQUIPMENT AND INSTRUMENT DESIGNATOR DEFINITION:
EXAMPLE: FIT (A) - * (B) 10 (C) - Y (D)

A. EQUIPMENT/INSTRUMENT IDENTIFIER PER H-14-020000
B. ONE OR TWO DIGIT TANK FARM LOCATION NUMBER (1=AN, 31=SY)
C. TWO DIGIT SEQUENTIAL, LOOP OR DEVICE IDENTIFIER
D. ALPHA CHARACTER TANK IDENTIFIER

4.2.1 Test Preparation

STEP 1:
[] Verify that the GCS1HOST computer analog I/O card is connected to the AMUX card in the Analog drawer.

STEP 2:
[] Verify that the GCS1HOST computer serial card is connected to the 5B digital card in the Discrete drawer.

STEP 3:
[] Verify that all process instruments, which will be processed by LabView GCSVI.VI, are powered up per the Test Director's instruction.

STEP 4:
[] Place the gas delivery system into normal operating conditions under System Engineer's direction with the following parameter settings.

[] MAIN SAMPLE FLOW: 0.5 CFM / 2.5-3.0" H_2O
[] GC1 SAMPLE FLOW: 5-10 CC/M
[] GC2 SAMPLE FLOW: 5-15 CC/M

STEP 5:
[] On the GCS1HOST computer, close all active windows under Program Manager.

STEP 6:
[] Start LabView program by selecting "GCSVI" icon from GCSAPPS group.

STEP 7:
[] Verify that the GCSVI.VI front panel is displayed on the GCS1HOST computer.

STEP 8:
[] Click on the LabView continuous run button to run GCSVI.VI application.

4.2.2 ON/OFF Switch Control Test

STEP 1:

[] Set front panel controls as follows:

FILE CONFIGURATION:

* ARCHIVE PATH:	H:\NI	(DEFAULT)
* LOG INTERVAL SEC:	60	(DEFAULT)
* RECORD DATA:	PUSH TO SAVE	

GC1 NT-20
CALIBRATION

* TIME:	19:00	(DEFAULT)
* DURATION:	15	(DEFAULT)

GC2 NT-30
CALIBRATION

* TIME:	20:00	(DEFAULT)
* DURATION:	15	(DEFAULT)

STEP 2:

[] Toggle the ON/OFF switch to ON position and visually verify that the GCSVI.VI strip chart recorder is started.

STEP 3:

[] Toggle the ON/OFF switch to OFF position and visually verify that the GCSVI.VI strip chart recorder is stopped.

4.2.3 Process Instruments Readouts

STEP 1:

[] Toggle the ON/OFF switch to ON position.

STEP 2:(Pressure and Flow instruments)

[] Record and verify that the instrument LCD display and the "GCSVI.VI" window display agree within 5% for each instrument listed on TABLE 4.2.3.1.

STEP 3:(Pressure and Flow instruments)

[] Establish different instruments readings by decreasing or increasing main sample flow control valve FCV-*13 per the System Engineer's direction.

[] Repeat STEP 2.

STEP 4:(Temperature instruments)

[] Open the JBX-*10 FU-5.

[] Verify that the LED display on the temperature transmitter TIT-*40 and the display on GCS1HOST computer agree within %5.

[] Record both readings into TABLE 4.2.3.2 for TIT-*40.

STEP 5:(Temperature instruments)
[] Close the JBX-*10 FU-5.
[] Verify that the LED display on the temperature transmitter TIT-*11 and the display on GCS1HOST computer agree within %5.
[] Record both readings into TABLE 4.2.3.2 for TIT-*11.

STEP 6:(Temperature instruments)
[] Record and verify that the LED display on the temperature controller TIC-*10 is indicating the expected temperature.

Indicated temp: _____

STEP 7:(Temperature instruments)
[] Adjust the TIC-*10 low temperature alarm set point 2, to 10 degrees BELOW the indicated temperature.

Indicated temp: _____
Alarm set point 2: _____

STEP 8:
[] Record the TIC-*10 alarm status displayed on the window "GCSVI.VI".

Expected Result: ALARM
GCSVI.VI Status: _____

STEP 9:(Temperature instruments)
[] Adjust the TIC-*10 low temperature alarm set point 2, to 10 degrees ABOVE the indicated temperature.

Indicated temp: _____
Alarm set point 2: _____

STEP 10:
[] Record the TIC-*10 alarm status displayed on the window "GCSVI.VI".

Expected Result: NORMAL
GCSVI.VI Status: _____

STEP 11:
[] Verify that the GC1_VI.DAT and GC2_VI.DAT files exist on GCS1HOST computer.
[] C:\GC1_VI.DAT
[] C:\GC2_VI.DAT

STEP 12:
[] Open the C:\GC1_VI.DAT file and record the following data into TABLE 4.2.3.3
Row 1 is H2-LO PPM
Row 2 is H2-HI PPM

STEP 13:

[] Open the C:\GC2_VI.DAT file and record the following data into TABLE 4.2.3.4

Row 1 is CH4-LO PPM
Row 2 is N2O-LO PPM
Row 3 is CH4-HI PPM
Row 4 is N2O-HI PPM

STEP 14:

[] Record the H2-LO PPM and the H2-HI PPM displayed on GCSVI.VI window into TABLE 4.2.3.3 under GCSVI.VI READING column.

STEP 15:

[] Record the CH4-LO PPM, N2O-LO PPM, CH4-HI PPM, and N2O-HI PPM displayed on GCSVI.VI window into TABLE 4.2.3.4 under GCSVI.VI READING column.

4.2.4 Record Data To File Control

STEP 1:

[] Verify that the PUSH TO SAVE/LOG TO FILE push button is in PUSH TO SAVE position.

STEP 2:

[] Set the record data rate value to:
LOG INTERVAL SEC = 1 SEC

STEP 3:

[] Remove all subdirectories and files under the GCS1HOST data directory "D:\NI".

STEP 4:

[] Click on the PUSH TO SAVE button to toggle to the LOG TO FILE position.

STEP 5:

[] In File Manager verify that the file "Y-MM-DD-VI.RPT" exist in the directory "D:\NI", where Y-MM-DD is the current year, month, and day.

STEP 6:

[] In GCSVI.VI window, push the LOG TO FILE button to toggle to the PUSH TO SAVE position.

NOTE: DO NOT attempt to adjust the temperature, pressure, and flow controls during testing in section 4.2.5. and 4.2.6.

4.2.5 Record Data Rate Control Input

STEP 1:
[] Verify that the PUSH TO SAVE/LOG TO FILE push button is in PUSH TO SAVE position.

STEP 2:
[] Set the record data rate value to:
LOG INTERVAL SEC = 60 SEC

STEP 3:
[] Remove files under directory D:\NI if they exist.

STEP 4:
[] In the GCSVI.VI window, push the PUSH TO SAVE button to toggle to LOG TO FILE position.

STEP 5:
[] Wait approximately for five to six minutes before proceeding.

STEP 6:
[] Set the data rate value to:
LOG INTERVAL SEC = 120 SEC

STEP 7:
[] Wait approximately for five to six minutes before proceeding.

STEP 8:
[] In the GCSVI.VI window, push the LOG TO FILE button to toggle to the PUSH TO SAVE position.

STEP 9:
[] In File Manager verify that the file "Y-MM-DD-VI.RPT" exist in the directory "D:\NI", where Y-MM-DD is the current year, month, and day.

STEP 10:
[] Use a text editor to view the file "D:\NI\Y-MM-DD-VI.RPT" where Y-MM-DD refers to the year, month and day of today's date.

STEP 11:
[] View and verify the time stamp column in "D:\NI\YMMDDVI.RPT" file for the following:

- [] 1 MIN (+-) 1 MIN increments between two consecutive data records, for the first four to five minutes.

- [] 2 MIN (+-) 1 MIN increments between two consecutive data records, for the second four to five minutes.

4.2.6 Data File Content

STEP 1:

[] Use a text editor to view the file "D:\NI\Y-MM-DD-VI.RPT" where Y-MM-DD refers to the year, month and day of today's date.

STEP 2:

[] Verify the header information in the file by checking each match in the TABLE 4.2.6.1.

STEP 3:

[] Record the last data record to the TABLE 4.2.6.2.

STEP 4:

[] Close text editor and switch back to GCSVI.VI application.

STEP 5:

[] Record process instrument displayed on GCSVI.VI to the TABLE 4.2.6.2.

STEP 6:

[] Verify that the recorded data match the instrument displays on the front panel listed on TABLE 4.2.6.2. (agree within 5%)

4.2.7 Data Transfer Across HLAN

STEP 1:

[] Use the File Manager to remove all files under data directory H:\NI, if files exist.

STEP 2:

[] In the GCSVI.VI window, verify that the archive path contained H:\NI

[] Set LOG INTERVAL SEC to 2 seconds.

STEP 3:

[] In the GCSVI.VI window, push the PUSH TO SAVE button to toggle to the LOG TO FILE position.

