Dpt 4

(2)

APR 08 1996

ENGINEERING DATA TRANSMITTAL

1. EDT № 141086

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
TWRS/ENG	KHC/ETS	None
5. Proj./Prog./Dept./Div.:	6. Cog. Engr.:	7. Purchase Order No.:
AN-107 Caustic Addition	J. L. Dowell	N/A
8. Originator Remarks:		9. Equip./Component No.:
Document routed for review and approval prior to release.		N/A
		10. System/Bldg./Facility:
		241-AN-274
11. Receiver Remarks:		12. Major Assm. Dwg. No.:
		N/A
		13. Permit/Permit Application No.:
		N/A
		14. Required Response Date:
		ASAP

15. DATA TRANSMITTED

(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-ATR-149		0	Acceptance Test Report for the 241-AN-107 Caustic Addition Mixer Pump Datalogger	~~HS~~ NA	1,2	1	

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 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

17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng. JL Dowell	JL Dowell	1-8-96	E6-21	KG Carothers	KG Carothers	3-12-96	R1-51	3	
1	1	Cog. Mgr. GN Hanson	KG Carothers for	3-13-96	S5-05	RS Nicholson	William Nicholson for	3/13/96	S5-05	1	1
3		QA JJ Verderber			S1-57	MD Harding	M. D. Harding	3-18-96	S5-10	1	1
3		Safety SU Zaman			R3-08						
		Env. N/A									

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
JL Dowell 1/8/96 Signature of EDT Originator — Date	KG Carothers 3/12/96 Authorized Representative for Receiving Organization — Date	KG Carothers 3-13-96 Cognizant Manager — Date	[ ] Approved [ ] Approved w/comments [ ] Disapproved w/comments

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

RELEASE AUTHORIZATION

Document Number:	WHC-SD-WM-ATR-149, REV 0
Document Title:	Acceptance Test Report for the 241-AN-107 Caustic Addition Mixer Pump Datalogger
Release Date:	4/5/96

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara Broz 4/5/96

SUPPORTING DOCUMENT

1. Total Pages 103

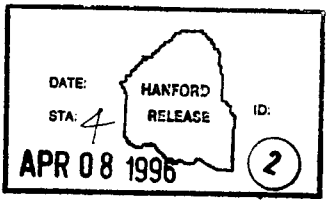
2. Title	3. Number	4. Rev No.
Acceptance Test Report for the 241-AN-107 Caustic Addition Mixer Pump Datalogger	WHC-SD-WM-ATR-149	0

5. Key Words	6. Author
caustic addition, AN-107, mixer pump, datalogger, data acquisition, test report	Name: J. L. Dowell Signature Organization/Charge Code 57C00/E49954

7. Abstract

The purpose of this report is to document that the Caustic Addition Mixer Pump Datalogger, functioned as intended as installed at 241-AN-107 tank farm.

8. RELEASE STAMP



ACCEPTANCE TEST REPORT

FOR THE

241-AN-107 CAUSTIC ADDITION MIXER PUMP DATALOGGER

November 1995

J. L. Dowell

Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

CONTENTS

ACCEPTANCE TEST REPORT FOR THE 241-AN-107 CAUSTIC ADDITION MIXER PUMP DATALOGGER

1.0 INTRODUCTION

The Acceptance Test Procedure for the 241-AN-107 Caustic Addition Mixer Pump Datalogger, WHC-SD-WM-ATP-149, was started on September 25, 1995, and completed November 13, 1995. K. G. Carothers of Tank Waste Remediation Engineering requested the test procedure and ICF Kaiser Control Systems Engineering group wrote the test procedure and executed it at the 305 building in 300 area and at the 241-AN Tank Farm in 200 East area.

2.0 DESCRIPTION OF TEST

Testing was done in two phases: pre-installation testing at the 305 building in 300 Area, and post-installation testing at 241-AN Tank Farm. The purpose of the pre-installation testing portion (Section 1.7) was to formally close out engineering development activities by verifying and documenting the datalogger met the functional design criteria [listed in section 1.3 of the test procedure and reproduced below]. Once the datalogger successfully completed the pre-installation testing it was turned over for installation in the field.

The purpose of the post-installation testing (Section 1.8) was to verify the proper operation of each channel of the datalogger system. Testing was intended to verify that the datalogger met the functional, operational, and design requirements in its final in-service configuration. The computer workstation and datalogger were evaluated against the following criteria:

2.1 THE WORKSTATION/COMPUTER CRITERIA

2.1.1 Boots up to DOS prompt or the WAM menu.

2.1.2 Communicates with the datalogger via the serial interface using the DeCipher program.

2.1.3 Displays data in engineering units with timestamp.

2.1.4 Transfers the data from the datalogger to the workstation memory.

2.1.5 Stores data in a Lotus 1-2-3™ compatible format including the timestamp.

2.2 DATALOGGER CRITERIA

2.2.1 Transfers the data to the workstation when commanded by the program.

2.2.2 If power is removed the datalogger will continue to record and will retain all recorded data (until the battery is drained). When power returns the datalogger continues as before the power loss.

2.2.3 Runs the "schedule" to record the following seven parameters every 5 minutes when the Motor Torque exceeds 5% (nominal):

Parameter	Datalogger Channel	Low Range	High Range
Pump motor power	1	0	90kW
Pump motor rpm	2	0	1800
Pump motor temperature	3	50	250 (deg F)
Pump column vibration	4	0	1 in/sec
Pump column strain	5	0	150 lbs
Motor voltage	6	0	460 Volt
Motor torque	7	0	150%

Note: The signals for channels 1-5 are a 0.4 to 2.0 volts (4-20 mA current loop across a 100 ohm, 0.1% resistor). The signal for channel 6 is a 0 to 6V dc voltage. The signal for channel 7 is a 0 to 10V dc voltage.

3.0 TEST METHOD AND TEST EQUIPMENT

The test method for the pre-installation portion followed these general steps:

1. Assure the computer communicated with the datalogger.
2. Put a low-scale/near zero signal on Channel 1.
3. Trigger Channel 7 by simulating an input of ~0.33 volts.
4. Take at least 3 readings.
5. Change the signal to mid-scale; take at least 3 readings.
6. Change the signal to full-scale (or near full-scale); take at least 3 readings.
7. Change the signal to low-scale/near zero; take at least 3 readings.
8. Change Channel 7 to under 0.32 volts (to end recording).
9. Repeat steps 2 through 8 for Channels 2 through 6.
10. Assure Channel 7 responds.
11. Transfer readings from datalogger to computer disc.
12. Repeat steps 2 through 9 above, except after doing Channel 4, turn off datalogger power for 1 minute, then turn power back on, then continue with Channels 5 through 7.
13. Transfer readings from datalogger to computer disc.
14. Evaluate the data.

For the post-installation testing, the general test method was to:

1. Assure the computer communicated with the datalogger.
2. Put a mid-scale signal on Channel 1.
3. Trigger Channel 7 by simulating an input of ~0.33 volts.
4. Take 2 readings.
5. Change Channel 7 to under 0.32 volts.
6. Repeat steps 2 through 5 for Channels 2 through 6.
7. Assure Channel 7 responds.
8. Transfer readings from datalogger to computer disc.
9. Evaluate the data.

Test equipment included 2 signal sources, and (if uncalibrated) a calibrated multimeter plus an assortment of hand tools.

4.0 TEST RESULTS

Pre-installation test results: Communication between the datalogger and computer workstation was without problems. The datalogger performed well but several minor test exceptions (TE #1 thru 5) were generated. Test Exception (TE) #1 noted a minor test measurement equipment failure (batteries died) that had no impact on test performance. The balance of the Test Exceptions dealt with minor "glitches" in the procedure itself or minor errors in performance of the procedure.

Post-installation test results: During the informal checkout communication problems between the datalogger and computer workstation were traced to a poor connection. Once the connectors were reseated the datalogger communicated with the computer workstation. Testing appeared to go well, but again several Test Exceptions (TE #6-9) were generated. These again dealt with minor procedural corrections, a missing nameplate and an interuption for some troubleshooting. However, upon graphing the data channel by channel it was discovered that the static signal on Channel 5 was equal to the signal applied during the procedure. Thus, it was not possible to unambiguously state that Channel 5 responded to the applied signal. Thus TE #10 was generated and Channel 5 was retested. The retest modified the procedure slightly and a mid-scale signal was applied for the first reading, but a slightly higher signal was applied for the second reading. Channel 5 responded exactly as expected and the post-installation test was ended.

The DeCipher program batch file successfully communicated with the datalogger and obtained the data. The datalogger files were successfully converted into a spreadsheet compatible file. A copy of the test control copy of the procedure is in Attachment A. The data sheets containing all data taken are included in Attachment A as are the channel by channel graphs of the data recorded plus the Test Exeptions, Test Log, and Test Execution Sheet.

Test exceptions were generated for all steps that were not performed satisfactorily or were modified and all text exceptions were resolved satisfactorily.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The results of the Test Procedure shows the datalogger functions as required for the 241-AN-107 Caustic Addition program.

6.0 DISPOSITION OF ITEM BEING TESTED

The datalogger, computer workstation, DeCipher program, and "batch" file CA_PUMP.CMD were all accepted as tested and are ready for operational use.

WHC-SD-WM-ATR-149
Revision 0

Attachment A

Master Copy
of

Acceptance Test Procedure
for the
241-AN-107 Caustic Addition Mixer Pump Datalogger
WHC-SD-WM-ATP-149

ACCEPTANCE TEST PROCEDURE

FOR THE 241-AN-107

CAUSTIC ADDITION MIXER PUMP DATALOGGER

September 1995

J. L. Dowell

Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

TEST CONTROL COPY

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CONTENTS

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CONTENTS (cont)

TEST CONTROL COPY

ACCEPTANCE TEST PROCEDURE FOR THE 241-AN-107 CAUSTIC ADDITION MIXER PUMP DATALOGGER

1.0 INSTRUCTION SECTION

1.1 PURPOSE/SCOPE

The purpose of this document is to demonstrate that the Data Logger monitoring the Caustic Addition Mixer pump functions per the design media and criteria. It is the intent of this test procedure to satisfy the requirements of an ATP to complete development (Section 1.7) and an OTP for the field installation (Section 1.8). Testing is expected to be done at the 305 Building (Section 1.7) and at 241-AN-274 (Section 1.8). Satisfactory completion of Section 1.7 is required before the datalogger and associated equipment are turned over for field installation. As of this writing, testing is expected to be performed in September 1995 and will take less than one week (excluding field installation) to complete.

The purpose of this procedure is to verify the data logger correctly records various parameters associated with the Caustic Addition Mixer pump. This test will also perform verification and validation of the programs and files associated with the datalogger. Testing described in this document will verify that the hardware and software function per the criteria (Section 1.3) prior to starting tank mixing tests.

1.2 DESCRIPTION OF THE SYSTEM

The Datalogger is a part of the AN-107 Caustic Addition Mixer Pump that periodically records 7 mixer pump parameters. The five 4-20 mA signals and two DC voltage signals are generated by the mixer pump instruments and the Variable Frequency drive (VFD). In order to correlate the recorded data to other independent data acquisition activities all data will be time stamped.

The following items will be tested for functionality: the datalogger assembly, DeCipher software (running on a standard workstation) using the datalogger "schedule", the interconnecting cables/wiring and other accessories.

1.2.1 The Datalogger

The datalogger has the terminals that connect to the various signals to be recorded. It also has a port to communicate to the workstation via the serial port using the DeCipher program.

1.2.2 The DeCipher software

Communicates to the datalogger via the serial interface using the DeCipher program and stores the data in a Lotus 1-2-3™ file format.

TEST CONTRO
COPY

1.3 CRITERIA

This test procedure will be successful if the following criteria are met:

1.3.1 The Workstation/Computer Criteria

1.3.1.1 Boots up to DOS prompt or the WAM menu.

1.3.1.2 Communicates with the datalogger via the serial interface using the DeCipher program.

1.3.1.3 Displays data in engineering units with timestamp.

1.3.1.4 Transfers the data from the datalogger to the workstation memory.

1.3.1.5 Stores data in a Lotus 1-2-3™ compatible format including the timestamp.

1.3.2 Datalogger Criteria

1.3.2.1 Transfers the data to the workstation when commanded by the program.

1.3.2.2 If power is removed the datalogger will continue to record and will retain all recorded data (until the battery is drained). When power returns the datalogger continues as before the power loss.

1.3.2.3 Runs the "schedule" to record the following seven parameters every 5 minutes when the Motor Torque exceeds 5% (nominal):

Parameter	Datalogger Channel	Low Range	High Range
Pump motor power	1	0	90kW?
Pump motor rpm	2	0	1800
Pump motor temperature	3	50	250 (deg F)
Pump column vibration	4	0	1 in/sec
Pump column strain	5	0	150 lbs
Motor voltage	6	0	460 Volt
Motor torque	7	0	150%

Note: The signals for channels 1-5 are a 0.4 to 2.0 volts (4-20 mA current loop across a 100 ohm, 0.1% resistor). The signal for channel 6 is a 0 to 6V dc voltage. The signal for channel 7 is a 0 to 10V dc voltage.

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1.4 REFERENCES

1.4.1 Drawings/ECN

- ECN 621961, shows installation of data logger to monitor 5 parameters
- ECN 623762, shows connection of data logger to record motor voltage and motor torque.
- H-2-85573, Electrical, Caustic Addition Project

Note: the above listing may not be complete.

1.5 RESPONSIBILITIES

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

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

1.5.1 Project Engineer

1.5.1.1 Designate a Test Director.

1.5.1.2 Coordinate testing with facility management.

1.5.1.3 Act as liaison between the participants in testing.

1.5.1.4 Ensure informal testing and inspection is complete.

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

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

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

1.5.1.8 Approve field changes to this test procedure.

1.5.1.9 Sign/date Test Execution Sheet (Appendix D) when This test procedure is approved and accepted.

1.5.1.10 Take necessary action to clear exceptions to this test procedure.

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1.5.1.11 Sign/date Test Exception Sheet (Appendix B) when an exception has been resolved.

1.5.1.12 Provide a distribution list for the approved and accepted test procedure.

1.5.1.13 Confirm that all equipment required for performing this test, as listed in Section 1.6.2, will be available for the test duration.

1.5.1.14 Provide equipment required for performing this test, which has not been designated as being provided by others.

1.5.2 Test Director

1.5.2.1 Witness the tests.

1.5.2.2 Coordinate all testing.

1.5.2.3 Confirm that shop testing (if any) and/or inspection (if any) of the test unit(s) or portion of the test unit(s) have been completed.

1.5.2.4 Stop any test which may cause damage to the test unit(s) until the test procedure has been revised.

1.5.2.5 Approve field changes to this test procedure.

1.5.2.6 Obtain revisions to this test procedure, as necessary, to comply with authorized field changes or to accommodate existing field conditions.

1.5.2.7 Evaluate recorded data, discrepancies, and exceptions.

1.5.2.8 Obtain from the Project Engineer, any information or changes necessary to clear or resolve exceptions.

1.5.2.9 Sign/date Test Data sheets and Test Execution sheet (Appendix A & D) when execution of this test procedure has been completed.

1.5.2.10 Sign/date Test Exception Sheet (Appendix B) when acceptable retest has been performed.

1.5.2.11 Prepare and obtain required signatures on the Test Report prior to reproduction and distribution.

1.5.3 Safety

1.5.3.1 Review and approve this Test Procedure.

TEST CONTROL COPY

1.5.4 Recorder

1.5.4.1 Witness testing and perform all recording using black ink.

1.5.4.2 Record names of all designated personnel on the Test Execution sheet (Appendix D) on the Recorder's copy of this test procedure prior to testing.

1.5.4.3 Observe tests, record test data (Appendix A) and maintain Test Log (Appendix C).

1.5.4.4 Sign/date the Test Execution Sheet, Test Data sheets and Test Exception sheet(s) (Appendices A, B & D) as the Recorder.

1.5.4.5 Initial every test step on the Recorder's copy as it is completed, next to the step number and under the appropriate gauge identifier.

1.5.4.6 Record authorized field changes to this test procedure.

1.5.4.7 Record, on a Test Exception Sheet, exceptions and test steps that are either modified or are not performed. Additional Test Exception Sheets can be reproduced as needed (Appendix B).

1.5.4.8 Orally notify the Test Director at the time an objection is made.

1.5.4.9 After this test procedure is complete assign page numbers to Test Exception Sheets.

1.5.4.10 Submit the completed test procedure to the Test Director for approval signatures and distribution.

1.5.5 Quality

1.5.5.1 Witness the tests.

1.5.5.2 Evaluate recorded data, discrepancies, and exceptions.

1.5.5.3 Approve field changes to this test procedure.

1.5.5.4 Sign/date Test Execution Sheet (Appendix D) when execution of this test procedure is completed and again when it is approved and accepted.

1.5.5.5 Sign/date Test Exception Sheet (Appendix B) when an exception is made and again when it has been resolved.

1.5.5.6 Initial/mark Test Data sheets (Appendix A), assuring data is entered correctly.

TEST CONTROL COPY

1.6 TEST CONDITIONS & EQUIPMENT REQUIRED

1.6.1 Test Conditions

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

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

The testing of the Datalogger will be performed in the 305 Building (Section 1.7, pre-installation) and 241-AN-274 building (Section 1.8, post installation).

1.6.2 Equipment Required

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

	Qty	Description
	2	- 3 1/2 digit multi-meter with current valid calibration
	2	- Adjustable DC power supply, 0-2 volt (min) @ 100 mA (nominal)
or	2	- Field Calibrator with current valid calibration
	1	- IBM™ (or compatible) computer/monitor with DeCipher/DeTerminal software
	1	- Interface cable, 9 pin "D"
	1	- Manual for DataTaker™.
	A/R	- Assorted hand tools
	A/R	- Jumper wires
	A/R	- Blank computer diskettes (3 1/2 or 5 1/4 inch, as needed)

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1.7 ACCEPTANCE TEST - PRE-INSTALLATION

1.7.1 Preliminary Conditions

The following shall be satisfactorily completed before performing Section 1.7.2.

✓ 1.7.1.1 The datalogger has been inspected for general workmanship and is connected per Figure 1, Appendix F.

✓ 1.7.1.2 Continuity and megger tests have been performed on portions of the electrical and instrument systems being tested, as required.

✓ 1.7.1.3 All test instruments requiring calibration have a currently valid calibration stamp attached that indicates a calibration traceable to the National Institute of Standards and Testing.

✓ 1.7.1.4 Personnel responsible for directing and witnessing the performance of the tests described in this test procedure have read and understand their roles.

✓ 1.7.1.5 All other items have been tested to insure their proper function.

✓ 1.7.1.6 The test unit(s) and associated components have been checked and informally operated to ensure that they are in good general working order.

✓ 1.7.1.7 All components and equipment are de-energized.

H L Dowell — 9-25-95
Test Director — Date

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1.7.2 Datalogger Setup

The purpose of this section is to assure the workstation boots up properly and the datalogger communicates with the DeCipher program via the serial link.

✓ 1.7.2.1 Verify all the steps in Section 1.7.1 are complete.

✓ 1.7.2.2 Record the model number and serial number of the datalogger.

✓ 1.7.2:3 Turn on power to the computer, datalogger and any other associated equipment. Assure computer boots up normally.

✓ 1.7.2.4 Go to the subdirectory where "DeCipher" is located; type DCP <Enter> to start "DeCipher". Assure the appropriate messages and screen appears (see pages 7 & 8 of the DataTaker manual, "Getting Started with Datataker" and Appendix E).

✓ 1.7.2.5 In the Command menu, go to the Command Edit window. Open and load command file CA_PUMP. This file will log all 7 analog data channels every 5 minutes when the motor torque exceeds 5%, nominal.

✓ 1.7.2.6 Go to the Data menu. In the Source window, select "Logged then Stop". In the Select Chans window assure all channels are selected.

✓ 1.7.2.7 Go to the File menu. In the Format window, select "Lotus". In the Channels window assure the "Time with Date" channel is selected and that all the other data channels are selected. In the Send To window select the following:

File	Yes
Name	[NORMDATA
Printer	No
Screen	Yes

✓ 1.7.2.8 Go to the Run menu. In the Run what? window select the following:

File	Yes
Plot	No
Meter	No
Screen	File

✓ 1.7.2.9 Return to the Command menu. From the Command Edit window, arrow up (↑) to view the file CA_PUMP. Alter the "report schedule" to log all 7 analog data channels with timestamp every 5 seconds (instead of every 5 minutes). Send the file to the datalogger by pressing Alt-A [Send All].

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1.7.2.10 Assure the "report schedule" was correctly loaded by using the "STATUS2" command (Ref. page 4, headed "Schedules" of the DataTaker Manual). Record the report schedule reported using the "STATUS2" command.

1.7.3 Datalogger Test: Normal operation

The purpose of this section is to assure the datalogger records the data properly, transfers the data to the workstation, and stores the data in a Lotus 1-2-3™ compatible file.

1.7.3.1 Verify all the steps in Section 1.7.2 are complete.

1.7.3.2 Assure the signal to the datalogger Channels 1 through 5 is 0.4 volts or less, and the signal to datalogger Channels 6 and 7 is 0.0 volts (nominal), unless otherwise directed.

1.7.3.3 Exit DeCipher to the DOS prompt.

1.7.3.4 Set the Channel 7 signal to 0.33 (-0.00, + 0.02) volts. (This simulates a motor load of over 5% and starts the datalogger recording.) Record the Channel 7 voltage.

TE1

1.7.3.5 Set the Channel 1 signal to 0.4 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 1 voltage.

1.7.3.6 Set the Channel 1 signal to 1.2 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 1 voltage.

1.7.3.7 Set the Channel 1 signal to 2.0 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 1 voltage.

1.7.3.8 Set the Channel 1 signal to 0.4 volts or less. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 1 voltage.

1.7.3.9 Repeat Steps 1.7.3.5 to 1.7.3.8 for Channel 2.

1.7.3.10 Repeat Steps 1.7.3.5 to 1.7.3.8 for Channel 3.

1.7.3.11 Repeat Steps 1.7.3.5 to 1.7.3.8 for Channel 4.

1.7.3.12 Repeat Steps 1.7.3.5 to 1.7.3.8 for Channel 5.

1.7.3.13 Set the Channel 6 signal to 0.1 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 6 voltage.

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1.7.3.14 Set the Channel 6 signal to 3.0 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 6 voltage.

1.7.3.15 Set the Channel 6 signal to 5.8 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 6 voltage.

1.7.3.16 Set the Channel 6 signal to 0.1 volts or less. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 6 voltage.

1.7.3.17 Set the Channel 7 signal to 5.0 ± 0.10 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 7 voltage.

1.7.3.18 Set the Channel 7 signal to 9.9 ± 0.10 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 7 voltage.

1.7.3.19 Set the Channel 7 signal to less than 0.30 volts. (This simulates a motor torque of less than 5%, ending data recording). Record the Channel 7 voltage.

1.7.3.20 Go to the subdirectory where "DeCipher" is located, if needed; type DCP <Enter> to start the "DeCipher". Assure the appropriate messages and screen appears (see pages 7 & 8 of the DataTaker manual, "Getting Started with Datataker™").

1.7.3.21 Transfer the data from the datalogger to the computer. Save the data as a Lotus 1-2-3™ compatible file. RECORD the drive, directory and file name.

1.7.4 Display Logged Data

The purpose of this section is to assure the data can be displayed in engineering units with timestamp.

1.7.4.1 Copy the data from the Data Logger memory to a file. Name the file NORMDATA.

1.7.4.2 Erase the internal memory of the Data Logger and erase the data in the From Datataker window of the Command menu.

TEST 1.7.4.3 Go to the File menu. In the Send To window select the following:

File	Yes
Name	[NORMDATA
Printer	No
Screen	Yes

TEST CONTROL COPY

TEST 1.7.4.4 View the data; verify the data for channels 1 through 7 inclusive have a profile per Figure 2, Appendix F.

1.7.5 Datalogger Test: Loss of power operation

This section assures the datalogger will not lose data due to a power loss.

Note: this section is similar to the Normal Operation section but power is removed from the datataker for a short time. Data is then examined to assure no loss occurred.

1.7.5.1 Assure the signal to the datalogger Channels 1 through 5 is 0.4 volts or less, and Channels 6 and 7 is 0.0 volts (nominal), unless otherwise directed.

1.7.5.2 Exit DeCipher to the DOS prompt.

1.7.5.3 Set the Channel 7 signal to 0.33 (-0.00, + 0.02) volts. (This simulates a motor load of over 5% and starts the datalogger recording.) Record the Channel 7 voltage.

1.7.5.4 Set the Channel 1 signal to 0.4 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 1 voltage.

1.7.5.5 Set the Channel 1 signal to 1.2 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 1 voltage.

1.7.5.6 Set the Channel 1 signal to 2.0 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 1 voltage.

TEST 1.7.5.7 Set the Channel 1 signal to 0.4 volts or less. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 1 voltage.

1.7.5.8 Repeat Steps 1.7.5.4 to 1.7.5.7 for Channel 2.

1.7.5.9 Repeat Steps 1.7.5.4 to 1.7.5.7 for Channel 3.

1.7.5.10 Repeat Steps 1.7.5.4 to 1.7.5.7 for Channel 4.

1.7.5.11 Remove power from the datalogger for about 1 minute; then restore the power.

1.7.5.12 Repeat Steps 1.7.5.4 to 1.7.5.7 for Channel 5.

TEST CONTROL COPY

1.7.5.13 Set the Channel 6 signal to 0.1 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 6 voltage.

1.7.5.14 Set the Channel 6 signal to 3.0 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 6 voltage.

1.7.5.15 Set the Channel 6 signal to 5.8 ± 0.05 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 6 voltage.

1.7.5.16 Set the Channel 6 signal to 0.1 volts or less. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 6 voltage.

1.7.5.17 Set the Channel 7 signal to 5.0 ± 0.10 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 7 voltage.

1.7.5.18 Set the Channel 7 signal to 9.9 ± 0.10 volts. Have it remain at this level long enough for 3 readings (min) to be taken by the datalogger. Record the Channel 7 voltage.

1.7.5.19 Set the Channel 7 signal to less than 0.30 volts. (This simulates a motor load of less than 5%, ending data recording).

TES

1.7.5.20 ~~Enter DeCipher~~ JLD 4-23-97 Copy the data from the Data Logger memory to a file. Name the file PWR_OFF.

1.7.5.21 Erase the internal memory of the Data Logger and erase the data in the From Datataker window of the Command menu.

1.7.5.22 Go to the File menu. In the Send To window select the following:

File	Yes
Name	[PWR_OFF
Printer	No
Screen	Yes

1.7.5.23 Go to the subdirectory where "DeCipher" is located, if needed; type DCP <Enter> to start the "DeCipher". Assure the appropriate messages and screen appears (see pages 7 & 8 of the DataTaker manual, "Getting Started with Datataker").

1.7.5.24 View the data; verify the data for channels 1 through 7 inclusive have a profile per Figure 2, Appendix F.

1.7.5.25 Remove power from the datalogger and all other test equipment.

TEST CONTROL COPY

1.7.6 Review

JP 1.7.6.1 **Verify** that all steps in Section 1.7 have been satisfactorily completed.

JP 1.7.6.2 Print out and include the following files as part of the test data: command file **CA_PUMP** ; data files **NORMDATA** and **PWR_OFF** and any graphs generated.

JP 1.7.6.3 The cognizant engineer(s), by their signature below state that the Datalogger and associated equipment have satisfactorily completed development testing, are functional and ready for final installation at 241-AN-274.

J.J. Dowell	9-25-95	N/A	
Cognizant Engineer	Date	Cognizant Engineer	Date

TEST CONTROL COPY

1.8 ACCEPTANCE TEST - POST INSTALLATION

1.8.1 Preliminary Conditions

The following shall be satisfactorily completed before performing Section 1.8.2.

KW 1.8.1.1 Verify all steps in Section 1.7 are satisfactorily completed.

KW 1.8.1.2 The datalogger has been installed in 241-AN-274 per the design drawing(s) and applicable ECNs.

KW 1.8.1.3 Continuity and megger tests have been performed on portions of the electrical and instrument systems being tested, as required.

KW 1.8.1.4 All test instruments requiring calibration have a currently valid calibration stamp attached that indicates a calibration traceable to the National Institute of Standards and Testing.

KW 1.8.1.5 Personnel responsible for directing and witnessing the performance of the tests described in this test procedure have read and understand their roles.

KW 1.8.1.6 All other items have been tested to insure there proper function.

TEB 1.8.1.7 All nameplates, equipment tags, etc. are installed/attached per the design drawing(s).

KW 1.8.1.8 The test unit(s) and associated components have been checked and informally operated to ensure that they are in good general working order.

N/A 1.8.1.9 All components and equipment are de-energized. JHD 11-2-95 will turn on in 2 steps. Equipment already on

KW 1.8.1.10 Assure an Instrument Technician/Electrician and any other craft support are identified and available.

Test Director _____ Date 11-15-95

TEST CONTROL COPY

1.8.2 Datalogger Setup

TC-6 1.8.2.1 Verify all the steps in Section 1.8.1 are complete.

KW 1.8.2.2 Assure the computer is connected to the datalogger via the serial interface cable.

N/A 1.8.2.3 Turn on power to the computer, datalogger and any other associated equipment. Assure computer boots up normally.

JJD 11-2-95 Power already on

KW 1.8.2.4 Go to the subdirectory where "DeCipher" is located; type DCP <Enter> to start the "DeCipher". Assure the appropriate messages and screen appears (see pages 7 & 8 of the DataTaker manual, "Getting Started with Datataker").

KW 1.8.2.5 In the Command menu, go to the **Command Edit** window. Open and load command file **CA_PUMP**. This file will log all 7 analog data channels every 5 minutes after the motor torque exceeds 5% (nominal).

KW 1.8.2.6 Go to the **Data** menu. In the **Source** window, select "Logged then Stop". In the **Select Chans** window assure all channels are selected.

KW 1.8.2.7 Go to the **File** menu. In the **Format** window, select "Lotus". In the **Channels** window assure the "Time with Date" channel is selected and that all the other data channels are selected. In the **Send To** window select the following:

File	Yes
Name	[CAM_DAT
Printer	No
Screen	Yes

KW 1.8.2.8 Go to the **Run** menu. In the **Run what?** window select the following:

File	Yes
Plot	No
Meter	No
Screen	File

KW 1.8.2.9 Return to the **Command** menu. From the **Command Edit** window, arrow up (↑) to view the file **CA_PUMP**. Send the file to the datalogger by pressing Alt-A [Send All].

KW 1.8.2.10 Verify and record the "report schedule" was correctly loaded by using the "STATUS2" command (Ref. page 4, headed "Schedules" of The DataTaker Manual).

TEST CONTROL COPY

1.8.3 Datalogger: Record Data

KW 1.8.3.1 Verify all the steps in Section 1.8.2 are complete.

KW 1.8.3.2 Verify there is no power to the variable frequency drive for the caustic addition mixer pump.

KW 1.8.3.3 Open the VFD enclosure.

KW 1.8.3.4 Lift wires DL-7-(+) and DL-7-(-) on TB1 and connect to a signal source. Assure the signal source is at 0.1 volts DC or less.

KW 1.8.3.5 Lift wires DL-6-(+) and DL-6-(-) on TB1 and connect to a signal source. Assure the signal source is at 0.1 volts DC or less.

KW 1.8.3.6 Set the signal source connected to wires DL-6-(+) and DL-6-(-) to 3.0 $\pm$0.10 volts. Record the value of this signal.

KW 1.8.3.7 Set the signal source connected to wires DL-7-(+) and DL-7-(-) to 0.33 (-0.00, +0.02) volts. Record the value of this signal.

TC-7

KW 1.8.3.8 Wait 7 minutes.

KW 1.8.3.9 Set both signal sources to less than 0.1 volts.

KW 1.8.3.10 Disconnect the signal source connected to wires DL-6-(+) and DL-6-(-). Reconnect the wires to the terminals they were removed from.

> Note: The signal sources used, for the rest of this section, may be a 0.4-2.0 volt or a 4-20 mA source. The datalogger Channels 1 through 5 have a 100 ohm (0.1%) resistor across the input terminals. Thus the personnel may freely use either type of signal source at the Test Directors discretion.

KW 1.8.3.11 Lift wires DL-1-(+) and DL-1-(-) on TB-AB and connect to a signal source. Assure the signal source is at 0.4 volts or less.

KW 1.8.3.12 Set the signal source connected to wires DL-1-(+) and DL-1-(-) to 1.2 $\pm$0.05 volts. Record the value of this signal.

KW 1.8.3.13 Set the signal source connected to wires DL-7-(+) and DL-7-(-) to 0.33 (-0.00, +0.02) volts. Record the value of this signal.

KW 1.8.3.14 Wait 7 minutes.

KW 1.8.3.15 Set both signal sources to less than 0.1 volts.

TEST CONTROL COPY

KW 1.8.3.16 Disconnect the signal source connected to wires DL-1-(+) and DL-1-(-). Reconnect the wires to the terminals they were removed from.

KW 1.8.3.17 Lift wires DL-2-(+) and DL-2-(-) on TB-AB and connect to a signal source. Assure the signal source is at 0.4 volts or less.

KW 1.8.3.18 Set the signal source connected to wires DL-2-(+) and DL-2-(-) to 1.2 $\pm$0.05 volts. Record the value of this signal.

KW 1.8.3.19 Set the signal source connected to wires DL-7-(+) and DL-7-(-) to 0.33 (-0.00, +0.02) volts. Record the value of this signal.

KW 1.8.3.20 Wait 7 minutes.

KW 1.8.3.21 Set both signal sources to less than 0.1 volts.

KW 1.8.3.22 Disconnect the signal source connected to wires DL-2-(+) and DL-2-(-). Reconnect the wires to the terminals they were removed from.

KW 1.8.3.23 In the instrument cabinet lift wires DL-3-(+) and DL-3-(-) from TB-1A and connect to a signal source. Assure the signal source is at 0.4 volts or less.

KW 1.8.3.24 Set the signal source connected to wires DL-3-(+) and DL-3-(-) to 1.2 $\pm$0.05 volts. Record the value of this signal.

KW 1.8.3.25 Set the signal source connected to wires DL-7-(+) and DL-7-(-) to 0.33 (-0.00, +0.02) volts. Record the value of this signal.

KW 1.8.3.26 Wait 7 minutes.

KW 1.8.3.27 Set both signal sources to less than 0.1 volts.

KW 1.8.3.28 Disconnect the signal source connected to wires DL-3-(+) and DL-3-(-). Reconnect the wires to the terminals they were removed from.

KW 1.8.3.29 In the instrument cabinet lift wires DL-4-(+) and DL-4-(-) from TB-1A and connect to a signal source. Assure the signal source is at 0.4 volts or 4 mA.

KW 1.8.3.30 Set the signal source connected to wires DL-4-(+) and DL-4-(-) to 1.2 $\pm$0.05 volts. Record the value of this signal.

KW 1.8.3.31 Set the signal source connected to wires DL-7-(+) and DL-7-(-) to 0.33 (-0.00, +0.02) volts. Record the value of this signal.

KW 1.8.3.32 Wait 7 minutes.

TEST CONTROL COPY

KW 1.8.3.33 Set both signal sources to less than 0.1 volts.

KW 1.8.3.34 Disconnect the signal source connected to wires DL-4-(+) and DL-4-(-). Reconnect the wires to the terminals they were removed from.

KW 1.8.3.35 In the instrument cabinet lift wires DL-5-(+) and DL-5-(-) from TB-1A and connect to a signal source. Assure the signal source is at 0.4 volts or less.

KW 1.8.3.36 Set the signal source connected to wires DL-5-(+) and DL-5-(-) to 1.2 $\pm$0.05 volts. Record the value of this signal.

KW 1.8.3.37 Set the signal source connected to wires DL-7-(+) and DL-7-(-) to 0.33 (-0.00, +0.02) volts. Record the value of this signal.

KW 1.8.3.38 Wait 7 minutes.

KW 1.8.3.39 Set both signal sources to less than 0.1 volts.

KW 1.8.3.40 Disconnect the signal source connected to wires DL-5-(+) and DL-5-(-). Reconnect the wires to the terminals they were removed from.

KW 1.8.3.41 Set the signal source connected to wires DL-7-(+) and DL-7-(-) to 5.0 ($\pm$0.10) volts. Record the value of this signal.

KW 1.8.3.42 Wait 7 minutes.

KW 1.8.3.43 Set the signal source to less than 0.1 volts.

KW 1.8.3.44 Disconnect the signal source connected to wires DL-7-(+) and DL-7-(-). Reconnect the wires to the terminals they were removed from.

KW 1.8.3.45 Close the door of the VFD.

KW 1.8.3.46 Transfer the data from the datalogger to a computer drive. Save the data as a 1-2-3™ compatible file. RECORD the drive, directory and file name.

1.8.4 Display Logged Datab

The purpose of this section is to assure the data can be displayed in engineering units with timestamp.

KW 1.8.4.1 Copy the data from the Data Logger memory to a file. Name the file CAM_DAT.

TEST CONTROL COPY

KW 1.8.4.2 Erase the internal memory of the Data Logger and erase the data in the **From Datataker** window of the **Command** menu.

TE-8 1.8.4.3 Go to the **File** menu. In the **Send To** window select the following:

File	Yes
Name	[CAM_DAT
Printer	No
Screen	Yes

TE-10 KW 1.8.4.4 View the data; verify the data for channels 1 through 7 inclusive have a profile per Figure 3, Appendix F.

KW 11-2-95

TE-9 1.8.4.5 Remove all test equipment connections and remove power from the data logger.

1.8.5 Review

KW 11/15/95 1.8.5.1 Verify that Section 1.8 has been completed.

KW 11/15/95 1.8.5.2 The cognizant engineer(s), by their signature below state that the Data Logger and associated equipment are functional and ready for operational use at 241-AN-274.

KW 11-2-95

J. L. Dowell 11-15-95 N/A

Cognizant Engineer Date Cognizant Engineer Date

TEST CONTROL COPY

1.9 TEST DATA SHEETS

The Test Data Sheets are used to document any procedure step requiring verification. All entries are made in black ink. A description of the data sheet format follows.

1. Date--Record the date the test is performed.

2. Title Of Test Section--There are several sections of this one test being performed by this procedure, e.g. the Preliminary Conditions, Data logger Setup, etc.

3. Test Unit Number--Record the unit number of the test unit, if any.

4. Equipment Serial Number(s)--Record the serial numbers of any device used during the tests.

5. Test Performed By--Print the name of the person performing the test.

6. Procedure Step Number--This column contains the test steps requiring verification.

7. Item--This column contains the item being verified, (Pump, Air Conditioner, Heater, etc). or the parameter (voltage, pressure, etc.) being recorded.