STEP 4:

[] Under Program Manager set the GCS1HOST system date to the next day's date.

STEP 5:

[] Allow 3 minutes before proceeding.

STEP 6:

[] In File Manager verify that the file "H:\NI\Y-MM-DD-VI.RPT" of the previous day exists.

STEP 7:
[] In File Manager verify that the file "D:\NI\Y-MM-DD-VI.RPT" was generated and the file of the previous day was deleted.

STEP 8:
[] In the GCSVI.VI window, push the LOG TO FILE button to toggle to the PUSH TO SAVE position.

STEP 9:
[] Under Program Manager set the GCS1HOST system date back to today's date.

4.2.8 Local Data Storage In The Event of HLAN Outage or Failure

STEP 1:
[] Use the File Manager to remove all files under the following directories if files exist:
[] D:\NI
[] H:\NI

STEP 2:
[] In GCSVI.VI window, verify that the archive path containes H:\NI
[] Set LOG INTERVAL SEC to 2 seconds.

STEP 3:
[] In the GCSVI. VI window, push the PUSH TO SAVE button to toggle to the LOG TO FILE position.

STEP 4:
[] Simulate the HLAN problem. Disconnect "LABHOST" from "GCS1HOST" by breaking the HLAN connection at "GCS1HOST". To do this click the "Disconnect" button in File Manager. Select the connection to the LABHOST computer "H:\\LABHOST\GCS1DATA".

STEP 5:
[] Under Program Manager set the GCS1HOST system date to the next day's date.

STEP 6:
[] Allow 3 minutes before proceeding.

STEP 7:
[] In File Manager verify that today's file "D:\NI\Y-MM-DD-VI.RPT" was generated and that yesterday's file still remaines in the directory "D:\NI".

STEP 8:
[] In the GCSVI.VI window, push the LOG TO FILE button to toggle to the PUSH TO SAVE position.

STEP 9:
[] Under Program Manager set the GCS1HOST system date back to today's date.

STEP 10:
[] Use the File Manager to remove all files under the directory "D:\NI".

STEP 11:
[] Use the File Manager to reconnect the network drive H: "H:\\LABHOST\GCS1DATA".

4.2.9 GCs Automatic Calibration

STEP 1:
[] In the discrete I/O drawer, verify that the LED #8 on the circuit card is OFF. Terminals 17 and 18 control GC1 calibration gas solenoid valves SOV-*20 and SOV-*21.

[] LED #8: OFF

STEP 2:
[] In the discrete I/O drawer, verify that the LED #9 on the circuit card is OFF. Terminals 19 and 20 control GC2 calibration gas solenoid valves SOV-*30 and SOV-*31.

[] LED #9: OFF

STEP 3:
[] Use the File Manager to remove files listed if they exist:
[] C:\GC1.CAL
[] C:\GC2.CAL

STEP 4:
[] Under Program Manager record the current time of GCS1HOST system.
TIME: _____

STEP 5:
[] In the GCSVI.VI window, set and record front panel calibration controls as follows:

GC1 NT--20
CALIBRATION
TIME = TIME FROM STEP 4 + 5 MIN COMPUTED TIME =_____
DURATION = 5 MIN

GC2 NT--30
CALIBRATION
TIME = TIME FROM STEP 4 + 15 MIN COMPUTED TIME =_____
DURATION = 5 MIN

NOTE: Read steps 6 through 13 before proceeding. Perform

these steps in any order as applicable during the calibration process.

STEP 6:

[] Use the GCS1HOST system clock to record the actual time when GC1 and GC2 systems START their calibration process.

GC1 CALIBRATION START TIME: _____
GC2 CALIBRATION START TIME: _____

[] The expected results should be within (+-) 1 MIN of the computed times for GC1 and GC2 in step 5.

STEP 7:

[] The front panel valve indicators will change color from yellow to red when the system starts the calibration process and remain red during calibration.

STEP 8:

[] In the discrete I/O drawer, verify that the LED #8 on the circuit card is ON during the GC1 calibration period. Terminals 17 and 18 control GC1 calibration gas solenoid valves SOV-*20 and SOV-*21.

[] LED #8: ON

STEP 9:

[] In the discrete I/O drawer, verify that the LED #9 on the circuit card is ON during the GC2 calibration period. Terminals 19 and 20 control GC2 calibration gas solenoid valves SOV-*30 and SOV-*31.

[] LED #9: ON

STEP 10:

[] Use the File Manager to verify the existence of files listed below during calibration period:
[] C:\GC1.CAL
[] C:\GC2.CAL

STEP 11:

[] Use the GCS1HOST system clock to record the actual time when GC1 or GC2 system stops its calibration process.

GC1 CALIBRATION STOP TIME: _____
GC2 CALIBRATION STOP TIME: _____

[] The expected results should be within (+-) 1 MIN of the computed time plus duration in step 5.

STEP 12:

[] In the discrete I/O drawer, verify that the LED #8 on the circuit card is OFF right after the termination of the GC1

calibration process. Terminals 17 and 18 control GC1 calibration gas solenoid valves SOV-*20 and SOV-*21.

[] LED #8: OFF

STEP 13:

[] In the discrete I/O drawer, verify that the LED #9 on the circuit card is OFF right after the termination of the GC2 calibration process. Terminals 19 and 20 control GC2 calibration gas solenoid valves SOV-*30 and SOV-*31.

[] LED #9: OFF

STEP 14:

[] Use the File Manager to verify that the following files do not exist after the calibration process is complete.
[] C:\GC1.CAL
[] C:\GC2.CAL

STEP 15:

[] Stop and close LabView GCSVI.VI application program.

4.3 GC1 DATA SYSTEM

4.3.1 Test Preparation

STEP 1:

[] Place the gas delivery system and GC1 instrument into their calibration operating mode per System Engineer's directions.

STEP 2:

[] Generate method file for GC1 using certified standard calibration gas listed in TABLE 4.3.1.1 under the system engineer's direction and vendor instructions.

STEP 3:

[] Record calibration values into TABLE 4.3.1.1

STEP 4:

[] Save method file to C:\MTI\EZChrom\200\methods\GC1.MTD.

4.3.2 Verify The Operation EZChrom 200 Data System

STEP 1:

[] At the GC1 computer, use File Manager to remove all files under C:\GC1 directory.

STEP 2:

[] Under the MTI programs group, start EZChrom 200.

STEP 3:

[] Load method file from C:\MTI\EZChrom\200\methods\GC1.MTD.

STEP 4:

[ ] Under REPORT menu, select the External Standard for both channels A and B.

STEP 5:

[ ] Select the START menu. A run window should appear. Set the following parameters and click on START to begin the sampling process.

```
Run ID                                  GC1
Number of Runs:(1-999,inf)              5
Time Between Injections:(secs)          120
[ ] Wait for External Start
[X] Save          [ ] Print
[X] DIF Save      [ ] PRN Save     [ ] Extended
User Program:
```

STEP 6:

[ ] Record the Amount listed under the EXTERNAL STANDARD REPORT window into TABLE 4.3.1.2 for each run.

STEP 7:

[ ] After five samples, use File Manager to examine the DIF file and record the concentration in TABLE 4.3.1.2. The DIF file is located at "C:\GC1\GC1.DIF".

STEP 8:

[ ] Under the Data and Analyze functions in EZChrom, load chromatograms and analyze all five samples. The chromatogram file name for each sample is GC1 and is followed by a sequential index number for extension. The index value corresponds to the sample number. (i.e. "D:\GC1\GC1.3" file is the 3rd chromatogram.)

STEP 9:

[ ] Record the amount listed under EXTERNAL STANDARD Report window in TABLE 4.3.1.2 for each sample analyzed from the chromatogram in STEP 8.

STEP 10:

[ ] Use File Manager to remove all the files under C:\GC1 directory.

4.3.3 Retrieve, Organise and Format Data Generated In EZChrom

STEP 1:

[ ] At GCS1HOST computer, use File Manager to remove all subdirectories and files under D:\GC1 directory.

STEP 2:

[ ] At GCS1HOST computer, run the GC1 data acquisition application program from the GCSAPPS group.

[] Press RUN button in the GC1 Data Acquisition Application window to START the data interface with EZChrom.

STEP 3:

[] Verify that the GC1.MTD method file is indicated at the bottom tool bar in EZChrom.

STEP 4:

[] Select the START menu from EZChrom. A run window should appear. Set the following parameters and click on START to begin sampling process.

```
Run ID                                  GC1
Number of Runs:(1-999,inf)              5
Time Between Injections:(secs)          120
[ ] Wait for External Start
[X] Save          [ ] Print
[X] DIF Save      [ ] PRN Save      [ ] Extended
User Program:
```

STEP 5:

[] Record the Amount listed under EXTERNAL STANDARD Report window into TABLE 4.3.3.1 for each run.

NOTE: A new directory for the day will be generated by GC1 application program. The directory naming convention is specified as Y-MM-DD-GC1 where Y-MM-DD refers to the year, month and day of today's date followed by GC1 for Gas Chromatograph 1 (i.e. 60211GC1 stands for the Feb 11, 1996 directory). All files under the directory also use the same naming convention with two different extensions. The extension .RPT is for the report file (i.e. 60211GC1.RPT) and the .### extension is the index number for the chromatogram (i.e. 60211GC1.020 is the 20th chromatogram).

STEP 6:

[] Wait until EZChrom stops to proceed with the next step (i.e. after completion of 5 gas samples).

STEP 7:

[] In GCS1HOST computer, use File Manager to examine and record the formatted file names for the directory, report file, and chromatogram files under "D:\GC1" directory.

```
Directory name:          _______GC1
Report file name:        _______GC1.RPT
Chromatogram 001:        _______GC1.001
Chromatogram 002:        _______GC1.002
Chromatogram 003:        _______GC1.003
Chromatogram 004:        _______GC1.004
Chromatogram 005:        _______GC1.005
```

STEP 8:

[] Use the text editor to view the report file "D:\GC1\YMMDDGC1\YMMDDGC1.RPT" where Y-MM-DD refers to the year, month and day of today's date.

STEP 9:

[] Record the concentrations into TABLE 4.3.3.1 from the report file "D:\GC1\YMMDDGC1\YMMDDGC1.RPT".

STEP 10:

[] Verify and record the header contents in the report file "D:\GC1\YMMDDGC1\YMMDDGC1.RPT". Check mark for each element that match to the contents in the TABLE 4.3.3.2.

4.3.4 Append Data After Restart And Day Change Verifications

STEP 1:

[] From the report file "D:\GC1\YMMDDGC1\YMMDDGC1.RPT", verify and record the initial INDEX and TIME of the record number 5 into TABLE 4.3.4.1.

STEP 2:

[] Under Program Manager set the time on both GCS1HOST and GC1 systems to 23:45 to simulate the rollover time (i.e. day change is at 24:00).

STEP 3:

[] Use the GCS1HOST system Clock window to monitor the date and time during the rollover process.

STEP 4:

[] At GCS1HOST computer, press the RUN button in the GC1 Data Acquisition Application window to RE-START the data interface with EZChrom.

STEP 5:

[] At GC1 computer, select the START menu from EZChrom. A run window should appear. Set the following parameters and then click on START to begin the sampling process.

```
Run ID                                  GC1
Number of Runs:(1-999,inf)              inf
Time Between Injections:(secs)          120
[ ] Wait for External Start
[X] Save          [ ] Print
[X] DIF Save      [ ] PRN Save      [ ] Extended
User Program:
```

STEP 6:

[] Monitor the GCS1HOST system Clock window until the date changes to the next day and the time is 12:10 AM. Record the following parameters:

Actual Date: _____
Roll Over Date: _____
Time: _____

STEP 7:

[] Press Esc key to terminate the EZChrom sampling process at GC1 computer.

STEP 8:

[] Under Program Manager reset the current date and time on both the GCS1HOST and GC1 systems to the actual date and time.

STEP 9:

[] At the GCS1HOST computer, use the text editor to view the report file "D:\GC1\YMMDDGC1\YMMDDGC1.RPT" where Y-MM-DD refers to the year, month and day of today's date.

STEP 10:

[] From the report file "D:\GC1\YMMDDGC1\YMMDDGC1.RPT", verify and record the INDEX and TIME of the appended record number 6 into TABLE 4.3.4.1.

STEP 11:

[] Use File Manager to verify and record the existence of the simulated directory for the next day, the report file, and all the chromatogram files.

Directory name: _____GC1
Report file name: _____GC1.RPT
Chromatogram 001: _____GC1.001
Chromatogram 002: _____GC1.002
Chromatogram 003: _____GC1.003
Chromatogram 004: _____GC1.004
Chromatogram 005: _____GC1.005
Chromatogram 006: _____GC1.006 (if applicable)
Chromatogram 007: _____GC1.007 (if applicable)
Chromatogram 008: _____GC1.008 (if applicable)
NOTE: The total chromatograms is depended on the time of termination of EZChrom sampling process.

STEP 12:

[] Use File Manager to remove all subdirectories and files under D:\GC1 directory.

STEP 13:

[] Press QUIT button on the GC1 Data Acquisition Application.

4.3.5 Calibration and Display Interface Between LabView VI and GC1 Data Acquisition Application

STEP 1:

[] At the GCS1HOST computer, terminate all active applications

and close all windows under Program Manager.

STEP 2:

[] Start LabView program by selecting "GCSVI" icon from GCSAPPS group.

STEP 3:

[] The GCSVI.VI front panel should now be displayed on the GCS1HOST computer.

STEP 4:

[] To run GCSVI.VI application, click on the LabView continuous run icon.

STEP 5:

[] Set front panel controls as follows:

FILE CONFIGURATION:

* ARCHIVE PATH:	H:\NI	(DEFAULT)
* LOG INTERVAL SEC:	60	(DEFAULT)
* RECORD DATA:	PUSH TO SAVE	

GC1 NT-20
CALIBRATION

* TIME:	19:00	(DEFAULT)
* DURATION:	15	(DEFAULT)

GC2 NT-30
CALIBRATION

* TIME:	20:00	(DEFAULT)
* DURATION:	15	(DEFAULT)

STEP 6:

[] Run the GCSVI.VI application by toggling the ON/OFF switch to ON position.

STEP 7:

[] Use the GCS1HOST system Clock window to monitor the time during the calibration process.

STEP 8:

[] At GCS1HOST computer, run the GC1 data acquisition application program from the GCSAPPS group.

[] Press the RUN button in the GC1 Data Acquisition Application window to START the data interface with EZChrom.

STEP 9:

[] At GC1 computer, select the START menu from EZChrom. A run window should appear. Set the following parameters and click on START to begin sampling process.

Run ID	GC1
Number of Runs:(1-999,inf)	inf

Time Between Injections:(secs) 120
[ ] Wait for External Start
[X] Save [ ] Print
[X] DIF Save [ ] PRN Save [ ] Extended
User Program:

STEP 10:

[] Record the current time of GCS1HOST system clock.
TIME: _____

STEP 11:

[] In the GCSVI.VI window, set and record front panel calibration controls as follows:

GC1 NT--20
CALIBRATION
TIME = TIME FROM STEP 10 + 6 MIN COMPUTED TIME =_____
DURATION = 10 MIN

STEP 12:

[] Verify that the GCSVI.VI application is reading the actual concentrations shown in EZChrom system. Compare and record the GC1 NT-20 display of GCSVI.VI application and the EZChrom display for H2-LO PPM and H2-HI PPM.

GCSVI.VI Application GC1 NT--20		EZChrom GC1	
H2-LO PPM	H2-HI PPM	H2-LO	H2-HI

STEP 13:

[] Wait until the time indicated on the GCS1HOST system clock reaches the time from step 10 + 22 MIN then procees with the next step.

STEP 14:

[] Press Esc key to stop the EZChrom sampling process at GC1 computer.

STEP 15:

[] Stop and close LabView GCSVI.VI application program.

STEP 16:

[] In GCS1HOST computer, use the text editor to view the report file "D:\GC1\YMMDDGC1\YMMDDGC1.RPT" where Y-MM-DD refers to the year, month and day of today's date.

NOTE: The calibrated records in the report file are identified with a 1 under Cal column. A 0 was

used to identify normal sample records.

STEP 17:

[] From the report file "D:\GC1\YMMDDGC1\YMMDDGC1.RPT", record the time when the calibration starts and the time when the calibration ends.

[] CAL START TIME: _____

[] CAL END TIME: _____

[] DURATION = CAL START TIME - CAL END TIME

_____

STEP 18:

[] The calibration time setting from step 11 and the reading from step 17 should be within (+-) 4 MIN of each other.

STEP 19:

[] Use File Manager to remove all subdirectories and files under D:\GC1 directory.

STEP 20:

[] Press QUIT button on the GC1 Data Acquisition Application.

STEP 21:

[] At the GCS1HOST computer, terminate all active applications and close all windows under Program Manager.

4.3.6 Compress And Transfer GC1 Data Across HLAN

The following series of steps are designed to verify the reduction of the data files and data tranfer functions in the software. The test data set was created and stored in the directory "D:\TEST.GC1" prior to the test. The test data set contains the report file "60208GC1.RPT" and all the associated chromatograms. The report file contains the calibration records, the zero concentration records.

STEP 1:

[] In the File Manager verify that the report and all the associated chromatogram files exist in the testing directory "D:\TST.GC1\60208GC1".

STEP 2:

[] Use File Manager to verify the "H:\GC1\60208GC1.ZIP" and the "H:\GC1\60208GC1.RPT" files do not exist.

STEP 3:

[] Use File Manager to copy the subdirectory and all files under "D:\TST.GC1" into the directory "D:\GC1".