8. Value--This column contains the quantitative or qualitative measure of the item being verified, i.e. a line voltage may have a value of 120V, whereas a pump may have a value of ON or OFF.

9. Range--This column indicates the anticipated value of the item being measured. If a value is recorded for later analysis, there may not be a tolerance associated with it.

10. Accept/Reject--Indicate whether the value obtained is acceptable in comparison with the Range. If a value is recorded for later analysis, the accept/reject decision may be determined later.

11. Comment--If the value is rejected, give a justification for denial.

12. QA--This column indicates that QA concurred with the items recorded or verified.

Test Data Sheets are in Appendix A.

1.10 TEST LOG SHEET

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

TEST CONTROL COPY

2.0 CHANGE CONTROL AND EXCEPTIONS TO ACCEPTANCE TEST SECTION

2.1 ACCEPTANCE TEST PROCEDURE CHANGE CONTROL

Acceptance testing is to be conducted in accordance with the steps and requirements specified in this procedure. Any required field changes must be per Sections 1.5.2, 1.5.3, and 1.5.4. Field changes shall also be recorded as an exception.

2.2 TEST EXECUTION

The acceptance test procedures detailed in Section 1.7 and 1.8 shall be performed in sequential steps starting with Section 1.7.1. As required by Section 1.5.4, the Recorder will initial and date every test step in the space provided on the Recorder's copy of the ATP as each step is completed. Any step that requires verification must also be recorded on the Test Data Sheet.

2.2.1 Without Exception

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

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

2.2.1.3 Distribute requisite copies of ATP.

2.2.2 With Exception/Resolved

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

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

2.2.2.3 Distribute requisite copies of ATP.

2.2.3 With Exception/Outstanding

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

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

2.2.3.3 Distribute requisite copies of ATP.

TEST CONTROL COPY

3.0 RECORDING AND RESOLVING EXCEPTIONS

3.1 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.

3.2 RECORDING

3.2.1 Number each exception sequentially as it occurs and record it on a Test Exception Sheet.

3.2.2 Enter name and organization of objecting party for each exception.

3.2.3 Enter planned action to resolve each exception when such determination is made.

3.3 RETEST/RESOLUTION

3.3.1 Record the action taken to resolve each exception on the Test Exception Sheet. Action taken may not be the same as planned action.

3.3.2 When action taken results in an acceptable retest, sign and date Acceptable Retest section of the Test Exception Sheet.

3.3.3 When action taken does not involve an acceptable retest, strike out the Acceptable Retest section of the Test Exception Sheet. Resolve exception per Section 3.4 below.

3.4 APPROVAL AND ACCEPTANCE

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

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

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

3.5 DISTRIBUTION

Distribute requisite copies of completed the Test Exception Sheets to the client.

APPENDIX A - TEST DATA SHEETS

Test Control Copy

TEST DATA SHEET

Date of test: 9-25-95	Test Unit Number: S/N 21755
Test Section Title: DATA LOGGER SETUP NORMAL OPERATION	Equipment Serial Number(s): 752-45-08-001 DUE 4-28-96 752-45-08-012 DUE 11-2-95 TE1
Test Performed By: NORM J. LEECH	

Procedure Step Number	Item	Range	Value	(A/R)	Comment	QA
1.7.2.1	Section 1.7.1	Completed (yes)	YES	A		P
1.7.2.2	Model no.	Record Value	605	A		P
	Serial no.	Record Value	21755	A		P
1.7.2.10	Report Schedule	Record Value	2X, ACTIVE 4, HALTED	A		P
1.7.3.1	Section 1.7.2	Completed (yes)	YES	A		P
1.7.3.4	Channel 7 voltage	0.33 (-0.00, +0.02) volts	.332	A		P
1.7.3.5	Channel 1 voltage	0.4 ±0.05 volts	0.400	A		P
1.7.3.6	Channel 1 voltage	1.2 ±0.05 volts	1.200	A		P
1.7.3.7	Channel 1 voltage	2.0 ±0.05 volts	2.00	A		P
1.7.3.8	Channel 1 voltage	0.4 volts or less	0.40	A		P
1.7.3.9	Channel 2 voltage	0.4 ±0.05 volts	0.40	A		P
	Channel 2 voltage	1.2 ±0.05 volts	1.20	A		P
	Channel 2 voltage	2.0 ±0.05 volts	2.00	A		P
	Channel 2 voltage	0.4 volts or less	0.00	A		P

Test Control Copy

TEST DATA SHEET

Date of test: 9-25-95			Test Unit Number: SN # 21755			
Test Section Title: NORMAL OPERATION			Equipment Serial Number(s): 752-45-08-001 DUE 4-28-96			
Test Performed By: NORM J. LEECH						
Procedure Step Number	Item	Range	Value	(A/R)	Comment	QA
1.7.3.10	Channel 3 voltage	0.4 ±0.05 volts	0.40	A		P
	Channel 3 voltage	1.2 ±0.05 volts	1.20	A		P
	Channel 3 voltage	2.0 ±0.05 volts	2.00	A		P
	Channel 3 voltage	0.4 volts or less	0.00	A		P
1.7.3.11	Channel 4 voltage	0.4 ±0.05 volts	0.40	A		P
	Channel 4 voltage	1.2 ±0.05 volts	1.20	A		P
	Channel 4 voltage	2.0 ±0.05 volts	2.00	A		P
	Channel 4 voltage	0.4 volts or less	0.00	A		P
1.7.3.12	Channel 5 voltage	0.4 ±0.05 volts	0.40	A		P
	Channel 5 voltage	1.2 ±0.05 volts	1.20	A		P
	Channel 5 voltage	2.0 ±0.05 volts	2.00	A		P
	Channel 5 voltage	0.4 volts or less	0.00	A		P

Test Control Copy

TEST DATA SHEET

Date of test: 9-25-95	Test Unit Number: SN# 21755
Test Section Title: NORMAL OPERATION - L.O.A.	Equipment Serial Number(s): 752-45-08-001 DUE 4-28-96
Test Performed By: NORM J. LEECH	

Procedure Step Number	Item	Range	Value	(A/R)	Comment	QA
1.7.3.13	Channel 6 voltage	0.1 ±0.05 volts	0.100	A		P
1.7.3.14	Channel 6 voltage	3.0 ±0.05 volts	3.00	A		P
1.7.3.15	Channel 6 voltage	5.8 ±0.05 volts	5.80	A		P
1.7.3.16	Channel 6 voltage	0.1 volts or less	0.00	A		P
1.7.3.17	Channel 7 voltage	5.0 ±0.10 volts	5.00	A		P
1.7.3.18	Channel 7 voltage	9.9 ±0.10 volts	9.91	A		P
1.7.3.19	Channel 7 voltage	0.3 volts or less	0.21	A		P
1.7.3.21	Drive and directory	Record Value	C:\DCP	A		P
	File Name	Record Value	NORMDATA	A	.DAT	P
1.7.4.4	Data Channels 1 through 7	Match Figure 2 profile (Yes)	YES	A	T.E.3	P
1.7.5.3	Channel 7 voltage	0.33 (-0.00, +0.02) volts	0.342	A		P
1.7.5.4	Channel 1 voltage	0.4 ±0.05 volts	0.400	A		P
1.7.5.5	Channel 1 voltage	1.2 ±0.05 volts	1.20	A		P
1.7.5.6	Channel 1 voltage	2.0 ±0.05 volts	2.00	A		P
1.7.5.7	CHANNEL 1 VOLTAGE	.40 VOLTS OR LESS	0.00	A	TE 4	P

Test Control Copy

TEST DATA SHEET

Date of test: 9-25-95			Test Unit Number: SN# 21755			
Test Section Title: LOSS OF POWER			Equipment Serial Number(s): 752-45-08-001 due 4-25-96			
Test Performed By: NORM L. LEECH						
Procedure Step Number	Item	Range	Value	(A/R)	Comment	QA
1.7.5.8	Channel 2 voltage	0.4 ± 0.05 volts	0.40	A		P
	Channel 2 voltage	1.2 ± 0.05 volts	1.20	A		P
	Channel 2 voltage	2.0 ± 0.05 volts	2.00	A		P
	Channel 2 voltage	0.4 volts or less	0.00	A		P
1.7.5.9	Channel 3 voltage	0.4 ± 0.05 volts	0.40	A		P
	Channel 3 voltage	1.2 ± 0.05 volts	1.20	A		P
	Channel 3 voltage	2.0 ± 0.05 volts	2.00	A		P
	Channel 3 voltage	0.4 volts or less	0.00	A		P
1.7.5.10	Channel 4 voltage	0.4 ± 0.05 volts	0.40	A		P
	Channel 4 voltage	1.2 ± 0.05 volts	1.20	A		P
	Channel 4 voltage	2.0 ± 0.05 volts	2.00	A		P
	Channel 4 voltage	0.4 volts or less	0.00	A		P

Test Control Copy

TEST DATA SHEET

Date of test: 9-25-95	Test Unit Number: SN# 21755
Test Section Title: LOSS OF POWER	Equipment Serial Number(s): 752-45-08 CO1 DUE 4-28-96
Test Performed By: NORM J. LEECH	

Procedure Step Number	Item	Range	Value	(A/R)	Comment	QA
1.7.5.12	Channel 5 voltage	0.4 ± 0.05 volts	0.40	A		P
	Channel 5 voltage	1.2 ± 0.05 volts	1.20	A		P
	Channel 5 voltage	2.0 ± 0.05 volts	2.00	A		P
	Channel 5 voltage	0.4 volts or less	0.00	A		P
1.7.5.13	Channel 6 voltage	0.1 ± 0.05 volts	0.10	A		P
1.7.5.14	Channel 6 voltage	3.0 ± 0.05 volts	3.00	A		P
1.7.5.15	Channel 6 voltage	5.8 ± 0.05 volts	5.80	A		P
1.7.5.16	Channel 6 voltage	0.1 volts or less	0.00	A		P
1.7.5.17	Channel 7 voltage	5.0 ± 0.10 volts	5.00	A		P
1.7.5.18	Channel 7 voltage	9.9 ± 0.10 volts	9.89	A		P
1.7.5.19	Channel 7 voltage	0.3 volts or less	0.20	A		P
1.7.5.24	Data Channels 1 through 7	Match Figure 2 profile (Yes)	YES	A		P
1.7.6.1	Section 1.7	Complete (Yes)	YES	A		P
1.8.1.1	Section 1.7	Complete (Yes)	YES	A		KW
1.8.2.1	Section 1.8.1	Complete (Yes)	TE-46	A	NAME PLATE INSPECTED	KW 11/15/95

Test Control Copy

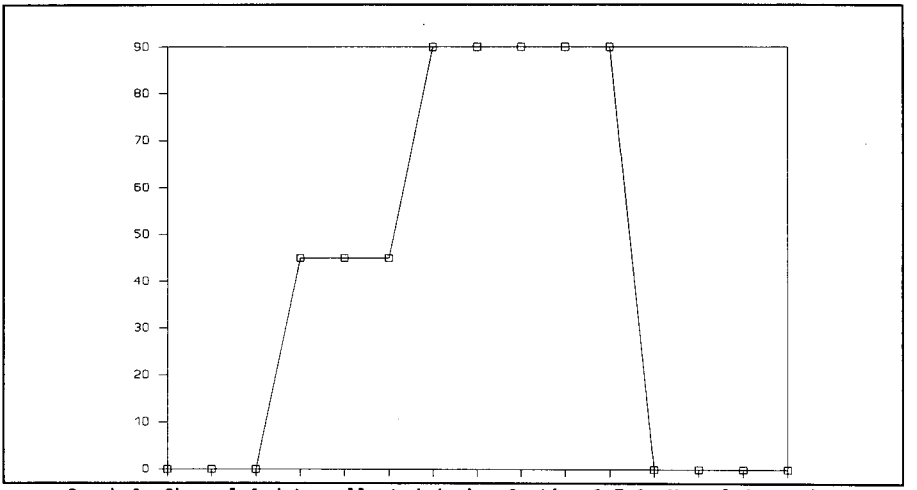
TEST DATA SHEET

Date of test: 9-25-95			Test Unit Number: SN 21755			
Test Section Title:			Equipment Serial Number(s): 817-23-01-005 DUE 12-19-95 752-45-08-001 DUE 4-28-96 817-23-01-007 DUE 7-12-96 817-45-08-051 DUE 11-16-95			
Test Performed By: NORM J. LEECH						
Procedure Step Number	Item	Range	Value	(A/R)	Comment	QA
1.8.2.1	Section 1.8.1	Complete (Yes)	YES		TE-6	KW
1.8.2.10	Report Schedule	Record Value	RX,A ACTIVE, HALTED	A		KW
1.8.3.1	Section 1.8.2	Complete (Yes)	YES	A		KW
1.8.3.2	VFD Power	OFF	OFF	A		KW
1.8.3.6	DL Channel 6	3.0 ±0.10 volts	3.00 V	A		KW
1.8.3.7	DL Channel 7	0.33, -0.00, +0.02 volts	~~.33.00V~~ KW 11-2-95 .3400 V	A	TE-7	KW
1.8.3.12	DL Channel 1	1.2 ±0.05 volts	1.20 V	A		KW
1.8.3.13	DL Channel 7	0.33, -0.00, +0.02 volts	.340 V	A		KW
1.8.3.18	DL Channel 2	1.2 ±0.05 volts	1.200V	A		KW
1.8.3.19	DL Channel 7	0.33, -0.00, +0.02 volts	.3400V	A		KW
1.8.3.24	DL Channel 3	1.2 ±0.05 volts	1.200 V	A		KW
1.8.3.25	DL Channel 7	0.33, -0.00, +0.02 volts	.3400 V	A		KW
1.8.3.30	DL Channel 4	1.2 ±0.05 volts	1.20 V	A		KW
1.8.3.31	DL Channel 7	0.33, -0.00, +0.02 volts	.3400V	A		KW
1.8.3.36	DL Channel 5	1.2 ±0.05 volts	1.20 V	A		KW

Test Control Copy

TEST DATA SHEET

Date of test: 9-25-95			Test Unit Number: SN 7.1755			
Test Section Title:			Equipment Serial Number(s): 817-23-01-005 Due 12-19-95			
Test Performed By: NORM J. LEECH			752-45-08 001 Due 4-28-96 817-23-01-007 Due 7-12-96 817-45-08-051 Due 11-16-95			
Procedure Step Number	Item	Range	Value	(A/R)	Comment	QA
1.8.3.37	DL Channel 7	0.33, -0.00, +0.02 volts	.340 V	A		KW
1.8.3.41	DL Channel 7	5.0 ±0.1 volts	5.00 V	A		KW
1.8.3.46	Drive and Directory	Record Value	C:\DCP\DCL_DATA	A		KW
	File Name	Record Value	CAM_DAT.PRN	A		KW
1.8.4.4	Data Channels 1 through 7	Match Figure 3 profile (Yes)	1-4 YES 6-7 YES 5 SEE TE-10	A	TE-10	KW
1.8.5.1	Section 1.8	Complete (Yes)	YES	A		KW

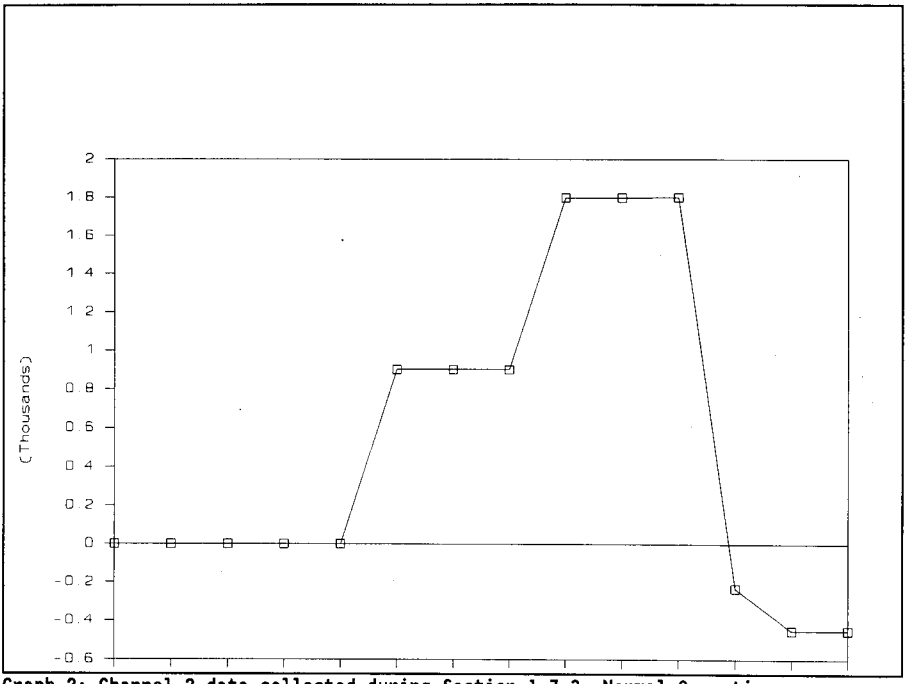


Graph 1: Channel 1 data collected during Section 1.7.3, Normal Operation

Channel 1 is Motor Power
Vertical scale is kW (Range is 0-9kW)
Horizontal scale is time (5 sec/division)

□ = data point

Comments: Matches Figure 2 criteria.

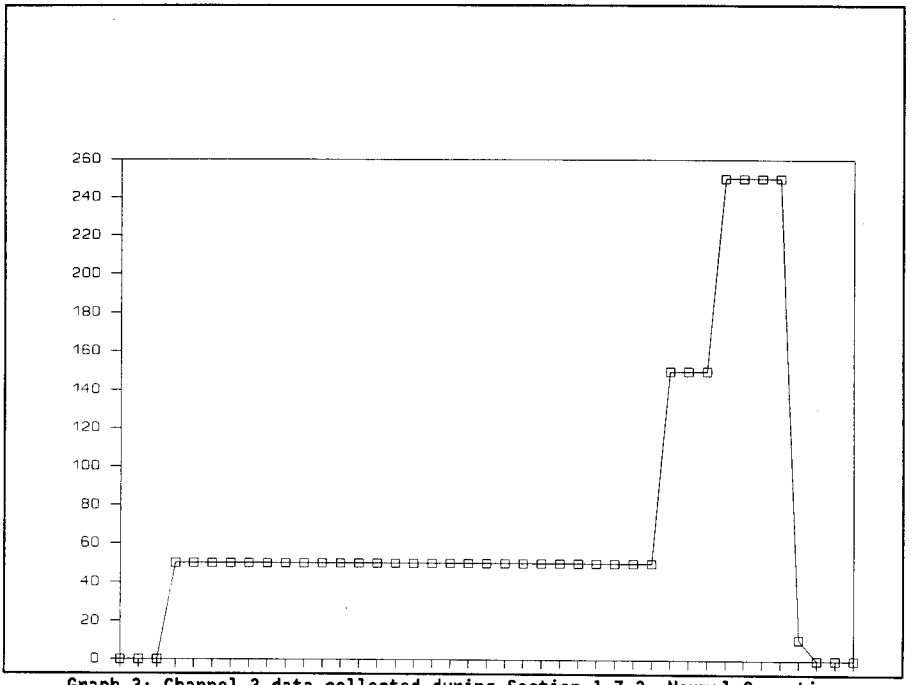


Graph 2: Channel 2 data collected during Section 1.7.3, Normal Operation

Channel 2 is Motor RPM
Vertical scale is RPM (Range is 0-1800 RPM)
Horizontal scale is time (5 sec/division)

□ = data point

Comments: While Figure 2 shows the right most data points as being at zero, the procedure says to reduce the voltage to 0.4 volts or less. During the test the datalogger input was usually grounded, thus resulting in the "Negative" values shown. This is acceptable.