STEP 4:

[] Use test editor to examine and verify the parameters in "C:\BIN\ZIP1.INI" file. If any of the parameters in the

ZIP1.INI file do not match the parameters listed below, correct them and save the corrected parameters back to "C:\BIN\ZIP1.INI" file.

[] path = c:\bin\pkzip.exe
[] zippath = d:\gc1\
[] out_path = h:\gc1\
[] nth_c = 2

NOTE: Ignore all parameter definitions in the C:\BIN\ZIP1.INI file.

STEP 5:
[] Verify that the contents of the report file "D:\GC1\60208GC1\60208GC1.RPT and TABLE 4.3.6.1 are the same.

STEP 6:
[] Under Program Manager set the date on the GCS1HOST system to 02-09-1996.

STEP 7:
[] In File Manager, ensure that all directories are closed before starting the compress and transfer process.
[] Run the C:\BIN\GC1ZIP.EXE program.

STEP 8:
[] Use File Manager to verify that the files "H:\GC1\60208GC1.ZIP" and "H:\GC1\60208GC1.RPT" exist.

STEP 9:
[] Use file Manager to verify that the "D:\GC1\60208GC1" directory was removed.

STEP 10:
[] Run WinZip to open and view the "H:\GC1\60208GC1.ZIP" file without unzipping.

STEP 11:
[] The calibration records, the zero concentration records, and every other chromatograms are preserved in the file "H:\GC1\60208GC1.ZIP". Verify this in TABLE 4.3.6.1 by entering an S or a U for saved or unsaved chromatograms in the column labelled actual results.

STEP 12:
[] Use File Manager to remove the "H:\GC\60208GC1.ZIP" and the "H:\GC1\60208GC1.RPT" files.

STEP 13:
[] Under Program Manager set the date on the GCS1HOST system back to the current date.

4.3.7 Data Handling Capabilities During Network Outages

STEP 1:

[] At the GC1 computer, use File Manager to remove all files under the C:\GC1 directory only if they exist.

STEP 2:

[] At the GCS1HOST computer, terminate all active applications and close all windows under Program Manager.

STEP 3:

[] Use File Manager to remove all subdirectories and files under the D:\GC1 directory only if they exist.

STEP 4:

[] Run the GC1 Data Acquisition Application program from the GCSAPPS group.

[] Press RUN button in the GC1 Data Acquisition Application window to START the data interface with EZChrom.

STEP 5:

[] At the GC1 computer, verify that the method file "GC1.MTD" is indicated at the bottom tool bar in EZChrom.

STEP 6:

[] Select the START menu from EZChrom. A run window should appear. Set the following parameters and click on START to begin the sampling process.

```
Run ID                                GC1
Number of Runs:(1-999,inf)            inf
Time Between Injections:(secs)        120
[ ] Wait for External Start
[X] Save          [ ] Print
[X] DIF Save      [ ] PRN Save    [ ] Extended
User Program:
```

STEP 7:

[] Monitor the GC1 Data Acquisition Application window. Wait until the message "Finished Appending #5" appears in this window to proceed with the next step.

STEP 8:

[] To simulate the local network problem, disconnect "GC1" from "GCS1HOST" by breaking the local network connection at "GCS1HOST". To do this click on the "Disconnect" button in File Manager. Select the connection to the GC1 computer "F:\\GC1\GC1".

STEP 9:

[] Verify that the GCS1HOST system is not locked up.

STEP 10:

[] At GC1 computer, wait until EZChrom has finished taking four or five more samples. Press Esc key to terminate the sampling process.

STEP 11:

[] Use File Manager to verify that GC1.DIF and the chromatogram files are stored locally at the GC1 computer under "C:\GC1" directory.

STEP 12:

[] Use File Manager to remove all files under C:\GC1 directory.

STEP 13:

[] Use the File Manager to reconnect the network drive F "F:\\GC1\GC1".

STEP 14:

[] To simulate the HLAN network outage, disconnect "LABHOST" from "GCS1HOST" by breaking the HLAN network connection at GCS1HOST. To do this click on the "disconnect" button in File Manager. Select the connection to the LABHOST computer "H:\\LABHOST\GCS1DATA".

STEP 15:

[] Using File Manager verify that the report and the chromatogram files exist in today's directory "D:\GC1\YMMDDGC1".

STEP 16:

[] Under Program Manager set the date on GCS1HOST to the next day's date.

STEP 17:

[] To start the compress and transfer process, run C:\BIN\GC1ZIP.EXE program.

STEP 18:

[] Use the File Manager to verify that "D:\YMMDDGC1.ZIP" exists and then delete it.

STEP 19:

[] Use file Manager to verify that the directory "D:\GC1\YMMDDGC1" was removed.

STEP 20:

[] Under Program Manager reset the date on GCS1HOST back to today's date.

STEP 21:

[] Use the File Manager to reconnect the network drive H "H:\\LABHOST\GCS1DATA".

STEP 22:

[] Terminate all active applications and close all program groups in GCS1HOST and GC1 computer.

4.4 GC2 DATA SYSTEM

4.4.1 Test Preparation

STEP 1:

[] Place the gas delivery system and GC2 instrument into their calibration operating mode per System Engineer's directions.

STEP 2:

[] Generate method file for GC2 using certified standard calibration gas listed in TABLE 4.4.1.1 under the system engineer's direction and vendor instructions.

STEP 3:

[] Record calibration values into TABLE 4.4.1.1

STEP 4:

[] Save method file to C:\MTI\EZChrom\200\methods\GC2.MTD.

4.4.2 Verify The Operation EZChrom 200 Data System

STEP 1:

[] At the GC2 computer, use File Manager to remove all files under C:\GC2 directory.

STEP 2:

[] Under the MTI programs group, start EZChrom 200.

STEP 3:

[] Load method file from C:\MTI\EZChrom\200\methods\GC2.MTD.

STEP 4:

[] Under REPORT menu, select the External Standard for both channels A and B.

STEP 5:

[] Select the START menu. A run window should appear. Set the following parameters and click on START to begin the sampling process.

```
Run ID                                GC2
Number of Runs:(1-999,inf)            5
Time Between Injections:(secs)        120
[ ] Wait for External Start
[X] Save          [ ] Print
[X] DIF Save      [ ] PRN Save      [ ] Extended
User Program:
```

STEP 6:

[] Record the Amount listed under the EXTERNAL STANDARD REPORT window into TABLE 4.4.1.2 for each run.

STEP 7:

[] After five samples, use File Manager to examine the DIF file and record the concentration in TABLE 4.4.1.2. The DIF file is located at "C:\GC2\GC2.DIF".

STEP 8:

[] Under the Data and Analyze functions in EZChrom, load chromatograms and analyze all five samples. The chromatogram file name for each sample is GC2 and is followed by a sequential index number for extension. The index value corresponds to the sample number. (i.e. "D:\GC2\GC2.3" file is the 3rd chromatogram.)

STEP 9:

[] Record the amount listed under EXTERNAL STANDARD Report window in TABLE 4.4.1.2 for each sample analyzed from the chromatogram in STEP 8.

STEP 10:

[] Use File Manager to remove all the files under C:\GC2 directory.

4.4.3 Retrieve, Organize and Format Data Generated In EZChrom

STEP 1:

[] At GCS1HOST computer, use File Manager to remove all subdirectories and files under D:\GC2 directory.

STEP 2:

[] At GCS1HOST computer, run the GC2 data acquisition application program from the GCSAPPS group.

[] Press RUN button in the GC2 Data Acquisition Application window to START the data interface with EZChrom.

STEP 3:

[] Verify that the GC2.MTD method file is indicated at the bottom tool bar in EZChrom.

STEP 4:

[] Select the START menu from EZChrom. A run window should appear. Set the following parameters and click on START to begin sampling process.

```
Run ID                                GC2
Number of Runs:(1-999,inf)            5
Time Between Injections:(secs)        120
[ ] Wait for External Start
[X] Save          [ ] Print
[X] DIF Save      [ ] PRN Save    [ ] Extended
User Program:
```

STEP 5:

[] Record the Amount listed under EXTERNAL STANDARD Report window into TABLES 4.4.3.1 for each run.

NOTE: A new directory for the day will be generated by GC2 application program. The directory naming convention is specified as Y-MM-DD-GC2 where Y-MM-DD refers to the year, month and day of today's date followed by GC2 for Gas Chromatograph 2 (i.e. 60211GC2 stands for the Feb 11, 1996 directory). All files under the directory also use the same naming convention with two different extensions. The extension .RPT is for the report file (i.e. 60211GC2.RPT) and the .### extension is the index number for the chromatogram (i.e. 60211GC2.020 is the 20th chromatogram).

STEP 6:

[] Wait until EZChrom stops to proceed with the next step (i.e. after completion of 5 gas samples).

STEP 7:

[] In GCS1HOST computer, use File Manager to examine and record the formatted file names for the directory, report file, and chromatogram files under "D:\GC2" directory.

Directory name: _____GC2
Report file name: _____GC2.RPT
Chromatogram 001: _____GC2.001
Chromatogram 002: _____GC2.002
Chromatogram 003: _____GC2.003
Chromatogram 004: _____GC2.004
Chromatogram 005: _____GC2.005

STEP 8:

[] Use the text editor to view the report file "D:\GC2\YMMDDGC2\YMMDDGC2.RPT" where Y-MM-DD refers to the year, month and day of today's date.

STEP 9:

[] Record the concentration into TABLE 4.4.3.1 from the report file "D:\GC2\YMMDDGC2\YMMDDGC2.RPT".

STEP 10:

[] Verify and record the header contents in the report file "D:\GC2\YMMDDGC2\YMMDDGC2.RPT". Check mark for each element that match to the contents in the TABLE 4.4.3.2.

4.4.4 Append Data After Restart And Day Change Verifications

STEP 1:

[] From the report file "D:\GC2\YMMDDGC2\YMMDDGC2.RPT", verify and record the initial INDEX and TIME of the record number 5 into TABLE 4.4.4.1.

STEP 2:

[] Under Program Manager set the time on both GCS1HOST and GC1 systems to 23:45 to simulate the rollover time (i.e. day change is at 24:00).

STEP 3:

[] Use the GCS1HOST system Clock window to monitor the date and time during the rollover process.

STEP 4:

[] At GCS1HOST computer, press the RUN button in the GC2 Data Acquisition Application window to RE-START the data interface with EZChrom.

STEP 5:

[] At GC2 computer, select the START menu from EZChrom. A run window should appear. Set the following parameters and then click on START to begin the sampling process.

```
Run ID                                  GC2
Number of Runs:(1-999,inf)              inf
Time Between Injections:(secs)          120
[ ] Wait for External Start
[X] Save          [ ] Print
[X] DIF Save      [ ] PRN Save    [ ] Extended
User Program:
```

STEP 6:

[] Monitor the GCS1HOST system Clock window until the date changes to the next day and the time is 12:10 AM. Record the following parameters:

Actual Date: _____
Rollover Date: _____
Time: _____

STEP 7:

[] Press Esc key to terminate the EZChrom sampling process at GC2 computer.

STEP 8:

[] Under Program Manager reset the current date and time on both the GCS1HOST and GC2 systems to the actual date and time.

STEP 9:

[] At the GCS1HOST computer, use the text editor to view the report file "D:\GC2\YMMDDGC2\YMMDDGC2.RPT" where Y-MM-DD refers to the year, month and day of today's date.

STEP 10:

[] From the report file "D:\GC2\YMMDDGC2\YMMDDGC2.RPT", verify and record the INDEX and TIME of the appended record number 6 into TABLE 4.4.4.1.

STEP 11:

[] Use File Manager to verify and record the existence of the simulated directory for the next day, the report file, and all the chromatogram files.

Directory name:	_____GC2	
Report file name:	_____GC2.RPT	
Chromatogram 001:	_____GC2.001	
Chromatogram 002:	_____GC2.002	
Chromatogram 003:	_____GC2.003	
Chromatogram 004:	_____GC2.004	
Chromatogram 005:	_____GC2.005	
Chromatogram 006:	_____GC2.006	(if applicable)
Chromatogram 007:	_____GC2.007	(if applicable)
Chromatogram 008:	_____GC2.008	(if applicable)

NOTE: The total number of chromatograms depends on the time of termination of EZChrom sampling process.

STEP 12:

[] Use File Manager to remove all subdirectories and files under D:\GC2 directory.

STEP 13:

[] Press QUIT button on the GC2 Data Acquisition Application.

4.4.5 Calibration and Display Interface Between LabView VI and GC2 Data Acquisition Application

STEP 1:

[] At the GCS1HOST computer, terminate all active applications and close all windows under Program Manager.

STEP 2:

[] Start LabView program by selecting "GCSVI" icon from GCSAPPS group.

STEP 3:

[] The GCSVI.VI front panel should now be displayed on the GCS1HOST computer.

STEP 4:

[] To run GCSVI.VI application, click on the LabView continuous run icon.

STEP 5:

[] Set front panel controls as follows:

FILE CONFIGURATION:

*	ARCHIVE PATH:	H:\NI	(DEFAULT)
*	LOG INTERVAL SEC:	60	(DEFAULT)
*	RECORD DATA:	PUSH TO SAVE	

GC1 NT-20
CALIBRATION

*	TIME:	19:00	(DEFAULT)
*	DURATION:	15	(DEFAULT)

GC2 NT-30
CALIBRATION

*	TIME:	20:00	(DEFAULT)
*	DURATION:	15	(DEFAULT)

STEP 6:

[] Run the GCSVI.VI application by toggling the ON/OFF switch to ON position.

STEP 7:

[] Use the GCS1HOST system Clock window to monitor the time during the calibration process.

STEP 8:

[] At GCS1HOST computer, run the GC2 data acquisition application program from the GCSAPPS group.

[] Press the RUN button in the GC2 Data Acquisition Application window to START the data interface with EZChrom.

STEP 9:

[] At GC2 computer, select the START menu from EZChrom. A run window should appear. Set the following parameters and click on START to begin the sampling process.

Run ID GC2
Number of Runs:(1-999,inf) inf
Time Between Injections:(secs) 120
[ ] Wait for External Start
[X] Save [ ] Print
[X] DIF Save [ ] PRN Save [ ] Extended
User Program:

STEP 10:

[] Record the current time of GCS1HOST system clock.
TIME: _____

STEP 11:

[] In the GCSVI.VI window, set and record front panel calibration controls as follows:

GC2 NT--30
CALIBRATION
TIME = TIME FROM STEP 10 + 6 MIN COMPUTED TIME =_____
DURATION = 10 MIN

STEP 12:

[] Verify that the GCSVI.VI application is reading the actual concentrations shown in EZChrom system. Compare and record the GC2 NT-30 display of GCSVI.VI application and the EZChrom display for CH4-LO, N2O-LO, CH4-HI and N2O-HI PPM.

GCSVI.VI Application GC2 NT--30				**EZChrom GC2**			
CH4 LO	N2O LO	CH4 HI	N2O HI	CH4 LO	N2O LO	CH4 HI	N2O HI

STEP 13:

[] Wait until the time indicated on the GCS1HOST system clock reaches the time from step 10 + 22 MIN then proceed with the next step.

STEP 14:

[] Press Esc key to stop the EZChrom sampling process at GC2 computer.

STEP 15:

[] Stop and close LabView GCSVI.VI application program.

STEP 16:

[] In GCS1HOST computer, use the text editor to view the report file "D:\GC2\YMMDDGC2\YMMDDGC2.RPT" where Y-MM-DD refers to the year, month and day of today's date.

NOTE: The calibrated records in the report file are identified with a 1 under Cal column. A 0 was used to identify normal sample records.

STEP 17:

[] From the report file "D:\GC2\YMMDDGC2\YMMDDGC2.RPT", record the time when the calibration starts and the time when the calibration ends.

[] CAL START TIME: _____
[] CAL END TIME: _____
[] DURATION = CAL START TIME - CAL END TIME
_____

STEP 18:

[] The calibration time setting from step 11 and the reading from step 17 should be within (+-) 4 MIN of each other.

STEP 19:

[] Use File Manager to remove all subdirectories and files under D:\GC2 directory.

STEP 20:

[] Press QUIT button on the GC2 Data Acquisition Application.

STEP 21:

[] At the GCS1HOST computer, terminate all active applications and close all windows under Program Manager.

4.4.6 Compress And Transfer GC2 Data Across HLAN

The following series of steps are designed to verify the reduction of the data files and data tranfer functions in the software. The test data set was created and stored in the directory "D:\TEST.GC2" prior to the test. The test data set contains the report file "60208GC2.RPT" and all the associated chromatograms. The report file contains the calibration records, the zero concentration records.

STEP 1:

[] In the File Manager verify that the report and all the associated chromatogram files exist in the testing directory "D:\TST.GC2\60208GC2".

STEP 2:

[] Use File Manager to verify the "H:\GC2\60208GC2.ZIP" and the "H:\GC2\60208GC2.RPT" files do not exist.

STEP 3:

[] Use File Manager to copy the subdirectory and all files under "D:\TST.GC2" into the directory "D:\GC2".

STEP 4:

[] Use test editor to examine and verify the parameters in "C:\BIN\ZIP2.INI" file. If any of the parameters in the ZIP2.INI file do not match the parameters listed below, correct them and save the corrected parameters back to "C:\BIN\ZIP2.INI" file.

[] path = c:\bin\pkzip.exe
[] zippath = d:\gc2\
[] out_path = h:\gc2\
[] nth_c = 2

NOTE: Ignore all parameter definitions in the C:\BIN\ZIP2.INI file.

STEP 5:

[] Verify that the contents of the report file "D:\GC2\60208GC2\60208GC2.RPT and TABLE 4.4.6.1 are the same.