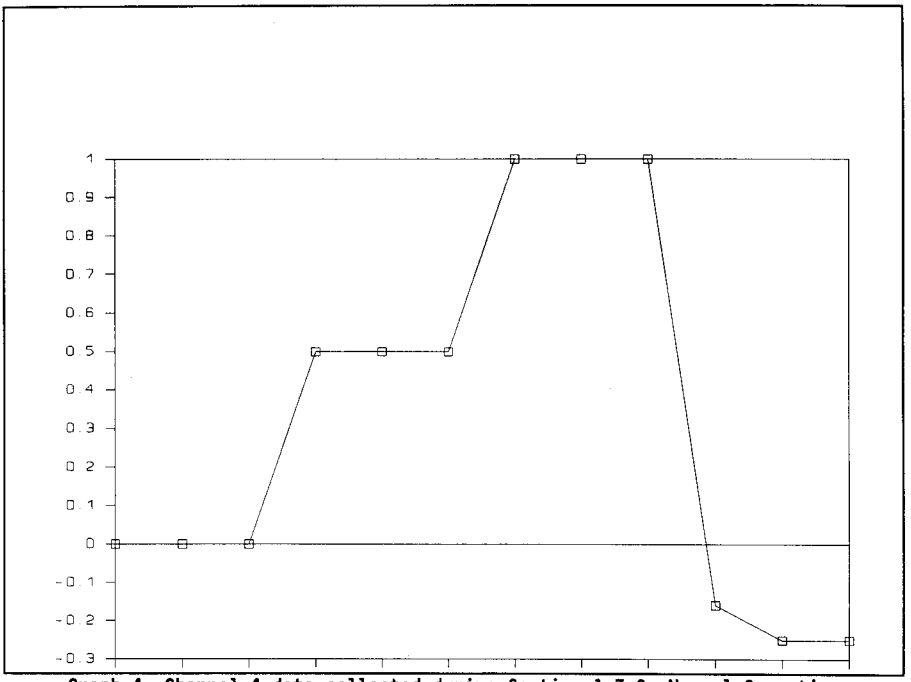


Graph 3: Channel 3 data collected during Section 1.7.3, Normal Operation

Channel 3 is Motor Temperature
Vertical scale is degrees F (Range is 0-250 degress F)
Horizontal scale is time (5 sec/division)

□ = data point

Comments: The first three (3) data points are for an input of 0.0 volts. The following 27 data points are for an input of 0.4 volts, per the procedure. The first 27 data points were inadvertently shown in this graph. The third to last data point is a transition voltage recorded as the input was being changed from 2.0 volts to 0.0 volts.

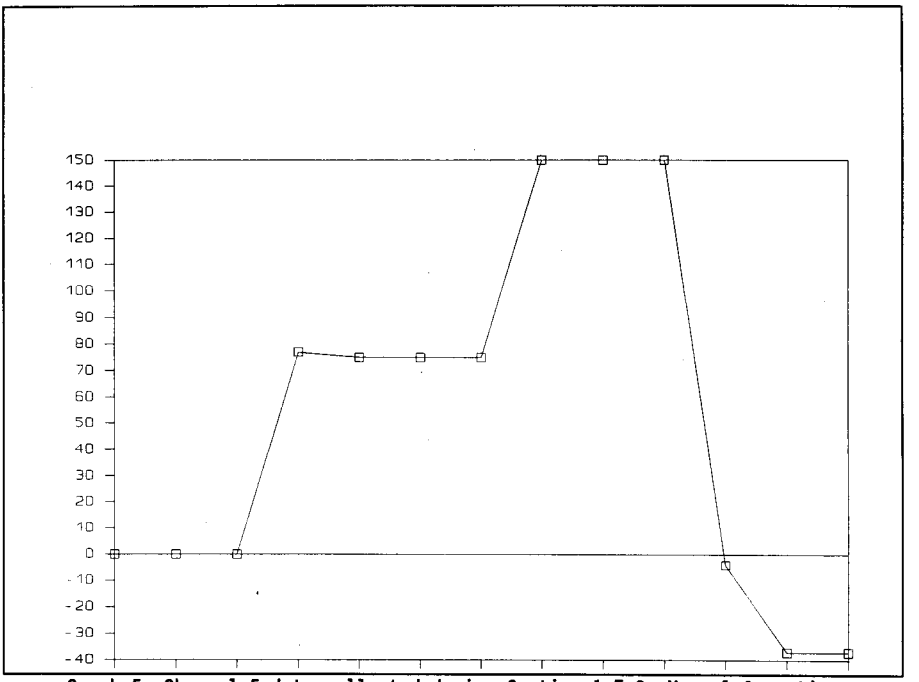


Graph 4: Channel 4 data collected during Section 1.7.3, Normal Operation

Channel 4 is Pump Column Vibration
Vertical scale is inch/sec (Range is 0-1.0 inch/sec)
Horizontal scale is time (5 sec/division)

□ = data point

Comments: While Figure 2 shows the right most data points as being at zero, the procedure says to reduce the voltage to 0.4 volts or less. During the test the datalogger input was usually grounded, thus resulting in the "Negative" values shown. This is acceptable.

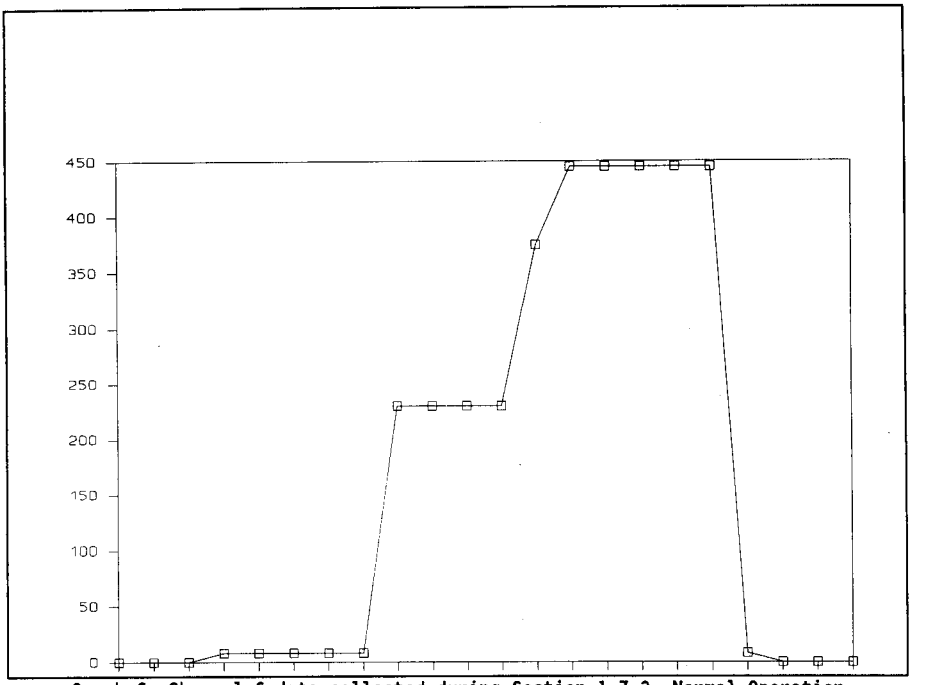


Graph 5: Channel 5 data collected during Section 1.7.3, Normal Operation

Channel 5 is Pump Column Strain
Vertical scale is Pounds (Range is 0-150 lbs)
Horizontal scale is time (5 sec/division)

□ = data point

Comments: While Figure 2 shows the right most data points as being zero, the procedure says to reduce the voltage to 0.4 volts or less. During the test the datalogger input was usually grounded, thus resulting in the "Negative" values shown. This is acceptable. Also, the forth data point is a transition voltage recorded while the input was being changed from 0.4 volt to 1.2 volts.

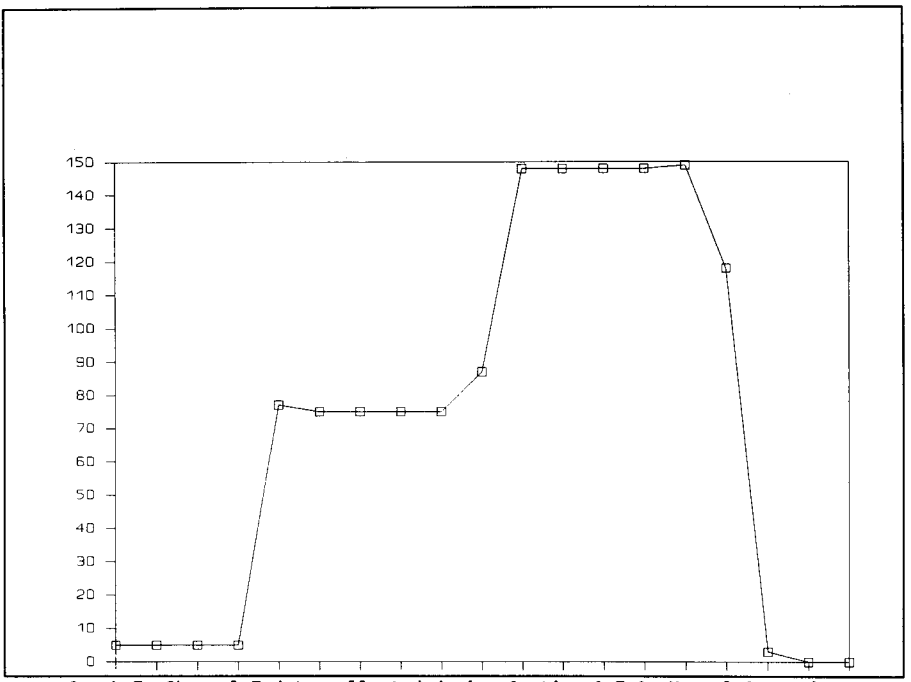


Graph 6: Channel 6 data collected during Section 1.7.3, Normal Operation

Channel 6 is Motor Voltage
Vertical scale is Volts (Range is 0-460 volts)
Horizontal scale is time (5 sec/division)

☐ = data point

Comments: The slight increase after the third data point is where 0.1 volt was applied to the datalogger input per the procedure. Transitional data points were recorded between the mid-scale and full-scale change and between the full-scale and low-scale change. This is acceptable.

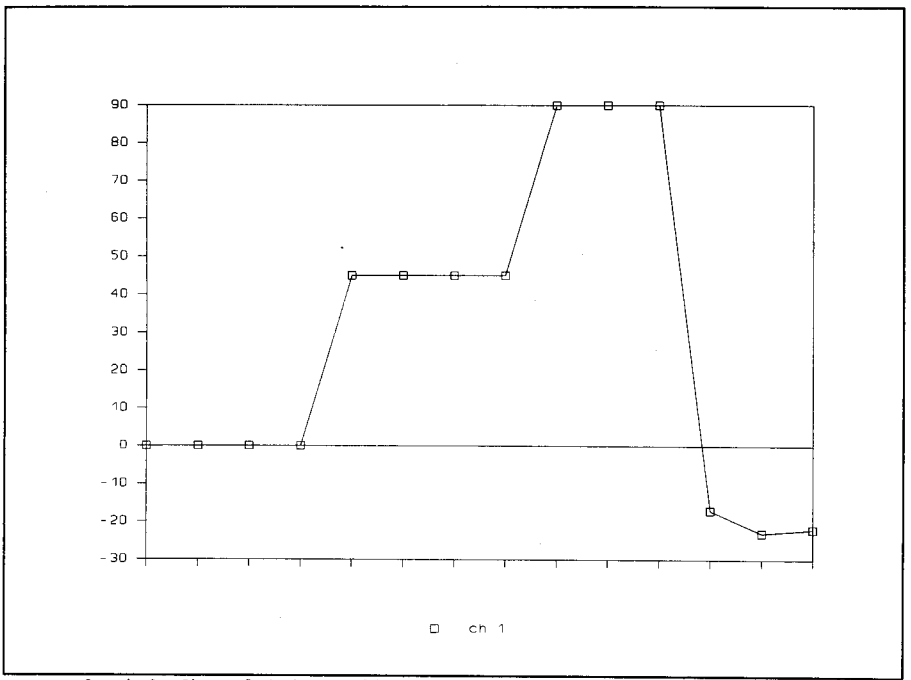


Graph 7: Channel 7 data collected during Section 1.7.3, Normal Operation

Channel 7 is Motor Torque
Vertical scale is % Full Load (Range is 0-150%)
Horizontal scale is time (5 sec/division)

□ = data point

Comments: Transitional data points were recorded between the low to mid scale change, the mid to full scale change, and the full-low scale change. While Figure 2 shows the right most data points as being zero, the procedure says to reduce the voltage to 0.4 volts or less. The second to last data point is less than 0.4 volts, but is not 0.0 volts (nominal) like the last two (2). This is acceptable.

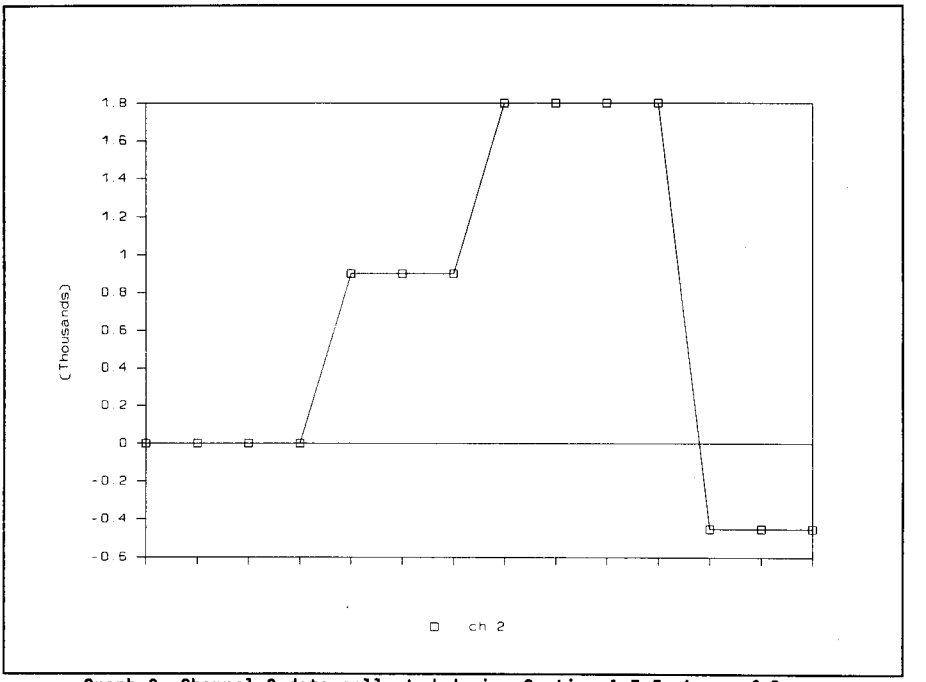


Graph 8: Channel 1 data collected during Section 1.7.5, Loss of Power

Channel 1 is Motor Power
Vertical scale is kW
Horizontal scale is time (5 sec/division)

□ = data point

Comments: While Figure 2 shows the right most data points as being zero, the procedure says to reduce the voltage to 0.4 volts or less. During the test the datalogger input was usually grounded, thus resulting in the "Negative" values shown. This is acceptable.

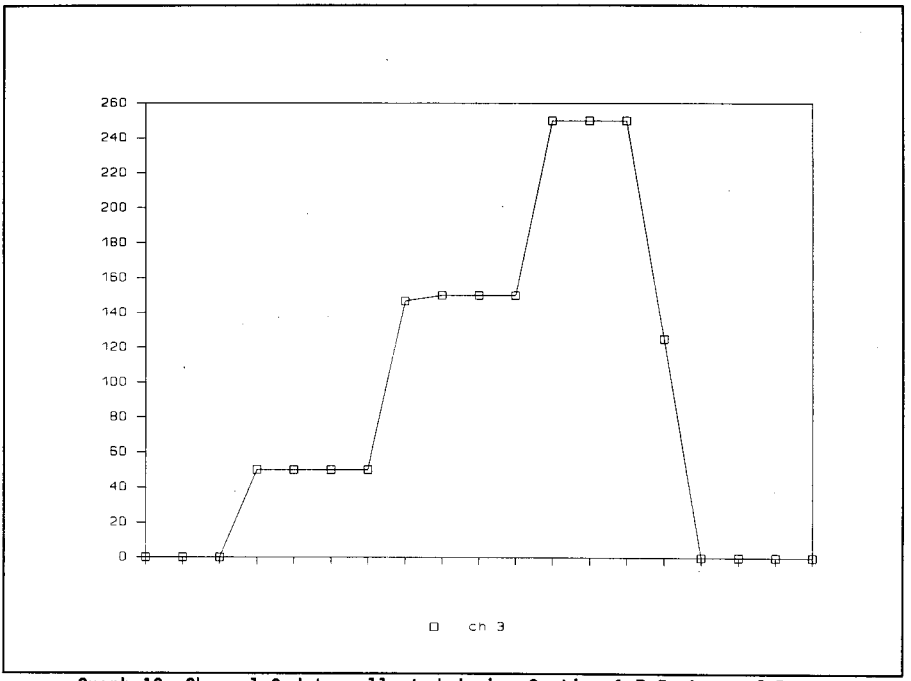


Graph 9: Channel 2 data collected during Section 1.7.5, Loss of Power

Channel 2 is Motor RPM
Vertical scale is Thousands RPM
Horizontal scale is time (5 sec/division)

□ = data point

Comments: While Figure 2 shows the right most data points as being zero, the procedure says to reduce the voltage to 0.4 volts or less. During the test the datalogger input was usually grounded, thus resulting in the "Negative" values shown. This is acceptable.

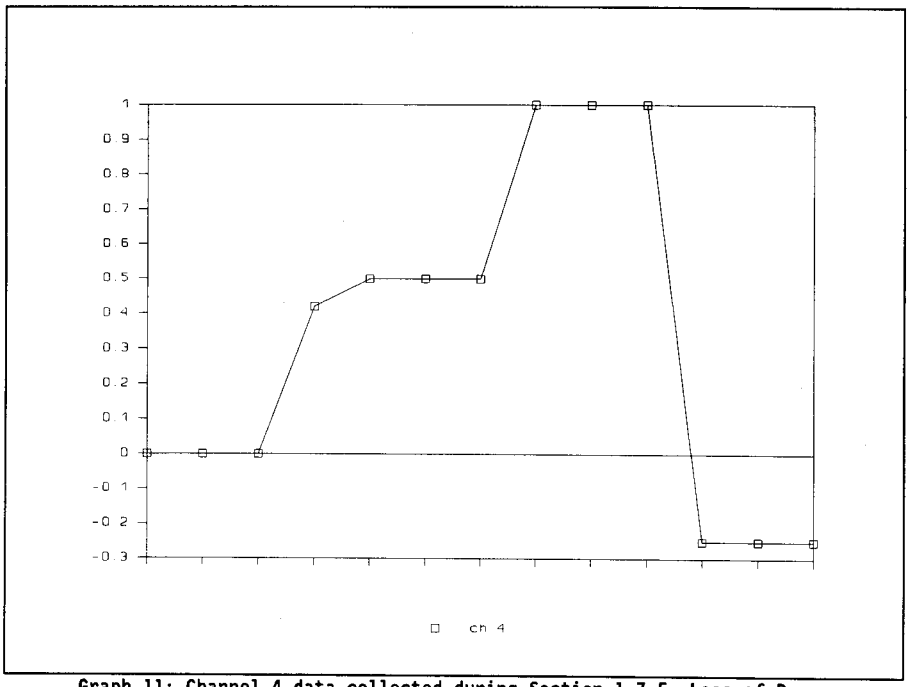


Graph 10: Channel 3 data collected during Section 1.7.5, Loss of Power

Channel 3 is Motor Temperature
Vertical scale is degrees F
Horizontal scale is time (5 sec/division)

□ = data point

Comments: The first three (3) data points are for an input of 0.0 volts. The following four (4) data points are for an input of 0.4 volts, per the procedure. Transitional data points were recorded between the low to mid-scale change, and the full-low scale change. While Figure 2 shows the right most data points as being zero, the procedure says to reduce the voltage to 0.4 volts or less. During the test the datalogger input was usually grounded, thus resulting in the "Negative" values shown. This is acceptable.