STEP 6:

[] Under Program Manager set the date on the GCS1HOST system to 02-09-1996.

STEP 7:

[] In File Manager, ensure that all directories are closed before starting the compression and transfer process.

[] Run the C:\BIN\GC2ZIP.EXE program.

STEP 8:

[] Use File Manager to verify that the files "H:\GC2\60208GC2.ZIP" and "H:\GC2\60208GC2.RPT" exist.

STEP 9:

[] Use file Manager to verify that the "D:\GC2\60208GC2" directory was removed.

STEP 10:

[] Run WinZip to open and view the "H:\GC2\60208GC2.ZIP" file without unzipping.

STEP 11:

[] The calibration records, the zero concentration records, and every other chromatograms are preserved in the file "H:\GC2\60208GC2.ZIP". Verify this in TABLE 4.4.6.1 by entering an S or a U for saved or unsaved chromatograms in the column labelled actual results.

STEP 12:

[] Use File Manager to remove the "H:\GC\60208GC2.ZIP" and the "H:\GC2\60208GC2.RPT" files.

STEP 13:

[] Under Program Manager set the date on the GCS1HOST system back to the current date.

4.4.7 Data Handling Capabilities During Network Outages

STEP 1:

[] At the GC2 computer, use File Manager to remove all files under the C:\GC2 directory only if they exist.

STEP 2:

[] At the GCS1HOST computer, terminate all active applications and close all windows under Program Manager.

STEP 3:

[] Use File Manager to remove all subdirectories and files

under the D:\GC2 directory only if they exist.

STEP 4:

[] Run the GC2 Data Acquisition Application program from the GCSAPPS group.

[] Press RUN button in the GC2 Data Acquisition Application window to START the data interface with EZChrom.

STEP 5:

[] At the GC2 computer, verify that the method file "GC2.MTD" is indicated at the bottom tool bar in EZChrom.

STEP 6:

[] Select the START menu from EZChrom. A run window should appear. Set the following parameters and click on START to begin the sampling process.

```
Run ID                                GC2
Number of Runs:(1-999,inf)            inf
Time Between Injections:(secs)        120
[ ] Wait for External Start
[X] Save          [ ] Print
[X] DIF Save      [ ] PRN Save     [ ] Extended
User Program:
```

STEP 7:

[] Monitor the GC2 Data Acquisition Application window. Wait until the message "Finished Appending #5" appears in this window to proceed with the next step.

STEP 8:

[] To simulate the local network problem, disconnect "GC2" from "GCS1HOST" by breaking the local network connection at "GCS1HOST". To do this click on the "Disconnect" button in File Manager. Select the connection to the GC2 computer "G:\\GC2\GC2".

STEP 9:

[] Verify that the GCS1HOST system is not locked up.

STEP 10:

[] At GC2 computer, wait until EZChrom has finished taking four or five more samples. Press Esc key to terminate the sampling process.

STEP 11:

[] Use File Manager to verify that GC2.DIF and the chromatogram files are stored locally at the GC2 computer under "C:\GC2" directory.

STEP 12:

[] Use File Manager to remove all files under C:\GC2 directory.

STEP 13:

[] Use the File Manager to reconnect the network drive G "G:\\GC2\GC2".

STEP 14:

[] To simulate the HLAN network outage, disconnect "LABHOST" from "GCS1HOST" by breaking the HLAN network connection at GCS1HOST. To do this click on the "disconnect" button in File Manager. Select the connection to the LABHOST computer "H:\\LABHOST\GCS1DATA".

STEP 15:

[] Using File Manager verify that the report and the chromatogram files exist in today's directory "D:\GC2\YMMDDGC2".

STEP 16:

[] Under Program Manager set the date on GCS1HOST to the next day's date.

STEP 17:

[] To start the compress and transfer process, run C:\BIN\GC2ZIP.EXE program.

STEP 18:

[] Use the File Manager to verify that "D:\YMMDDGC2.ZIP" exists and then delete it.

STEP 19:

[] Use file Manager to verify that the directory "D:\GC2\YMMDDGC2" was removed.

STEP 20:

[] Under Program Manager reset the date on GCS1HOST back to today's date.

STEP 21:

[] Use the File Manager to reconnect the network drive H "H:\\LABHOST\GCS1DATA".

STEP 22:

[] Terminate all active applications and close all program groups in GCS1HOST and GC2 computer.

STEP 23:

[] Turn OFF the system sample pump per the System Engineer's instruction.

4.5 FTIR DATA SYSTEM

4.5.1 Test Preparation

STEP 1:

[] At the GCS1HOST computer, use File Manager to remove all subdirectories and files under the directory "D:\FTIR" if they exist.

STEP 2:

[] At the FTIR computer, verify that the directory "C:\FTIR" contains no files. If any files exists, use File Manager to remove them.

STEP 3:

[] Use File Manager to verify that the FTIR computer contained the following configuration files:

[] C:\WIN_IR\CONF\CONF001.FTS
[] C:\WIN_IR\CONF\BACK_125.SPC
[] C:\WIN_IR\CONF\NH3_RED.Q

STEP 4:

[] Use the Text Editor to verify that the FTIR computer file "C:\WIN-IR\CONF\PARAM.INP" containes the following parameters:

c:\win_ir\conf\
conf001.fts
back_125.spc
nh3_red.q
2

4.5.2 Normal Mode Test

STEP 1:

[] Start the "Win-IR" application by clicking the icon located under the Win-IR program group.

STEP 2:

[] Enter the "Collect" menu and select "Advanced Scan Menu" to load and modify the FTS configuration file "C:\Win_IR\conf\conf001.FTS".

STEP 3:

[] Set the Number of Scans to 8. Save the FTS configuration file to "C:\Win_IR\conf\conf001.FTS" and return to the Bio-Rad Win-IR screen.

STEP 4:

[] Start the FTIR program by clicking on the SPFTIRII button.

STEP 5:

[] Once scanning starts, check the lower left hand corner of the screen for the file name. The file name "Y-MM-DD-###" refers to the year "Y", month "MM", day "DD" and the interferogram index number "###". It should match today's date and start with the index number 001 for the first sample.

STEP 6:

[] Wait until the index number of the last 3 digits in the file name located at the lower left corner of Win-IR screen indicates 009 and proceed promptly with the next step.

STEP 7:

[] During a scan, depress the Escape key, to stop the scaning process.

STEP 8:

[] Copy the index number of the last 3 digits in the file name located at the lower left corner of Win-IR screen.

RUN ID: _____

STEP 9:

[] In GCS1HOST computer, use File Manager to verify that the subdirectory "D:\FTIR\YMMDDIR" has been created and is titled with today's date followed by an "IR".

STEP 10:

[] Use File Manager to view and record the formated file names in the directory "D:\FTIR\YMMDDIR". The YMMDD###.SPC interferogram file numbers will be alternate even numbers (i.e. YMMDD002.SPC, YMMDD004.SPC, YMMDD006.SPC, ...).

Directory name: _____IR
Report file name: _____IR.RPT
Interferogram 002: _____.SPC
Interferogram 004: _____.SPC
Interferogram 006: _____.SPC
Interferogram 008: _____.SPC
Interferogram 010: _____.SPC (if applicable)

STEP 11:

[] Use the Text Editor to view the report file "D:\FTIR\YMMDDIR\YMMDDIR.RPT" where Y-MM-DD refers to the year, month and day of today's date.

STEP 12:

[] Verify that the header contents in the report file "D:\FTIR\YMMDDIR\YMMDDIR.RPT" match the items below:

[] TIME [] RUN ID [] NH3-LO [] NH3-MED

STEP 13:

[] Verify that every calculated concentration record is present (i.e. RUN ID: 001, 002, 003...).

[] records are sequentially numbered

STEP 14:

[] Verify that records are time stamp.

4.5.3 Interrupted Mode Test

STEP 1:

[] At GCS1HOST computer, use File Manager to view and record the RUN ID number of the last record in the report file "D\FTIR\YMMDDIR\YMMDDIR.RPT".

RUN ID: _____

STEP 2:

[] Assure at least 5 minutes have elapsed since the Win-IR program was stopped at section 4.5.2, step 7.

STEP 3:

[] At the FTIR computer, restart the Win-IR program by clicking the "SPFTIRII" button.

STEP 4:

[] Verify that the file name for the first sample at the lower left hand corner of the screen matched today's date and starts with the interferogram index number "RUN ID" listed in section 4.5.2, step 8.

STEP 5:

[] Wait until the index number of the last 3 digits in the file name located at the lower left corner of Win-IR screen indicates 013 and proceed prompthly with the next step.

STEP 6:

[] During a scan, depress the Esc key, to stop the scaning process.

STEP 7:

[] At the GCS1HOST computer, use Text Editor to view and verify the report file "D:\FTIR\YMMDDIR\YMMDDIR.RPT for continuous record index after the system interruption.