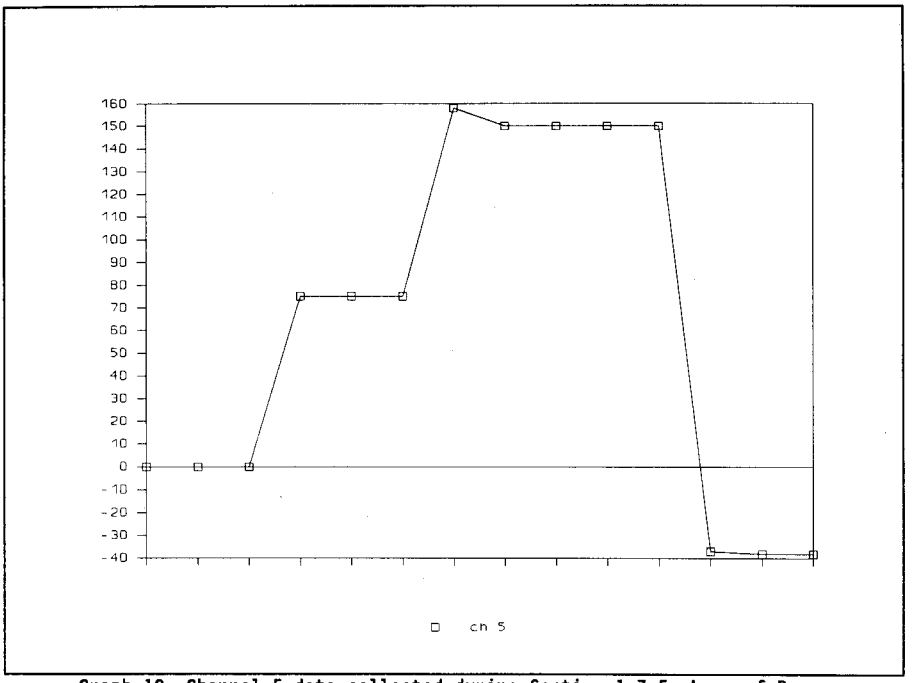
Graph 11: Channel 4 data collected during Section 1.7.5, Loss of Power

Channel 4 is Pump Column Vibration
Vertical scale is inch/sec
Horizontal scale is time (5 sec/division)

□ = data point

Comments: While Figure 2 shows the right most data points as being zero, the procedure says to reduce the voltage to 0.4 volts or less. During the test the datalogger input was usually grounded, thus resulting in the "Negative" values shown. This is acceptable. Also, the forth data point is a transition voltage recorded while the input was being changed from 0.4 volt to 1.2 volts.

Note: After this data was recorded power was removed from the datalogger for about one (1) minute.

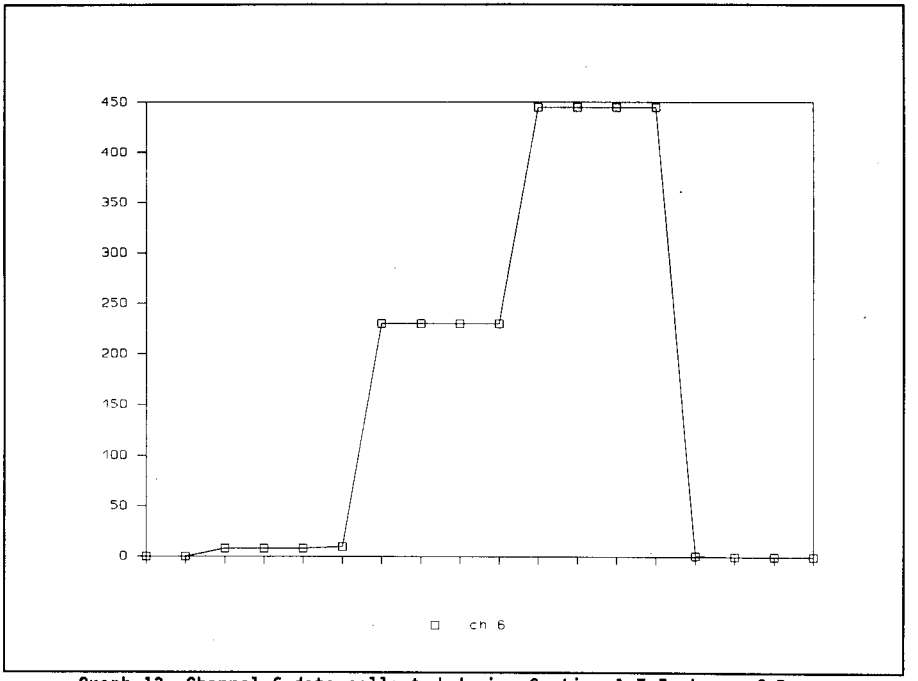


Graph 12: Channel 5 data collected during Section 1.7.5, Loss of Power

Channel 5 is Pump Column Strain
Vertical scale is Pounds
Horizontal scale is time (5 sec/division)

□ = data point

Comments: While Figure 2 shows the right most data points as being zero, the procedure says to reduce the voltage to 0.4 volts or less. During the test the datalogger input was usually grounded, thus resulting in the "Negative" values shown. This is acceptable. Also, the forth data point is a transition voltage recorded while the input was being changed from 0.4 volt to 1.2 volts.

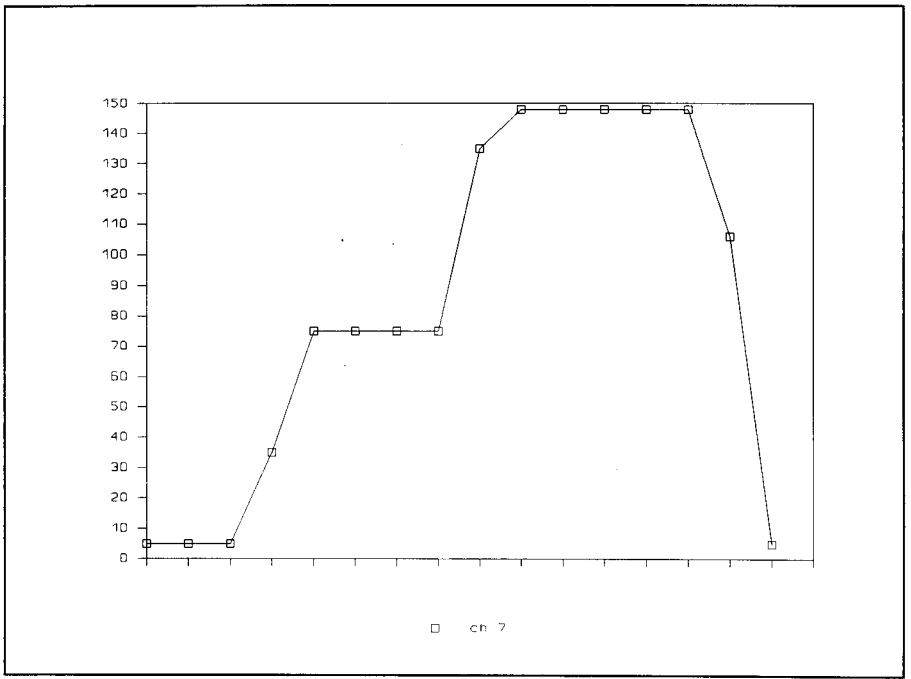


Graph 13: Channel 6 data collected during Section 1.7.5, Loss of Power

Channel 6 is Motor Voltage
Vertical scale is Volts
Horizontal scale is time (5 sec/division)

□ = data point

Comments: The slight increase after the second data point is where 0.1 volt was applied to the datalogger input per the test procedure.

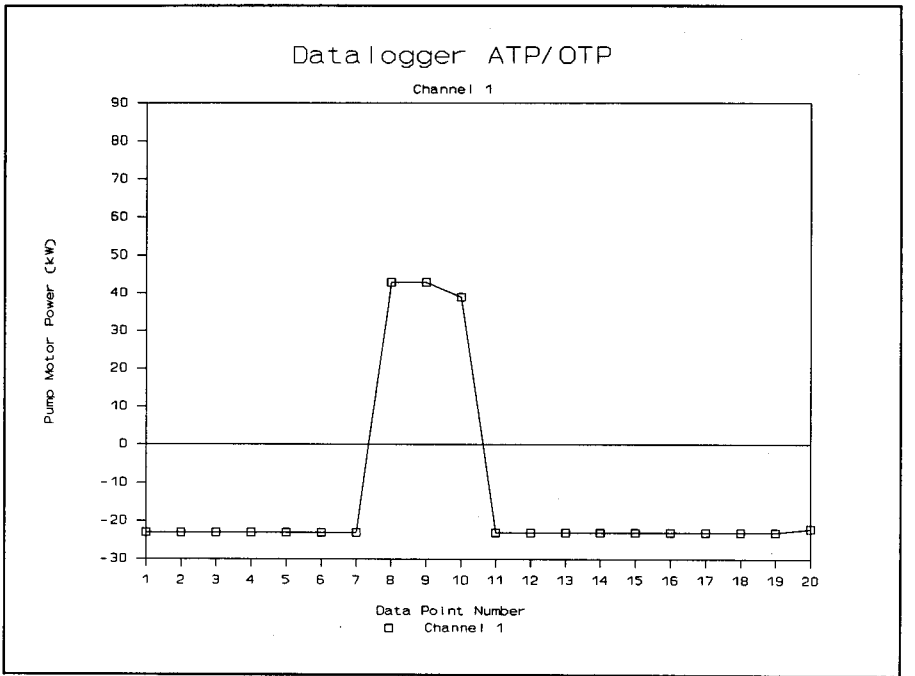


Graph 14: Channel 7 data collected during Section 1.7.5, Loss of Power

Channel 7 is Motor Torque
Vertical scale is % Full Load
Horizontal scale is time (5 sec/division)

□ = data point

Comments: Transitional data points were recorded between the low to mid scale change, the mid to full scale change, and the full-low scale change. While Figure 2 shows the three (3) right most data points as being zero, the procedure says to reduce-the voltage to less than 0.4 volts, which is below the setpoint which causes the datalogger to cease recording, thus there are not three (3) low-scale data points. This is acceptable.

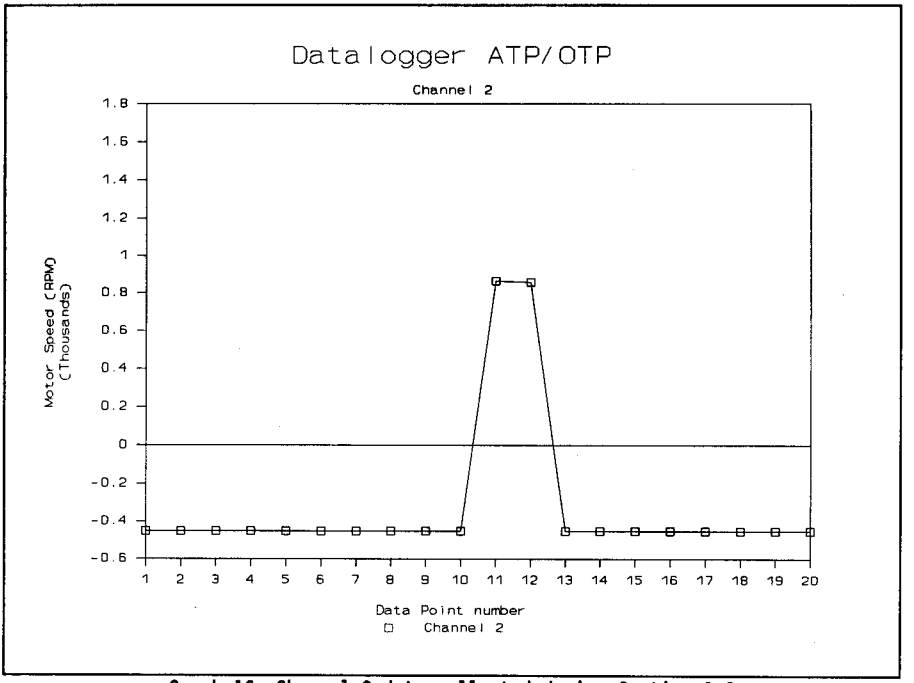


Graph 15: Channel 1 data collected during Section 1.8

Channel 1 is Motor Power
Vertical scale is kW (Range is 0-9kW)
Horizontal scale is time (data point number)

□ = data point

Comments: Data Points 8 & 9 are the two points associated with Steps 1.8.3.13 & 1.8.3.14. These are clearly seen to be at mid-range, as expected. The -23 reading for all other readings (except #10 - a spurious reading) is the data loggers attempt to scale a zero mA input on a 4-20 mA input. This is acceptable and matches Figure 3 criteria.

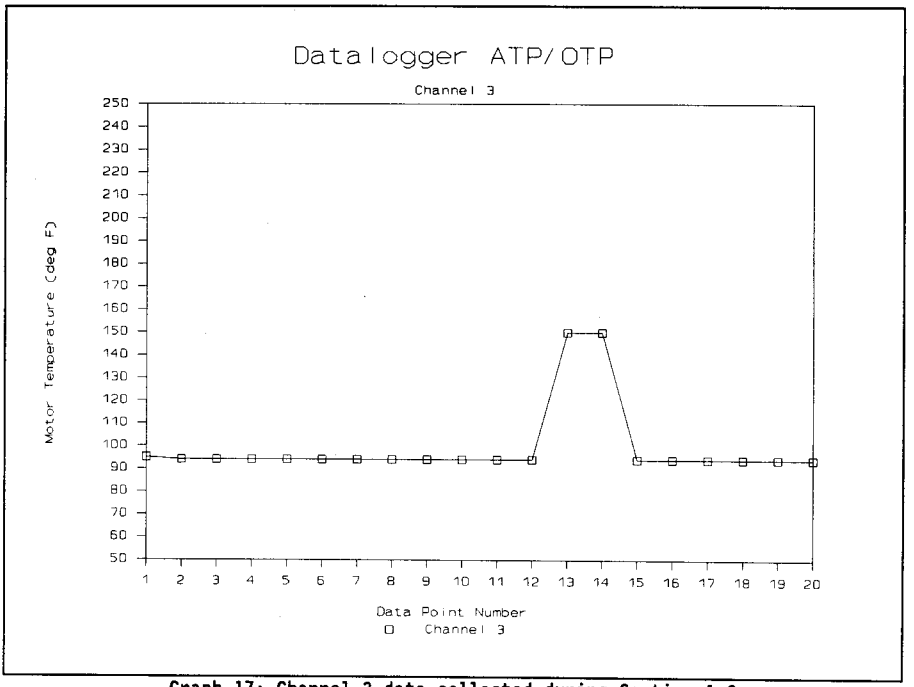


Graph 16: Channel 2 data collected during Section 1.8

Channel 2 is Motor RPM
Vertical scale is RPM (Range is 0-1800 RPM)
Horizontal scale is time (data point number)

□ = data point

Comments: Data Points 11 & 12 are the two points associated with Steps 1.8.3.19 & 1.8.3.20. These are clearly seen to be at mid-range, as expected. The -0.43 reading for all other readings is the data loggers attempt to scale a zero mA input on a 4-20 mA input. This is acceptable and matches Figure 3 criteria.

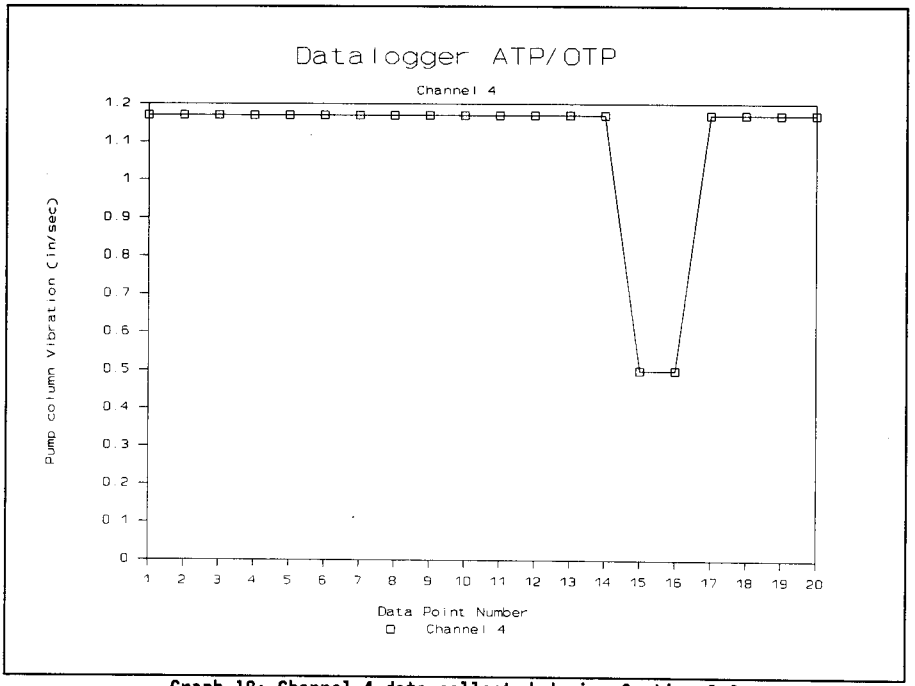


Graph 17: Channel 3 data collected during Section 1.8

Channel 3 is Motor Temperature
Vertical scale is degrees F (Range is 0-250 degress F)
Horizontal scale is time (data point number)

□ = data point

Comments: Data Points 13 & 14 are the two points associated with Steps 1.8.3.25 & 1.8.3.26. These are clearly seen to be at mid-range, as expected. The 95 reading for all other readings is the data logger reading the ambient signal on the Channel 3 input. This is acceptable and matches Figure 3 criteria.

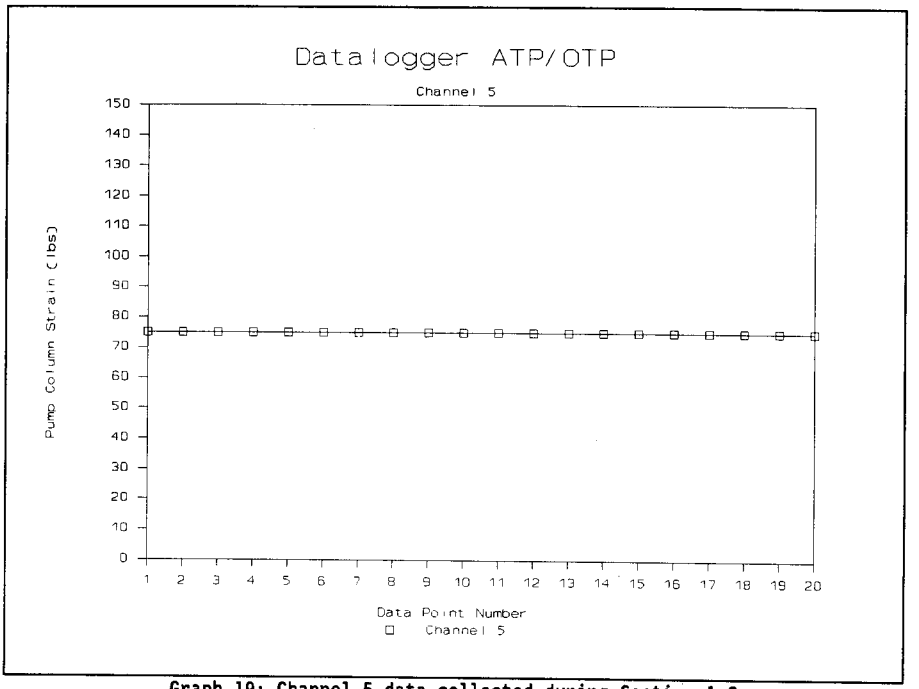


Graph 18: Channel 4 data collected during Section 1.8

Channel 4 is Pump Column Vibration
Vertical scale is inch/sec (Range is 0-1.0 inch/sec)
Horizontal scale is time (data point number)

□ = data point

Comments: Data Points 15 & 16 are the two points associated with Steps 1.8.3.31 & 1.8.3.32. These are clearly seen to be at mid-range, as expected. The 1.17 reading for all other readings is the data loggers reading the static signal on channel 4. This is acceptable and matches Figure 3 criteria.

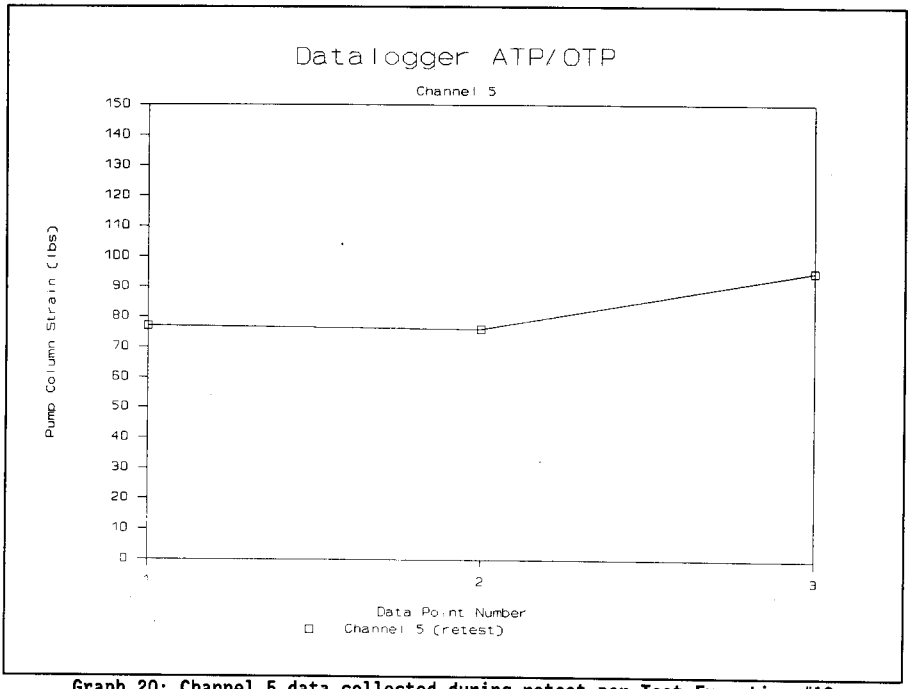


Graph 19: Channel 5 data collected during Section 1.8

Channel 5 is Pump Column Strain
Vertical scale is Pounds (Range is 0-150 lbs)
Horizontal scale is time (data point number)

□ = data point

Comments: Data Points 17 & 18 are the two points associated with Steps 1.8.3.38 & 1.8.3.39. These are clearly seen to be at mid-range, as expected. Unfortunately the 75 pound reading for all other readings does not allow the conclusion that the data logger responded to the applied input. This is NOT acceptable and does not match Figure 3 criteria: see Test Exception #10 and Graph 20 for data taken on retest.

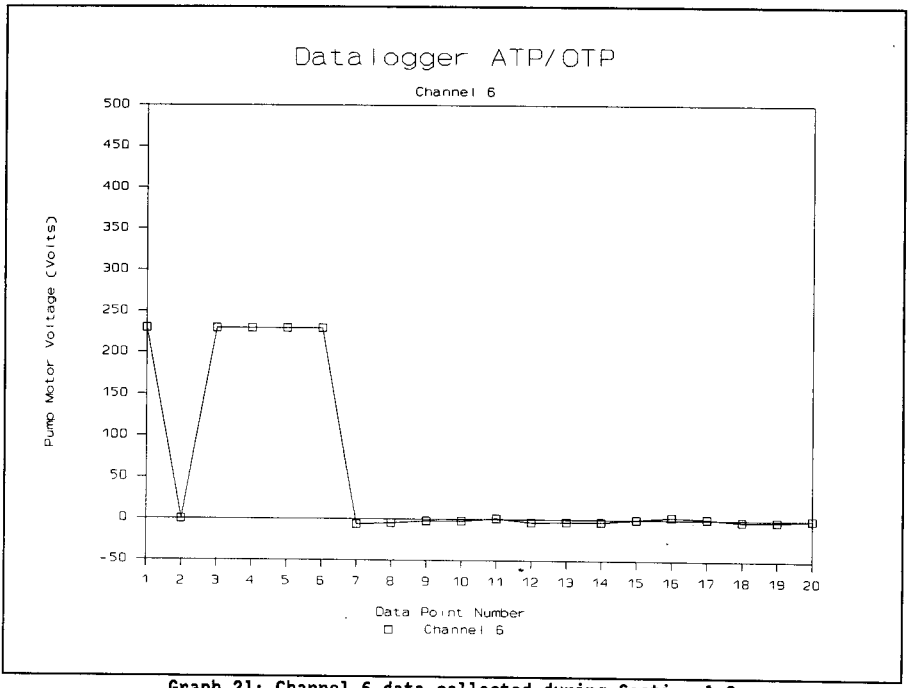


Graph 20: Channel 5 data collected during retest per Test Exception #10

Channel 5 is Pump Column Strain
Vertical scale is Pounds (Range is 0-150 lbs)
Horizontal scale is time (data point number)

□ = data point

Comments: Data point #1 is a spurious reading caused by noise while connecting the signal source to the data logger terminals. Data Points 2 & 3 are the two points associated with Steps 1.8.3.38 & 1.8.3.39. Data point #2 is clearly seen to be at mid-range and the following data point is slightly higher, as expected. This is per the retest directions in Test Exception #10 and is acceptable.

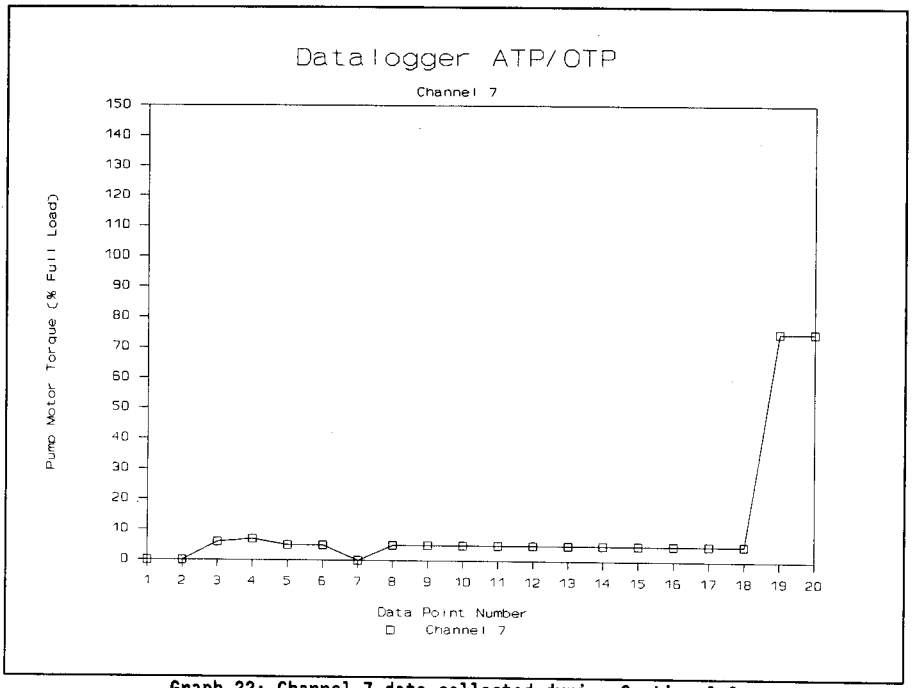


Graph 21: Channel 6 data collected during Section 1.8

Channel 6 is Motor Voltage
Vertical scale is Volts (Range is 0-460 volts)
Horizontal scale is time (data point number)

□ = data point

Comments: Data Points 5 & 6 are the two points associated with Steps 1.8.3.7 & 1.8.3.8. These are clearly seen to be at mid-range, as expected. The near zero reading for all other readings (except #1, 3, and 4 - spurious readings introduced by wires being connected/disconnected during the test procedure and efforts to determine actual "trip point" of data logger) is the data loggers reading an "open circuit" on a voltage input. This is acceptable and matches Figure 3 criteria.



Graph 22: Channel 7 data collected during Section 1.8

Channel 7 is Motor Torque
Vertical scale is % Full Load (Range is 0-150%)
Horizontal scale is time (data point number)

□ = data point

Comments: Data Points 19 & 20 are the two points associated with Steps 1.8.3.41 & 1.8.3.42. These are clearly seen to be at mid-range, as expected. The near zero reading for all other readings is the data loggers attempt to read an "open circuit" on a voltage input. This is acceptable and matches Figure 3 criteria.

Listing 1: Datalogger Command file CA_PUMP.CMD

```
RESET
\W2
'PROGRAM FOR 241-AN-107
'CREATED BY NJ LEECH WHC SEPT 15,1995
'LAST MOD BY NJ LEECH WHC SEPT 20,1995
'THIS PROGRAM MONITORS MOTOR TORQUE (CH7) ONCE A SECOND (BY RZ)
'IF >.34V CH 1..7 ARE LOGGED WITHIN 1 SEC (BY RX) AND THEN EVERY 5 MIN (BY RA)
'UNTIL CH7 <.32V,  ALARM 1 LED IS ON WHILE LOGGING

'SET TIME TO PC, ADD DATE STAMP, UN SYNC TIME
  T=\t D=\d /T /D /s

'SET ALARM SCAN TO 1 SEC (RZ)
  RZ1S
'DEFINE SPANS
  S1=0,90,.4,2" KW"
  S2=0,1800,.4,2" RPM"
  S3=50,250,.4,2" deg F"
  S4=0,1,.4,2" in/sec"
  S5=0,150,.4,2" lbs"
  S6=0,460,0,6" VAC"
  S7=0,150,0,10" %"

'SET TRIG FOR LOGGING AND DEFINE SCANS
'IF1 CH 7=>.33V     LED1 IS TURNED ON,  LOGGING IS STARTED,  RX IS TRIGGERED,
'AND RA IS STARTED
'IF2 CH 7<.32V      RA IS HALTED,  LED1 IS TURNED OFF,  LOGGING HALTED

  IF1(7HV>.34)"[LOGON X GA]"
  IF2(7HV<.32)"[HA LOGOFF]"
 BEGIN
  RX
   1HV(S1,FF0," MOTOR POWER   ")
   2HV(S2,FF0," MOTOR RPM     ")
   3HV(S3,FF0," MOTOR TEMP    ")
   4HV(S4,FF2," COLUMN VIBS   ")
   5HV(S5,FF0," COLUMN STRAIN ")
   6HV(S6,FF0," MOTOR VOLTS   ")
   7HV(S7,FF0," MOTOR TORQUE  ")
  RA5M
   1HV(S1,FF0," MOTOR POWER   ")
   2HV(S2,FF0," MOTOR RPM     ")
   3HV(S3,FF0," MOTOR TEMP    ")
   4HV(S4,FF2," COLUMN VIBS   ")
   5HV(S5,FF0," COLUMN STRAIN ")
   6HV(S6,FF0," MOTOR VOLTS   ")
   7HV(S7,FF0," MOTOR TORQUE  ")
END
```

Listing 2: File NORMDATA.PRN

```
,,,,,,,-0,-450,-0,-0.25,-38,-0,5
-0,-450,0,-0.25,-37,-0,5,,,,,,,
-0,-450,-0,-0.25,-38,-0,5,,,,,,,
-0,-450,-0,-0.25,-37,-0,5,,,,,,,
,,,,,,,-0,-450,-0,-0.25,-38,-0,5
-0,-450,0,-0.25,-38,0,5,,,,,,,
,,,,,,,-0,-450,0,-0.25,-38,-0,5
-0,-450,-0,-0.25,-38,-0,5,,,,,,,
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Listing 2 (Continued)

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Listing 2 (Continued)

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Listing 2 (Continued)

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-23,-450,0,-0.25,-37,0,148,,,,,,,
-23,-450,0,-0.25,-37,0,149,,,,,,,
-23,-450,0,-0.25,-37,0,118,,,,,,,
-22,-450,0,-0.25,-37,0,3,,,,,,,
```

Listing 3: File PWR_OFF.PRN

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2458.43964,-23,-450,0,-0.25,-38,-0,5,,,,,,,
2458.43970,-23,-450,-0,-0.25,-37,-0,5,,,,,,,
2458.43976,-23,-450,-0,-0.25,-38,-0,5,,,,,,,
2458.43981,-23,-450,0,-0.25,-37,-0,5,,,,,,,
2458.43987,-23,-450,0,-0.25,-38,-0,5,,,,,,,
2458.43993,-23,-450,0,-0.25,-38,-0,5,,,,,,,
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2458.44010,-0,-450,-0,-0.25,-37,0,5,,,,,,,
2458.44016,-0,-450,0,-0.25,-37,0,5,,,,,,,
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Listing 3 (Continued)

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2458.44404,-22,1800,0,-0.25,-37,0,5,,,,,,,
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2458.44421,-23,-451,50,-0.25,-38,-0,5,,,,,,,
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2458.44433,-23,-451,50,-0.25,-38,-0,5,,,,,,,
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2458.44468,-23,-450,250,-0.25,-38,-0,5,,,,,,,
2458.44473,-23,-450,250,-0.25,-38,-0,5,,,,,,,
2458.44479,-23,-450,125,-0.25,-38,-0,5,,,,,,,
2458.44485,-23,-451,-0,-0.25,-38,-0,5,,,,,,,
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2458.44497,-23,-450,-0,-0.00,-38,-0,5,,,,,,,
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2458.44508,-23,-450,-0,0.42,-38,-0,5,,,,,,,
2458.44514,-23,-450,-0,0.50,-38,-0,5,,,,,,,
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Listing 3 (Continued)

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2458.44554,-23,-450,-0,-0.25,-38,-0,5,,,,,,
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2458.44566,-23,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44572,-23,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44578,-23,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44583,-23,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44589,-23,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44595,-23,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44601,-23,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44606,-23,-450,0,-0.25,-38,-0,5,,,,,,
2458.44612,-23,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44618,-22,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44624,-23,-450,-0,-0.25,-38,-0,5,,,,,,
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2458.44688,-23,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44693,-23,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44699,-22,-450,0,-0.25,-38,0,5,,,,,,
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2458.44716,-23,-450,-0,-0.25,-0,-0,5,,,,,,
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2458.44734,-23,-450,0,-0.25,75,-0,5,,,,,,
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2458.44745,-22,-450,-0,-0.25,158,0,5,,,,,,
2458.44751,-23,-450,-0,-0.25,150,-0,5,,,,,,
2458.44757,-22,-450,0,-0.25,150,-0,5,,,,,,
2458.44763,-23,-450,-0,-0.25,150,-0,5,,,,,,
2458.44769,-23,-451,-0,-0.25,150,-0,5,,,,,,
2458.44774,-23,-450,-0,-0.25,-37,-0,5,,,,,,
2458.44780,-23,-450,0,-0.25,-38,-0,5,,,,,,
2458.44786,-23,-450,-0,-0.25,-38,-0,5,,,,,,
2458.44792,-23,-450,-0,-0.25,-38,8,5,,,,,,
2458.44797,-23,-450,0,-0.25,-38,8,5,,,,,,
2458.44803,-23,-450,-0,-0.25,-38,8,5,,,,,,
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Listing 3 (Continued)