4.5.4 Day Change Test

STEP 1:

[] To simulate the day change, set the GCS1HOST and the FTIR systems time to 23:55.

STEP 2:

[] Restart the Win-IR program by clicking the "SPFTIRII" button.

STEP 3:

[] Once scanning starts, monitor the lower left hand corner of the screen for the date change in file name. The file name "Y-MM-DD-###" refers to the year "Y", month "MM", day "DD" and the interferogram index number "###".

STEP 4:

[] Monitor until the interferogram index number of the last 3 digits in the file name indicates 003 before proceeding.

STEP 5:

[] During a scan, depress the Escape key twice, to stop the scaning process.

STEP 6:

[] In GCS1HOST computer, use File Manager to verify that the date has changed and that the new subdirectory "D:\FTIR\YMMDDIR" for the new date has been created.

STEP 7:

[] Use File Manager to verify that under a new subdirectory "D:\FTIR\YMMDDIR", new ".RPT and .SPC" files have been created with the new name based on the new date.

STEP 8:

[] At the GCS1HOST computer, use File Manager to remove all subdirectories and files under the directory "D:\FTIR".

STEP 9:

[] Reset the GCS1HOST system date and time back to current date and time.

STEP 10:

[] At the FTIR computer, use File Manager to remove all files under the directory "C:\FTIR".

STEP 11:

[] Reset the FTIR system date and time back to current date and time.

4.5.5 Transfer Data Accross HLAN

The following series of steps are designed to simulate the condition to verify the data tranfer function in the software. The test data set was created and stored in the directory "D:\FTIR.TST" prior to the test. The test data set contains the report file "60208IR.RPT" and all the associated interferograms.

STEP 1:
[] At GCS1HOST computer, use File Manager to verify that the report and all the associated interferogram files exist in the test directory "D:\FTIR.TST\60208IR".

STEP 2:
[] Use File Manager to verify the network "H:\FTIR\60208IR.ZIP" and the "H:\FTIR\60208IR.RPT" files do not exist.

STEP 3:
[] Use File Manager to copy the subdirectory and all files under "D:\FTIR.TST" into the directory "D:\FTIR".

STEP 4:
[] Use Text Editor to examine and verify the parameters in "C:\BIN\FTIR_ZIP.INI" file. If any of the parameters in the FTIR_ZIP.INI file do not match the parameters listed below, correct them and save the corrected parameters back to "C:\BIN\FTIR_ZIP.INI" file.

[] data_files_path = D:\ftir\
[] zip_file_path = H:\ftir\

NOTE: Ignore the comment in the C:\BIN\FTIRZIP.INI file.

STEP 5:
[] Under Program Manager set the date on the GCS1HOST system to 02-09-1996.

STEP 6:
[] In File Manager, close all directory windows before starting the zip and transfer process.
[] Run the C:\BIN\FTIRZIP.EXE program.

STEP 7:
[] Use File Manager to verify that the files "H:\FTIR\60208IR.ZIP" and "H:\FTIR\60208IR.RPT" exists.

STEP 8:
[] Use file Manager to verify that the "D:\FTIR\60208IR" directory was removed.

STEP 9:
[] Run WinZip to open and view the contents in "H:\FTIR\60208IR.ZIP" file.

STEP 10:
[] Use File Manager to remove the "H:\FTIR\60208IR.ZIP" and the "H:\FTIR\60208IR.RPT" files.

STEP 11:
[] Under Program Manager set the date on the GCS1HOST system back to the current date.

4.5.6 Network Failure Test

STEP 1:

[] At the FTIR computer, use File Manager to remove all files under the C:\FTIR directory if they exist.

STEP 2:

[] At the GCS1HOST computer, terminate all active applications and close all windows under Program Manager.

STEP 3:

[] Start the FTIR program by clicking on the SPFTIRII button.

STEP 4:

[] Once scanning starts, check the lower left hand corner of the screen for the file name. It should match today's date and starts with the index 001 for the first sample.

STEP 5:

[] Wait until the index number of the last 3 digits in the file name located at the lower left corner of Win-IR screen indicates 005 and proceed promptly with the next step.

STEP 6:

NOTE: In this step, bring File Manager to the foreground in the FTIR computer while the Win-IR program is doing scans. When calculations begin, Win-IR will return to the foreground. Do not inhibit this swap. Switch back only when scans start again.

[] To simulate the local network problem, disconnect "FTIR" from "GCS1HOST" by breaking the local network connection at the "FTIR" drive D. To do this click on the "Disconnect" button in File Manager. Select the connection to the GCS1HOST computer "D:\\GCS1HOST\FTIR".

STEP 8:

[] Verify that the Win-IR program is not locked up.

STEP 9:

[] Wait until Win-IR has finished taking four to five more samples. During a scan, depress the Escape key, to stop the scaning process.

STEP 10:

[] Use File Manager to verify that the ".SPC" files and the ".RPT" file are stored locally at the FTIR computers under "C:\FTIR" directory.

STEP 11:

[] Use File Manager to remove all interferogram files ".SPC" in the directory "C:\FTIR".

STEP 12:

[] To manually re-establish the FTIR/GCS1HOST link, use File Manager to reconnect the network drive D to "D:\\GCS1HOST\FTIR".

STEP 13:

[] To simulate the HLAN network outage, disconnect "LABHOST" from "GCS1HOST" by breaking the HLAN network connection at GCS1HOST. To do this click on the "disconnect" button in File Manager. Select the connection to the LABHOST computer "H:\\LABHOST\GCS1DATA".

STEP 14:

[] At GCS1HOST computer, use File Manager to verify that the report and the interferogram files exist in today's directory "D:\FTIR\YMMDDIR".

STEP 15:

[] Under Program Manager set the date on GCS1HOST to the next day's date.

STEP 16:

[] To start the FTIR's zip and transfer process, run C:\BIN\FTIRZIP.EXE program.

STEP 17:

[] Use the File Manager to verify that "D:\YMMDDIR.ZIP" exists locally and then delete it.

STEP 18:

[] Use file Manager to verify that the directory "D:\FTIR\YMMDDIR" was removed.

STEP 19:

[] Under Program Manager reset the date on GCS1HOST back to today's date.

STEP 20:

[] Use the File Manager to reconnect the network drive H "H:\\LABHOST\GCS1DATA".

STEP 21:

[] Terminate all active applications and close all program groups in GCS1HOST and FTIR computers.

4.6 TEST APPROVAL AND ACCEPTANCE

[ ] The System Engineer/Test Director, by his or her signature below, states that the Gas Characterization System Software complies with the design documents and is functional.

_____
System Engineer Date
Test Director

5.0 TEST RECORD SHEETS

5.1 TEST EXCEPTION SHEET

Test Exception Sheets are used to document exceptions to the test procedure. Actions taken regarding disposition are noted on the exception sheet. Typical dispositions are:

1. Test approved with exception (i.e. rerun of the acceptance test unnecessary).
2. Entire acceptance test to be repeated after the discrepancy has been corrected.
3. Acceptance Test Procedure step(s) affected to be repeated after the discrepancy has been corrected.

Test Exception Sheets are included in Appendix A.

5.2 TEST LOG SHEET

Test Log Sheets are used to document test start and stop times and to document any other notes concerning the execution of the Acceptance Test Procedure.

Test Log Sheets are included in Appendix B.

INSTRUMENTS		DISPLAY				%ERROR	
TAG NUMBER	DESCRIPTIONS	INSTRUMENT		GCSVI.VI			
		SEC 4.2.3 STEP 2	SEC 4.2.3 STEP 3	SEC 4.2.3 STEP 2	SEC 4.2.3 STEP 3	STEP 2	STEP 3
FIT-*10	MAIN SAMPLE LINE FLOW						
PDIT-*20	GC1 PRESSURE						
PDIT-*30	GC2 PRESSURE						
PIT-*10	MAIN SAMPLE LINE INLET PRESSURE						
PIT-*40	FTIR OUTLET PRESSURE						

TABLE 4.2.3.1

INSTRUMENTS		SCALE/RANGE	DISPLAY (STEP 5)		%ERROR
TAG NUMBER	DESCRIPTIONS		INSTRUMENT	GCSVI.VI	
TIT-*40	FTIR CELL TEMPERATURE	32-160 F			
TIT-*11	INSTRUMENT PANEL TEMPERATURE	32-160 F			

TABLE 4.2.3.2

DATA	"C:\GC1_VI.DAT" DATA FILE READING (STEP 12)	GCSVI.VI READING	COMMENTS
H2-LO PPM			
H2-HI PPM			

TABLE 4.2.3.3

DATA	"C:\GC2_VI.DAT" DATA FILE READING (STEP 13)	GCSVI.VI READING	COMMENTS
CH4-LO PPM			
N2O-LO PPM			
CH4-HI PPM			
N2O-HI PPM			