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2458.44826,-23,-450,-0,-0.25,-38,230,5,,,,,,,
2458.44832,-23,-450,-0,-0.25,-37,230,5,,,,,,,
2458.44838,-23,-450,0,-0.25,-37,445,5,,,,,,,
2458.44844,-23,-451,-0,-0.25,-37,445,5,,,,,,,
2458.44850,-23,-450,-0,-0.25,-37,445,5,,,,,,,
2458.44855,-23,-450,-0,-0.25,-38,445,5,,,,,,,
2458.44861,-23,-450,-0,-0.25,-38,1,5,,,,,,,
2458.44867,-23,-450,-0,-0.25,-37,-0,5,,,,,,,
2458.44873,-23,-450,-0,-0.25,-38,0,5,,,,,,,
2458.44878,-23,-450,-0,-0.25,-37,0,35,,,,,,,
2458.44884,-23,-450,0,-0.25,-38,-0,75,,,,,,,
2458.44890,-23,-450,-0,-0.25,-38,-0,75,,,,,,,
2458.44896,-23,-450,0,-0.25,-38,0,75,,,,,,,
2458.44902,-23,-450,-0,-0.25,-38,0,75,,,,,,,
2458.44907,-23,-450,-0,-0.25,-38,0,135,,,,,,,
2458.44913,-23,-450,-0,-0.25,-38,0,148,,,,,,,
2458.44919,-23,-450,0,-0.25,-38,0,148,,,,,,,
2458.44925,-23,-450,0,-0.25,-38,0,148,,,,,,,
2458.44931,-23,-450,-0,-0.25,-37,0,148,,,,,,,
2458.44936,-23,-450,-0,-0.25,-37,0,148,,,,,,,
2458.44942,-23,-450,0,-0.25,-38,-0,106,,,,,,,
2458.44948,-23,-450,-0,-0.25,-38,-0,5,,,,,,,
```

Listing 4: File CAM_DAT.PRN (annotated: data in Lotus 1-2-3 format)

Time/date Channel 1-7 data	Step No.	Comment
2496.46652,,,,,,,,-23,-451,95,1.17,75,230,-0	Spurious	Note 1
2496.47498,,,,,,,,-23,-451,94,1.17,75,-0,-0	Spurious	Note 2
2496.47723,,,,,,,,-23,-451,94,1.17,75,230,6	Spurious	Note 2
2496.47942,,,,,,,,-23,-450,94,1.17,75,230,7	Spurious	Note 2
2496.47972,,,,,,,,-23,-451,94,1.17,75,230,5	Step 1.8.3.7	Channel 6
2496.48319,-23,-451,94,1.17,75,230,5,,,,,,,	Step 1.8.3.8	
2496.54443,,,,,,,,-23,-451,94,1.17,75,-6,-0	Spurious	Note 1
2496.54707,,,,,,,,43,-450,94,1.17,75,-5,5	Step 1.8.3.13	Channel 1
2496.55054,43,-451,94,1.17,75,-2,5,,,,,,,	Step 1.8.3.14	
2496.55091,,,,,,,,39,-450,94,1.17,75,-2,5	Spurious	Note 1
2496.55459,,,,,,,,-23,864,94,1.17,75,1,5	Step 1.8.3.19	Channel 2
2496.55807,-23,858,94,1.17,75,-4,5,,,,,,,	Step 1.8.3.20	
2496.57380,,,,,,,,-23,-451,150,1.17,75,-3,5	Step 1.8.3.25	Channel 3
2496.57727,-23,-451,150,1.17,75,-3,5,,,,,,,	Step 1.8.3.26	
2496.58229,,,,,,,,-23,-451,94,0.50,75,-0,5	Step 1.8.3.31	Channel 4
2496.58576,-23,-451,94,0.50,75,3,5,,,,,,,	Step 1.8.3.32	
2496.58898,,,,,,,,-23,-451,94,1.17,75,1,5	Step 1.8.3.38	Channel 5
2496.59245,-23,-451,94,1.17,75,-2,5,,,,,,,	Step 1.8.3.39	
2496.59373,,,,,,,,-23,-451,94,1.17,75,-2,75	Step 1.8.3.41	Channel 7
2496.59720,-22,-450,94,1.17,75,-0,75,,,,,,,	Step 1.8.3.42	

Note 1: Spurious trip caused by wires being connected/disconnected during the test procedure.

Note 2: Spurious trip caused by efforts to determine datalogger "trip point". It was determined that the datalogger would NOT "trip" [and record the data] at 0.33 volts, but would respond at 0.34 volts which is within the tolerance specified in the procedure [0.33 (-0.00, +0.02) volts].

Listing 5: File CAM_RT.PRN (annotated: data in Lotus 1-2-3 format)

Time/date Channel 1-7 data	Step No.	Comment
2507.58913,,,,,,,,-23,-450,94,1.17,77,20,0	Spurious	Note 1
2507.58928,,,,,,,,-23,-450,93,1.17,76,15,5	Step 1.8.3.38	Channel 5
2507.59275,-23,-450,94,1.17,95,8,5,,,,,,,	Step 1.8.3.39	

Note 1: Spurious trip caused by wires being connected/disconnected during the test procedure.

APPENDIX B - TEST EXCEPTIONS

TEST EXCEPTION # 1

Test Title: WHC-SD-WM-ATP-149, REV 0			Test Item Number: 21755 (S/N)		
EXCEPTIONS			CORRECTION APPROVAL		
Procedure Step Number	Date	Description	Initials/Date		
			Project Engineer	Quality	Safety
1.7.3.4	9-25-95	Voltmeter batteries died. Will use other voltmeter as simultaneous readings not required.	JJD 9.25.95	P	N/A

OBJECTING PARTY: Test Director — RECORDER — 9-25-95 Date

ACCEPTABLE RETEST PERFORMED: YES ___ NO ___ N/A ✓

Quality — 9-25-95 Date — Test Director — 9.25.95 Date

N/A
Safety — Date

EXCEPTION RESOLVED: Project Engineer — 9.25.95 Date

Quality — 9-25-95 Date

TEST EXCEPTION # 2

Test Title: WHC-SD-WM-ATP-149, REV 0			Test Item Number: 21755 (s/n)		
EXCEPTIONS			CORRECTION APPROVAL		
Procedure Step Number	Date	Description	Initials/Date		
			Project Engineer	Quality	Safety
1.7.4.3	9.25.95	Used 1-2-3 to view data as data had already been erased from Data Viper.	JLD 9.25.95	P	N/A

OBJECTING PARTY: Test Director — RECORDER — Date 9-25-95

ACCEPTABLE RETEST PERFORMED: YES ___ NO ___ N/A ✓

Quality — Date 9-25-95

Test Director — Date 9-25-95

N/A
Safety — Date

EXCEPTION RESOLVED: Project Engineer — Date 9.25-95

Quality — Date 9-25-95

TEST EXCEPTION # 3

Test Title: WHC-SD-WM-ATP-149, REV 0			Test Item Number: 21755 (S/U)		
EXCEPTIONS			CORRECTION APPROVAL		
Procedure Step Number	Date	Description	Initials/Date		
			Project Engineer	Quality	Safety
1.7.4.4	9-25-95	Data collected lacked time stamp. Retest not done as section 1.7.5 data will show time stamp.	JLD 9.25.95	P	N/A

OBJECTING PARTY: Test Director — RECORDER — Date: 9-25-95

ACCEPTABLE RETEST PERFORMED: YES ___ NO ___ N/A ✓

Quality — Date: 9-25-95

Test Director — Date: 9.25.95

Safety N/A — Date

EXCEPTION RESOLVED:

Project Engineer — Date: 9.25.95

Quality — Date: 9-25-95

TEST EXCEPTION # 4

Test Title: WHC-SD-WM-ATP-149, REV 0			Test Item Number: 21755 (s/n)		
EXCEPTIONS			CORRECTION APPROVAL		
Procedure Step Number	Date	Description	Initials/Date		
			Project Engineer	Quality	Safety
1.7.5.7	9-25-95	Test Data Sheet lacks spot to record data. Added line to test data sheet.	JJD 95 9.25.95	P 9/25/95	N/A

OBJECTING PARTY: Recorder — RECORDER — Date

ACCEPTABLE RETEST PERFORMED: YES ___ NO ___ N/A ✓

W.P. Crockett — 9-25-95
Quality — Date

J.J. Dowell — 9-25-95
Test Director — Date

N/A
Safety — Date

EXCEPTION RESOLVED:

J.J. Dowell — 9-25-95
Project Engineer — Date

W.P. Crockett — 9-25-95
Quality — Date

TEST EXCEPTION # 5

Test Title: WHC-SD-WM-ATP-149, REV 0			Test Item Number: 21755 (s/n)		
EXCEPTIONS			CORRECTION APPROVAL		
Procedure Step Number	Date	Description	Initials/Date		
			Project Engineer	Quality	Safety
1.7.5.20	9-25-95	Procedure lacked step to re-enter (re-start De Cipher. Added step; showed moving of step 1.7.5.23 to precede 1.7.5.20. Also assure "Date with time" in the channels window is selected. as part of 1.7.5.22.	9.25.95	9/25/95	N/A

OBJECTING PARTY: Test Director — RECORDER — Date: 9-25-95

ACCEPTABLE RETEST PERFORMED: YES ___ NO ___ N/A

Quality — Date: 9-25-95

Test Director — Date: 9-25-95

N/A
Safety — Date

EXCEPTION RESOLVED:

Project Engineer — Date: 9.25.95

Quality — Date: 9-25-95

TEST EXCEPTION # 6

Test Title: WHC-SD-WM-ATP-149, REV 0			Test Item Number: S/N 21755		
EXCEPTIONS			CORRECTION APPROVAL		
Procedure Step Number	Date	Description	Initials/Date		
			Project Engineer	Quality	Safety
1.8.1.7	11.2.95	Nameplate not installed per ECN 621961. Exception will be resolved when Nameplate is installed.	JDD 11.2.95	KW 11/2/95	N/A
		NAME PLATE INSTALLED	JDD 11.15.95	KW 11/15/95	N/A

OBJECTING PARTY: Test Director — Ken Willburg — RECORDER — 11/2/95 Date

ACCEPTABLE RETEST PERFORMED: YES ___ NO ___ N/A

Ken Willburg — 11/2/95 — Quality — Date

Test Director — 11-15-95 — Date

N/A — Safety — Date

EXCEPTION RESOLVED: JD Dowell — 11-15-95 — Project Engineer — Date

Ken Willburg — 11/15/95 — Quality — Date

TEST EXCEPTION # 7

Test Title: WHC-SD-WM-ATP-149, REV 0			Test Item Number: 21755 (S/N)		
EXCEPTIONS			CORRECTION APPROVAL		
Procedure Step Number	Date	Description	Initials/Date		
			Project Engineer	Quality	Safety
1.8.3.7, 1.8.3.8	11-2-95	Data for 5 minutes after step 1.8.3.7 did not record. Investigation showed the datalogger will not record w/ a 0.3300 volt input on channel 7, but will record w/ a 0.3400 volt input. (w/in specified tolerance). Add ~~a General~~ Note after step 1.8.3.8 reading: "Assurance that the datalogger is working may be done by looking at the FROM DATATAKER window of the COMMAND menu: it displays the data read by the datalogger."	JLD	KW 11/2/95	N/A

OBJECTING PARTY: Project Engineer — Ken Willoughby, RECORDER — 11/2/95 Date

ACCEPTABLE RETEST PERFORMED: YES ___ NO ___ N/A

Ken Willoughby — Quality — 11/2/95 Date

Test Director — 11-15-95 Date

N/A — Safety — Date

EXCEPTION RESOLVED: J L Dodd — Project Engineer — 11-2-95 Date

Ken Willoughby — Quality — 11/2/95 Date

TEST EXCEPTION # 8

Test Title: WHC-SD-WM-ATP-149, REV 0			Test Item Number: 21755 (S/N)		
EXCEPTIONS			CORRECTION APPROVAL		
Procedure Step Number	Date	Description	Initials/Date		
			Project Engineer	Quality	Safety
1.8.4.3	11-2-95	Step calls out use of DeCipher program to view data. When data was saved, it was in Lotus 1-2-3 format. Replace this step w/ following: Import file into Lotus-1-2-3.	JJD 11-2-95	KW 11/2/95	N/A

OBJECTING PARTY: Project Engineer — Ken Willoughby 11/2/95
RECORDER Date

ACCEPTABLE RETEST PERFORMED: YES ___ NO ___ N/A

Ken Willoughby 11/2/95
Quality Date
KEN WILLOUGHBY

Test Director 11-15-95
Date

N/A
Safety Date

EXCEPTION RESOLVED: J. J. Dodd 11-2-95
Project Engineer Date

Ken Willoughby 11/2/95
Quality Date

TEST EXCEPTION # 9

Test Title: WHC-SD-WM-ATP-149, REV 0			Test Item Number: 21755 (s/N)		
EXCEPTIONS			CORRECTION APPROVAL		
Procedure Step Number	Date	Description	Initials/Date		
			Project Engineer	Quality	Safety
1.8.4.5	11.2.95	Step fails to remove power from Data Logger. This part of ~~the~~ step 1.8.4.5 will not be done, leaving power to the Datalogger ON at the end of the test.	11.2.95	KW 11/2/95	N/A

OBJECTING PARTY: Project Engineer — RECORDER — 11-2-95 Date

ACCEPTABLE RETEST PERFORMED: YES ___ NO ___ N/A

Quality KEN DICCOUGLAS 11/2/95 Date — Test Director 11-15-95 Date

N/A
Safety Date

EXCEPTION RESOLVED: Project Engineer 11-2-95 Date

Quality 11/15/95 Date

TEST EXCEPTION # 10

Test Title: WHC-SD-WM-ATP-149, REV 0			Test Item Number: 21755 (S/A)		
EXCEPTIONS			CORRECTION APPROVAL		
Procedure Step Number	Date	Description	Initials/Date		
			Project Engineer	Quality	Safety
1.8.4.4	11-10-95	Data Recorded on channel 5 showed no change in response to signals applied. (Static signal was e to applied signal) Resolution: Retest channel 5 Initial Conditions for retest 1) Assure computer is communicating with data logger. 2) Connect signal source to channel 6. 3) Connect signal source to channel 7. 4) Perform steps 1.8.3.36 - 1.8.3.40 inclusive, modified per the following: after 1.8.3.37, set signal source connected to channel 5 to 14mA. 5) Perform 1.8.3.44. 6) Perform 1.8.4 except name file CAM_TST. & profile matches above changes. 7) Record values below: 1.8.3.36 12.000mA 1.8.3.37 .34.000V 1.8.3.37a (per above) 14.000mA	JJS 11-10-95 JJS 11-13-95	KW 11/13/95 KW 11/13/95	N/A

OBJECTING PARTY: Project Eng. Ken Willoughby 11/13/95
RECORDER Date

ACCEPTABLE RETEST PERFORMED: YES X NO ___

Ken Willoughby 11/13/95
Quality Date
KEN WILLOUGHBY

Test Director 11-13-95
Date

M&TE
817-23-01-005 DUE 12/19/95
817-23-01-007 DUE 7/12/96

N/A
Safety Date

EXCEPTION RESOLVED:
Project Engineer 11-13-95
Date

Ken Willoughby 11/13/95
Quality Date

APPENDIX C - TEST LOG SHEET
(Copy as needed)

TEST LOG: WHC-SD-WM-ATP-149, REV 0

DATE/TIME	COMMENTS
9-25-95 8:30 Am	Begin test, section 1.7
9-25-95 11:30 Am	End testing section 1.7
11-2-95	Start testing section 1.8 @ 9:30 Am
11-2-95	End testing (completed) of section 1.8 @ 2:30.
11.13.95 1:00	Start retest of channel 5 per Test Exception #10 Dave VanDyke is Test Director.
11.13.95 2:??	End Retest per Test Exception #10.

APPENDIX D - TEST EXECUTION SHEET

TEST EXECUTION SHEET: PRE-INSTALLATION

Date: 9-25-95
Test Unit Number: 21755
Document Number: WHC-SD-WM-ATP-149, REV 0

TEST PERSONNEL

Project Engineer: J L Dowell (JL Dowell)
Test Director: J L Dowell (JL DOWELL)

Recorder: W. A VAN AELT
Quality: W. A VAN AELT

Other:
Other:

TEST EXECUTION

J L Dowell — Test Director — 9-25-95 Date
W. A Van Aelt — Recorder — 9-25-95 Date

Other — Date
W. A Van Aelt — Quality — 9-25-95 Date

TEST APPROVAL AND ACCEPTANCE

____ Without Exception
✓ With Exception/Resolved
____ With Exception/Outstanding

J L Dowell — Project Engineer — ~~9-25-95~~ 9-25-95 Date
W. A Van Aelt — Quality — 9-25-95 Date

Other — Date

TEST EXECUTION SHEET: POST-INSTALLATION

Date: 11/2/95

Document Number: WHC-SD-WM-ATP-149, REV 0

Test Unit Number: S/N 21755

TEST PERSONNEL

Project Engineer: J L Dowell
JL DOWELL

Test Director: MIKE COST
David G Dandle

Recorder: Ken Willoughby
KEN WILLOUGHBY

Quality: Ken Willoughby
KEN WILLOUGHBY

Other:
NORM LEECH

TEST EXECUTION

Test Director — 11-15-95 Date

Recorder — 11/2/95 Date

Other — Date

Quality — 11/2/95 Date

TEST APPROVAL AND ACCEPTANCE

___ Without Exception

_✓_ With Exception/Resolved

___ With Exception/Outstanding

Project Engineer — 11-15-95 Date

* Ken Willoughby — 11/15/95 Date
Quality

* POST INSTALLATION ONLY
KW 11-15-95

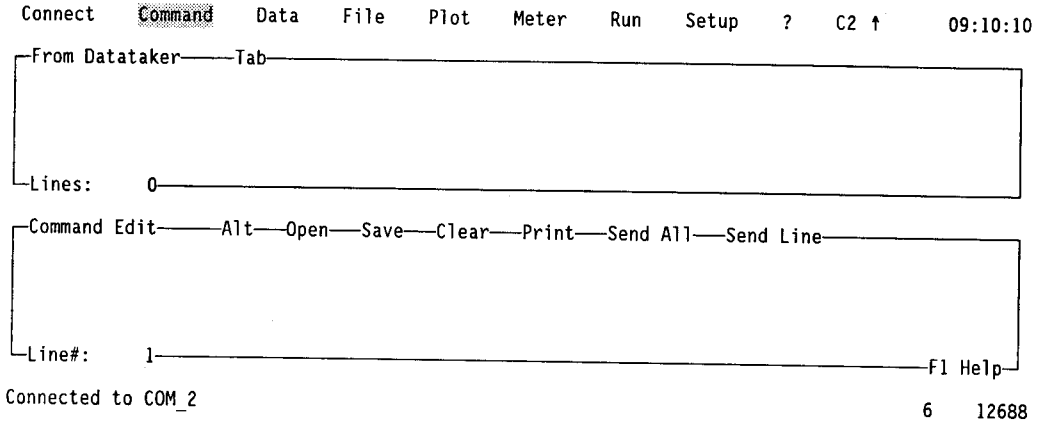
Other — Date

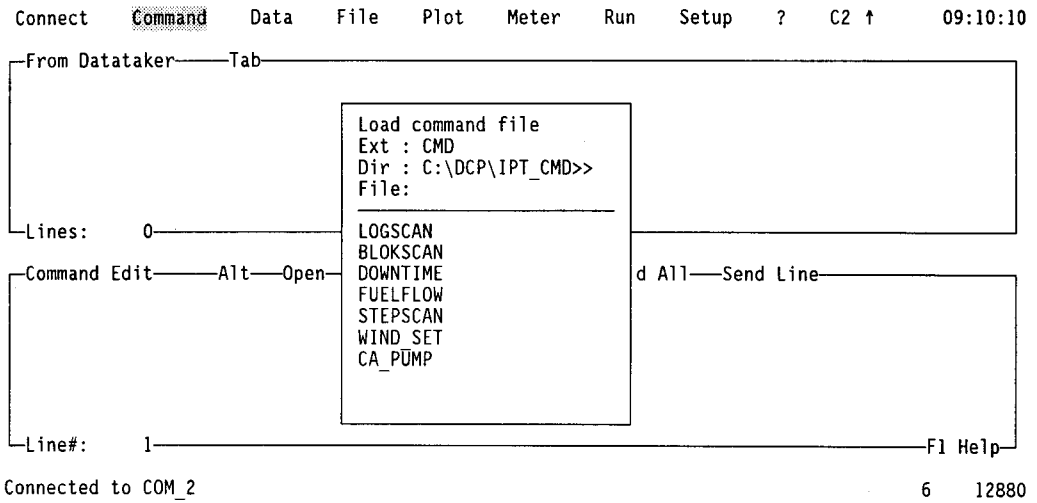
APPENDIX E - DeCipher/DeTerminal SCREENS

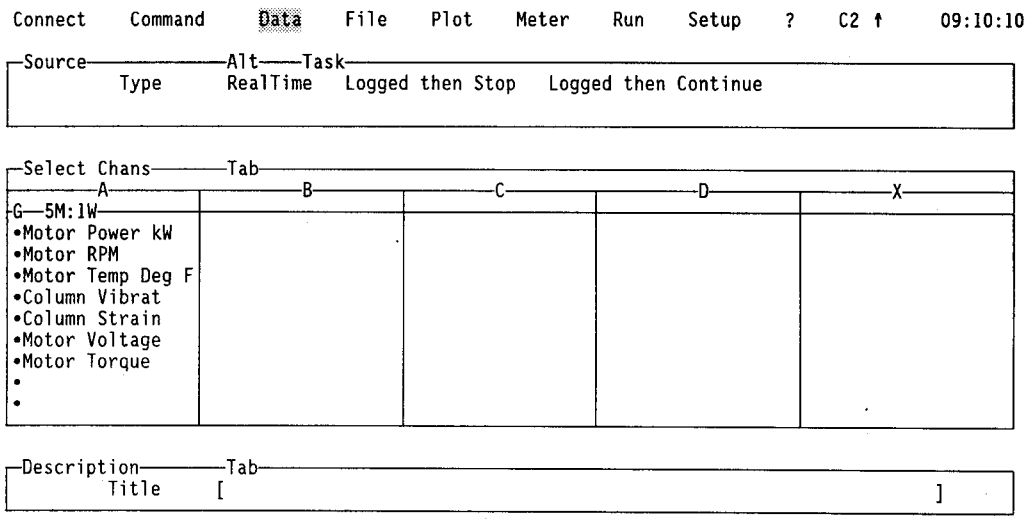
```
Connect   Command   Data   File   Plot   Meter   Run   Setup   ?   C2 ↑        09:10:10

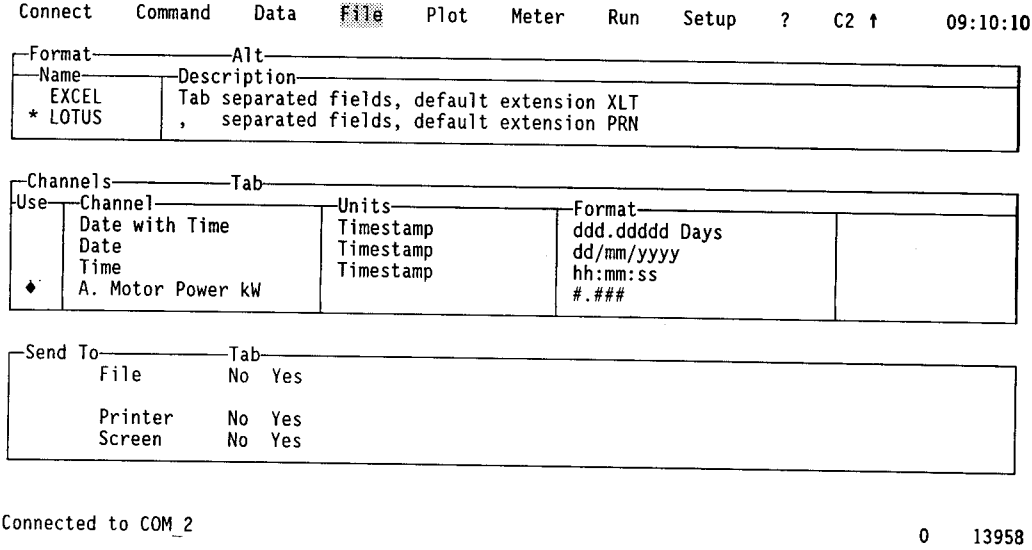
┌Connection──────────Alt─ New──View──Connect──Release──Modify──Delete──Startup──────┐
├──Name──────────┬Description──────────────────────────────────────────────────────┤
│                │                                                                 │
│   COM_1        │ Auto baud rate connection on COM1                               │
│   COM_1P       │ COM_1 with protocol                                             │
│ *S COM_2       │ Auto baud rate connection on COM2                               │
│   COM_2_1      │ Logger 1 on COM2                                                │
│   DEMO         │ File connection to air-conditioning data                        │
│   FILEDATA     │ Default file connection to \DCP\DCP_DATA\FILEDATA.DCP           │
│   MODEM_1      │ Call 123 4567 on Hayes 1200 modem - COM1 to local Datataker     │
└────────────────┴─────────────────────────────────────────────────────────────────┘

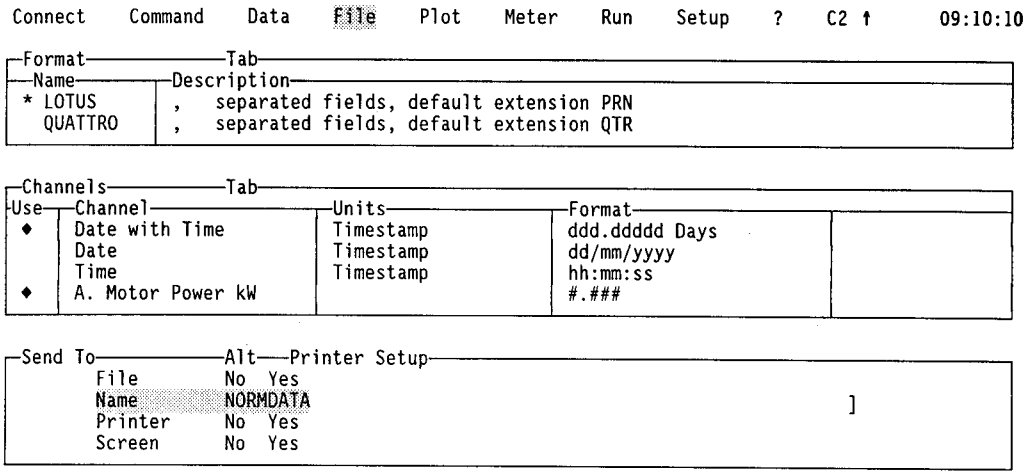
Connected to COM_2                                                  6    13622
```

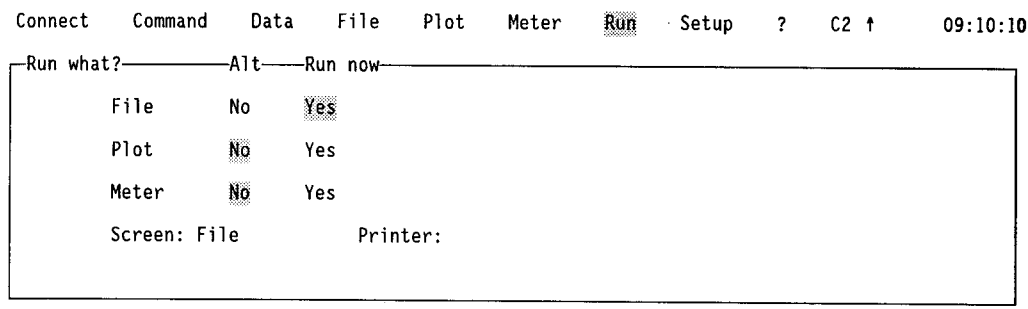

Connect Command Data File Plot Meter Run Setup ? C2 ↑ 09:10:10
From Datataker Tab
Lines: 0
Command Edit Alt Open Save Clear Print Send All Send Line
Line#: 1
F1 Help
Connected to COM_2
6 12688


Connect Command Data File Plot Meter Run Setup ? C2 ↑ 09:10:10
From Datataker Tab
Load command file
Ext : CMD
Dir : C:\DCP\IPT_CMD>>
File:
LOGSCAN
BLOKSCAN
DOWNTIME
FUELFLOW
STEPSCAN
WIND_SET
CA_PUMP
Lines: 0
Command Edit Alt Open
d All Send Line
Line#: 1
F1 Help
Connected to COM_2
6 12880


Connect Command Data File Plot Meter Run Setup ? C2 ↑ 09:10:10
Source
Type
Alt
RealTime
Task
Logged then Stop
Logged then Continue
Select Chans
Tab
A
B
C
D
X
G—5M:1W
•Motor Power kW
•Motor RPM
•Motor Temp Deg F
•Column Vibrat
•Column Strain
•Motor Voltage
•Motor Torque
Description
Tab
Title
Connected to COM_2
0 13412


Connect Command Data File Plot Meter Run Setup ? C2 ↑ 09:10:10
Format
Alt
Name
Description
EXCEL
Tab separated fields, default extension XLT
* LOTUS
, separated fields, default extension PRN
Channels
Tab
Use
Channel
Units
Format
Date with Time
Timestamp
ddd.ddddd Days
Date
Timestamp
dd/mm/yyyy
Time
Timestamp
hh:mm:ss
♦
A. Motor Power kW
#.###
Send To
Tab
File
No Yes
Printer
No Yes
Screen
No Yes
Connected to COM_2
0 13958


Connect Command Data File Plot Meter Run Setup ? C2 ↑ 09:10:10
Format Tab
Name Description
* LOTUS , separated fields, default extension PRN
QUATTRO , separated fields, default extension QTR
Channels Tab
Use Channel Units Format
♦ Date with Time Timestamp ddd.ddddd Days
Date Timestamp dd/mm/yyyy
Time Timestamp hh:mm:ss
♦ A. Motor Power kW #.###
Send To Alt Printer Setup
File No Yes
Name NORMDATA]
Printer No Yes
Screen No Yes
Connected to COM_2 6 14228


Connect Command Data File Plot Meter Run Setup ? C2 ↑ 09:10:10
Run what? Alt Run now
File No Yes
Plot No Yes
Meter No Yes
Screen: File Printer:
Connected to COM_2
6 13048

```
Connect   Command   Data   File   Plot   Meter   Run   Setup   ?   C2 ↑      09:10:10

┌Setup Type──────Alt──Save──────────────────────────────────────────────────┐
│                System  Task                                               │
└───────────────────────────────────────────────────────────────────────────┘

┌General──────────Tab───────────────────────────────────────────────────────┐
│      Startup Connect    Yes  No                                           │
│      Autoload Task      Yes  No                                           │
│      Auto Match         Yes  No                                           │
└───────────────────────────────────────────────────────────────────────────┘

┌Video────────────Tab───────────────────────────────────────────────────────┐
│      Monitor Type       Auto  Colour  Monochrome                          │
│      Startup Colours    Mono  Blue/White  Red/White  LCD  Gas Plasma      │
│      Video Mode         Auto  VGA  EGA  Hercules                          │
└───────────────────────────────────────────────────────────────────────────┘

┌Printers─────────Tab───────────────────────────────────────────────────────┐
│      Setup a text or graphics printer                                     │
└───────────────────────────────────────────────────────────────────────────┘

Connected to COM_2                                          0     12976
```

APPENDIX F - FIGURES

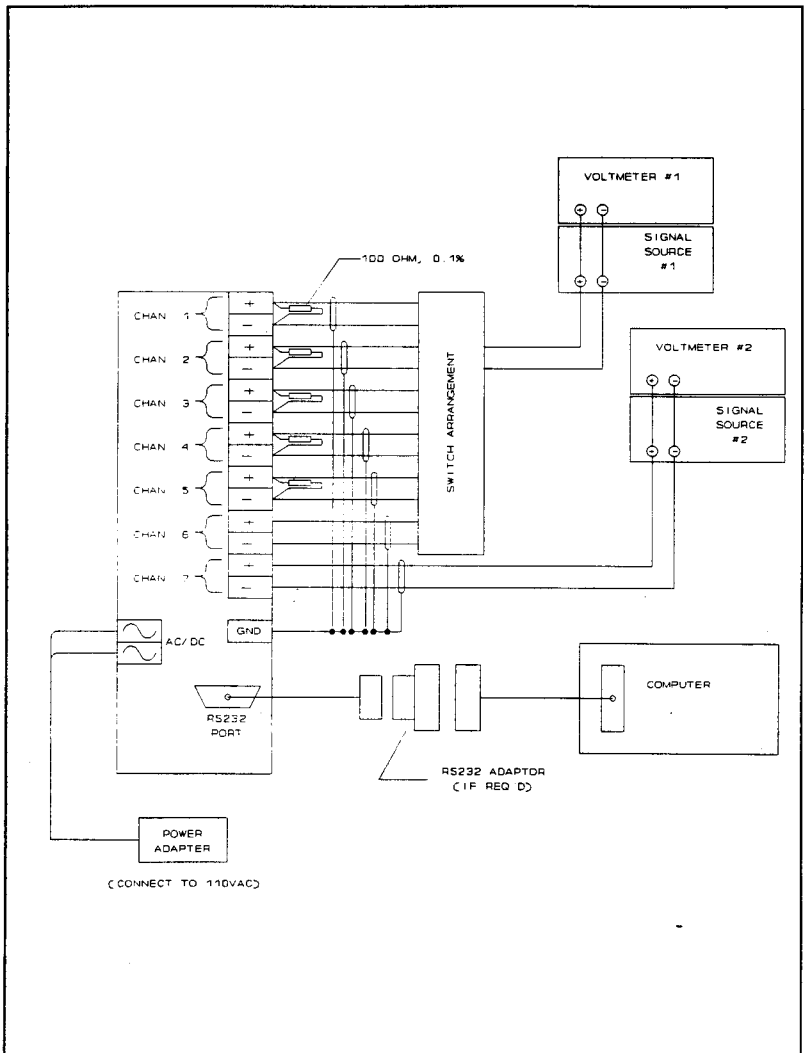


Figure 23. Connection Diagram for Testing the Datalogger.

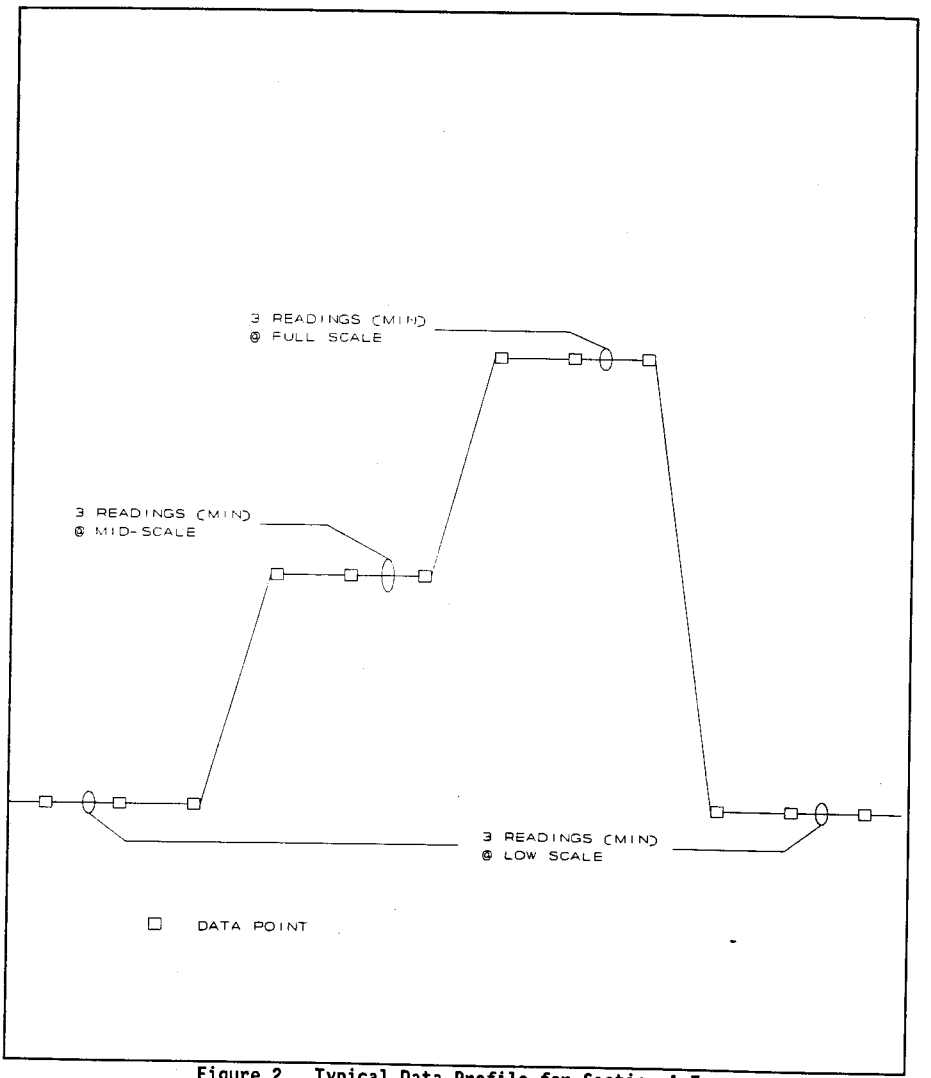


Figure 2. Typical Data Profile for Section 1.7.

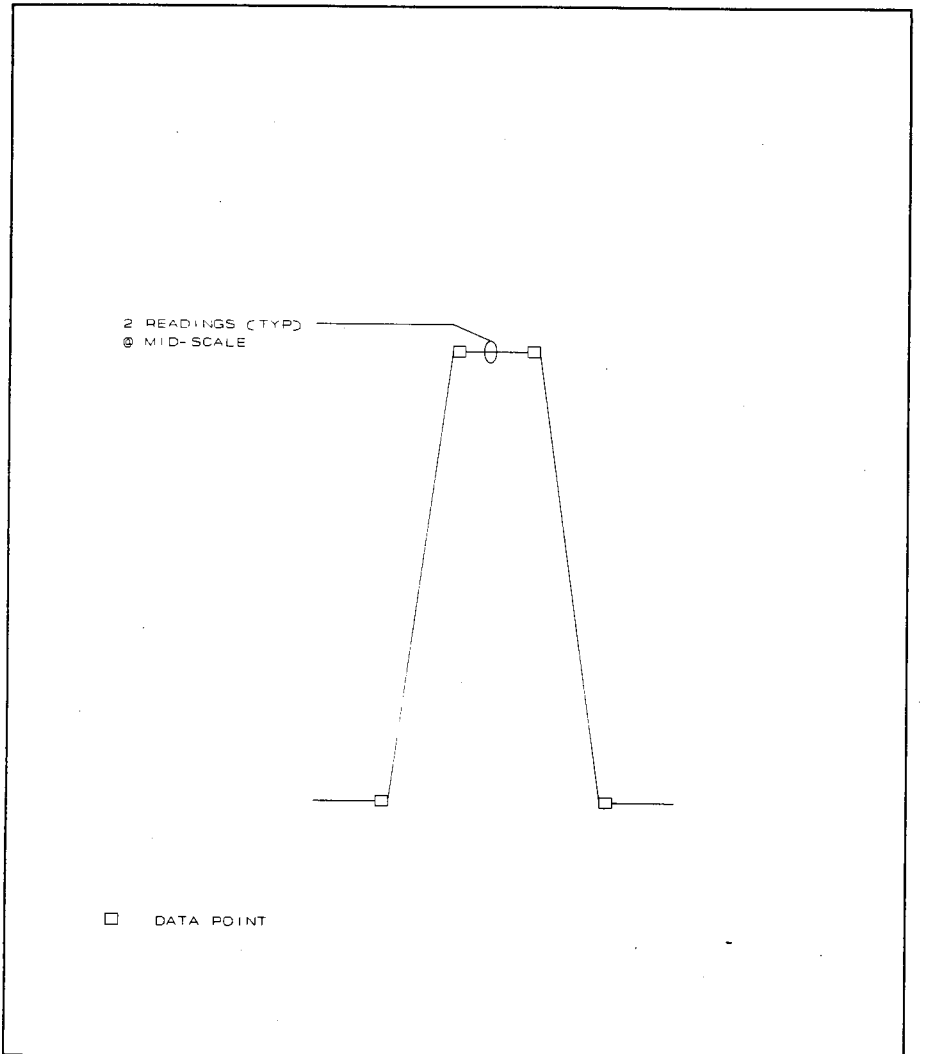


Figure 3. Typical Data Profile for Section 1.8.

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Control Systems Engineering	Date
Project Title/Work Order		EDT No. 141086
WHC-SD-WM-ATR-149, Rev. 0, Acceptance Test Report for the 241-AN-107 Caustic Addition Mixer Pump DataLogger		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
T. R. Beaver	H0-33	X			
K. G. Carothers	R1-51	X			
J. L. Dowell	E6-21	X			
G. N. Hanson	S5-05				X
M. D. Harding	S5-10	X			
O. B. Haugen	S5-10	X			
M. N. Islam	R3-08				X
W. E. Meeuwsen	S5-05	X			
R. E. Parizin	S4-43				X
J. J. Verderber	S1-57	X			
S. U. Zaman	R3-08	X			
Central Files	A3-88	X			
TFIC	R1-20	X			