TABLE 4.2.3.4

DATE	TIME	FIT-*10	PDIT-*20	PDIT-*20	PIT-*10	PIT-*40	TIT-*40	TIT-*11

TABLE 4.2.6.1

	DATE	TIME	FIT-*10	PDIT-*20	PDIT-*20	PIT-*10	PIT-*40	TIT-*40	TIT-*11
GCSVI.VI READING									
INSTRUMENT READ OUT									

TABLE 4.2.6.2

	CERTIFIED STANDARD CALIBRATION GAS		EZChrom READING (STEP 3)	COMMENTS
	NOMINAL	ACTUAL		
H2-LO PPM	100 PPM			
H2-HI PPM	100 PPM			

TABLE 4.3.1.1

	CERTIFIED STANDARD CALIBRATION GAS		EXTERNAL STANDARD REPORT		".DIF" FILE REPORT		VALUE FROM ANALYZED CHROMATOGRAM	
RUN	H2-LO	H2-HI	H2-LO	H2-HI	H2-LO	H2-HI	H2-LO	H2-HI
1								
2								
3								
4								
5								

TABLE 4.3.1.2

	CERTIFIED STANDARD CALIBRATION GAS		EXTERNAL STANDARD REPORT		FORMATED REPORT FROM GCS1HOST	
RUN	H2-LO	H2-HI	H2-LO	H2-HI	H2-LO	H2-HI
1						
2						
3						
4						
5						

TABLE 4.3.3.1

Cal	Mo	Day	Yr	TIME	INDEX	H2-LO	H2-HI

TABLE 4.3.3.2

INITIAL SAMPLE #5		APPENDED SAMPLE #6	
INDEX	TIME	INDEX	TIME

TABLE 4.3.4.1

Cal	Mo	Day	Yr	Time	INDEX	H2-LO	H2-HI	Expected Result	Actual Result (STEP 5)
0	Feb	08,	1996	08:23:22	1	10.000	10.000	U	
0	Feb	08,	1996	08:25:23	2	10.000	10.000	S	
0	Feb	08,	1996	08:27:23	3	10.000	10.000	U	
0	Feb	08,	1996	08:29:24	4	10.000	10.000	S	
0	Feb	08,	1996	08:31:24	5	0.000	0.000	S	
0	Feb	08,	1996	08:33:23	6	0.000	0.000	S	
0	Feb	08,	1996	08:35:24	7	0.000	0.000	S	
0	Feb	08,	1996	08:37:24	8	10.000	10.000	S	
0	Feb	08,	1996	08:39:25	9	10.000	10.000	U	
1	Feb	08,	1996	08:41:25	10	10.000	10.000	S	
1	Feb	08,	1996	08:43:24	11	10.000	10.000	S	
1	Feb	08,	1996	08:45:25	12	10.000	10.000	S	
1	Feb	08,	1996	08:47:25	13	10.000	10.000	S	
1	Feb	08,	1996	08:49:25	14	10.000	10.000	S	
0	Feb	08,	1996	08:51:26	15	10.000	10.000	U	
0	Feb	08,	1996	08:53:26	16	10.000	10.000	S	
0	Feb	08,	1996	08:55:27	17	10.000	10.000	U	
0	Feb	08,	1996	08:57:27	18	0.000	0.000	S	
0	Feb	08,	1996	08:59:26	19	0.000	0.000	S	
0	Feb	08,	1996	09:01:27	20	0.000	0.000	S	

TABLE 4.3.6.1

	CERTIFIED STANDARD CALIBRATION GAS		EZChrom READING (STEP 3)	COMMENTS
	NOMINAL	ACTUAL		
CH4-LO PPM	175 PPM			
N2O-LO PPM	175 PPM			
CH4-HI PPM	175 PPM			
N2O-HI PPM	175 PPM			

TABLE 4.4.1.1

	CERTIFIED STANDARD CALIBRATION GAS		EXTERNAL STANDARD REPORT		".DIF" FILE REPORT		VALUE FROM ANALYZED CHROMATOGRAM	
RUN	CH4-LO	N2O-LO	CH4-LO	N2O-LO	CH4-LO	N2O-LO	CH4-LO	N2O-LO
1								
2								
3								
4								
5								

TABLE 4.4.1.2 (Channel A)

	CERTIFIED STANDARD CALIBRATION GAS		EXTERNAL STANDARD REPORT		".DIF" FILE REPORT		VALUE FROM ANALYZED CHROMATOGRAM	
RUN	CH4-HI	N2O-HI	CH4-HI	N2O-HI	CH4-HI	N2O-HI	CH4-HI	N2O-HI
1								
2								
3								
4								
5								

TABLE 4.4.1.2 (Channel B)

	CERTIFIED STANDARD CALIBRATION GAS		EXTERNAL STANDARD REPORT		FORMATED REPORT FROM GCS1HOST	
RUN	CH4-LO	N2O-LO	CH4-LO	N2O-LO	CH4-LO	N2O-LO
1						
2						
3						
4						
5						

TABLE 4.4.3.1 (Channel A)

	CERTIFIED STANDARD CALIBRATION GAS		EXTERNAL STANDARD REPORT		FORMATED REPORT FROM GCS1HOST	
RUN	CH4-HI	N2O-HI	CH4-HI	N2O-HI	CH4-HI	N2O-HI
1						
2						
3						
4						
5						

TABLE 4.4.3.1 (Channel B)

Cal	Mo	Day	Yr	TIME	INDEX	CH4-LO	N2O-LO	CH4-HI	N2O-HI

TABLE 4.4.3.2

INITIAL SAMPLE #5 STEP 1		APPENDED SAMPLE #6 STEP 10	
INDEX	TIME	INDEX	TIME

TABLE 4.4.4.1

Cal	Mo	Day	Yr	Time	INDEX	CH4-LO	N2O-LO	CH4-HI	N2O-HI	Expected Result	Actual Result
0	Feb	08,	1996	08:24:13	1	10.000	10.000	10.000	10.000	U	
0	Feb	08,	1996	08:26:13	2	10.000	10.000	10.000	10.000	S	
0	Feb	08,	1996	08:28:13	3	10.000	10.000	10.000	10.000	U	
0	Feb	08,	1996	08:30:14	4	10.000	10.000	10.000	10.000	S	
0	Feb	08,	1996	08:32:14	5	0.000	0.000	0.000	0.000	S	
0	Feb	08,	1996	08:34:13	6	0.000	0.000	0.000	0.000	S	
0	Feb	08,	1996	08:36:14	7	0.000	0.000	0.000	0.000	S	
0	Feb	08,	1996	08:38:14	8	10.000	10.000	10.000	10.000	S	
0	Feb	08,	1996	08:40:14	9	10.000	10.000	10.000	10.000	U	
1	Feb	08,	1996	08:42:14	10	10.000	10.000	10.000	10.000	S	
1	Feb	08,	1996	08:44:15	11	10.000	10.000	10.000	10.000	S	
1	Feb	08,	1996	08:46:15	12	10.000	10.000	10.000	10.000	S	
1	Feb	08,	1996	08:48:15	13	10.000	10.000	10.000	10.000	S	
1	Feb	08,	1996	08:50:15	14	10.000	10.000	10.000	10.000	S	
0	Feb	08,	1996	08:52:16	15	10.000	10.000	10.000	10.000	U	
0	Feb	08,	1996	08:54:16	16	10.000	10.000	10.000	10.000	S	
0	Feb	08,	1996	08:56:16	17	10.000	10.000	10.000	10.000	U	
0	Feb	08,	1996	08:58:17	18	0.000	0.000	0.000	0.000	S	
0	Feb	08,	1996	09:00:17	19	0.000	0.000	0.000	0.000	S	
0	Feb	08,	1996	09:02:17	20	0.000	0.000	0.000	0.000	S	

TABLE 4.4.6.1

APPENDIX A: TEST EXCEPTION SHEETS

TEST EXCEPTION SHEET

EXCEPTIONS			CORRECTION APPROVAL
Procedure number	Date	Description	Initials/Date

EXCEPTION NUMBER: _____

OBJECTING: _____
Test Engineer Date

ACCEPTABLE RETEST PERFORMED: _____
Test Director Date
System Engineer

EXCEPTION RESOLVED: _____
System Engineer Date

APPENDIX B: TEST LOG SHEET

TEST LOG

DATE/TIME	COMMENTS

DISTRIBUTION SHEET

To	From	Page 1 of 1
DISTRIBUTION	Characterization Monitoring Development	Date Feb. 26, 1996
Project Title/Work Order		EDT No. 606747
95C-EWW-451, Tank Characterization / N2144		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
RE Bauer	L6-37				X
JR Bunch	L6-37	X			
GD Johnson	S7-15				X
S Kanjilal	L6-37	X			
JW Lentsch	S7-15				X
WE Meeusen	S5-05				X
CA Sams	S5-13				X
TC Schneider	L6-37	X			
EK Straalsund	L6-37	X			
DD Tate	L6-37	X			
CV Vo (2)	L6-37	X			
KA White	S5-13				X
Central Files (2)	A3-88	X			