APR 23 1996 21

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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
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1	/	Cog. Eng. GN Boechler			H5-09						
1	/	Cog. Mgr. CE Hansonn			H5-09						
1		QA ML McElroy			S7-07						
		Safety									
3		RY Seda			H5-09						
3		GA Barnes			H5-09						
3		RE Raymond			S7-12						

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
GA Barnes Signature of EDT Originator Date 4-22-96	Authorized Representative for Receiving Organization Date 4/22/96	CE Hanson Cognizant Manager Date 4/22/96	[ ] Approved [ ] Approved w/comments [ ] Disapproved w/comments

CONE PENETROMETER MOISTURE PROBE ACCEPTANCE TEST REPORT

GA BARNES
WESTINGHOUSE HANFORD COMPANY, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 158604 UC: 2070
Org Code: 75250 Charge Code: N4H4A
B&R Code: EW3120074 Total Pages: 103

Key Words: Cone Penetrometer, acceptance test procedure (ATR)

Abstract: This Acceptance Test Report (ATR) documents the results of WHC-SD-WM-ATP-146 (Prototype Cone Penetrometer Moisture Probe Acceptance Test Procedure) and WHC-SD-WM-ATP-145 (Cone Penetrometer Moisture Probe Acceptance Test Procedure). The master copy of WHC-SD-WM-ATP-145 can be found in Appendix A and the master copy of WHC-SD-WM-ATP-146 can be found in Appendix B. Also included with this report is a matrix showing design criteria of the Cone penetrometer moisture probe and the verification method used (Appendix C).

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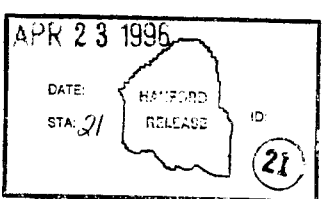

Karen L Noland 4/23/96
Release Approval Date

Release Stamp

Approved for Public Release

CONE PENETROMETER MOISTURE PROBE ACCEPTANCE TEST REPORT

APRIL 1996

CONTENTS

CONE PENETROMETER MOISTURE PROBE ACCEPTANCE TEST REPORT

1.0 INTRODUCTION

This Acceptance Test Report (ATR) documents the results of WHC-SD-WM-ATP-146 (Prototype Cone Penetrometer Moisture Probe Acceptance Test Procedure) and WHC-SD-WM-ATP-145 (Cone Penetrometer Moisture Probe Acceptance Test Procedure). The master copy of WHC-SD-WM-ATP-145 can be found in Appendix A and the master copy of WHC-SD-WM-ATP-146 can be found in Appendix B. Also included with this report is a matrix showing design criteria of the Cone penetrometer moisture probe and the verification method used (Appendix C).

2.0 SUMMARY AND CONCLUSIONS

2.1 PROTOTYPE ATP

The first ATP (WHC-SD-WM-ATP-146) performed was for the prototype CPMP. The prototype CPMP ATP verified that the mechanical and electrical features of the CPMP were operating as designed. The scope of the prototype ATP was as follows:

- Testing of basic equipment functions and mechanical interfaces
- Performance of electronic components were demonstrated
- The winch system was demonstrated
- The probe detectors were demonstrated

The prototype ATP was successfully completed on September 21, 1995 with no exceptions.

2.2 CPMP ATP

The CPMP ATP (WHC-SD-WM-ATP-145) was performed to turn the prototype CPMP into a field deployable moisture sensor. The design criteria used to verify the CPMP system can be found in WHC-SD-WM-FDC-047 and Appendix C. The scope of the CPMP ATP was as follows:

- Perform probe calibration using the calibration chamber and operating system
- Perform manual moisture probe operations
- Perform automatic moisture measurements
- Perform surface moisture measurements

- Verify the accuracy of the temperature sensor

The CPMP ATP was successfully completed on 1/30/96 with only minor exceptions as listed in appendix A. **Completion of this testing verifies that the CPMP is acceptable for inclusion on the Cone Penetrometer system.**

APPENDIX A

WHC-SD-WM-ATP-145

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2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	Characterization Equipment Development	N/A
5. Proj./Prog./Dept./Div.:	**6. Cog. Engr.:**	**7. Purchase Order No.:**
Characterization Project	G. N. Boechler	N/A
8. Originator Remarks: Transmitted For Release ETN-94-0027		**9. Equip./Component No.:** N/A
		10. System/Bldg./Facility: N/A
11. Receiver Remarks: MASTER		**12. ~~Hoist Assm.~~ Dwg. No.:** N/A
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1	WHC-SD-WM-ATP-145		0	Cone Penetrometer Moisture Probe Acceptance Test Procedure	Q	1	1	

16. KEY

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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.
2	1	Proj.Eng. G.N. Boechler		1/9/96	H5-09						
2	1	Proj. Mgr. C.E. Hanson		1/9/96	H5-09						
2	1	QA M.L. McElroy	M. L. McElroy	1/9/96	S7-07						
		Safety									
		Env.									
3	1	~~S~~ Eng. C.G. Linschooten			S7-12						

18.	19.	20.	21. DOE APPROVAL (if required)
G.A. Barnes Signature of EDT Originator — Date: 1-8-96	Authorized Representative for Receiving Organization — Date	C.E. Hanson Cognizant Manager — Date: 1/8/96	Ctrl. No. [ ] Approved [ ] Approved w/comments [ ] Disapproved w/comments

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

WHC-SD-WM-ATP-145, Rev. 0

Cone Penetrometer Moisture Probe Acceptance Test Procedure

G. A. Barnes
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 604981 UC: 2070
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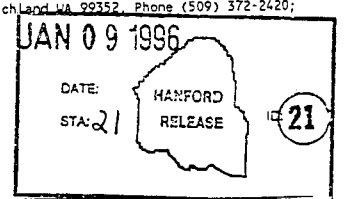

Release Stamp

Karen L. Boland 1/9/96
Release Approval Date

Approved for Public Release

WHC-SD-WM-ATP-145
REV 0

CONE PENETROMETER MOISTURE PROBE ACCEPTANCE TEST PROCEDURE

January 1995

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CONE PENETROMETER MOISTURE PROBE ACCEPTANCE TEST PROCEDURE

1.0 INTRODUCTION

1.1 PURPOSE

This procedure shall be used for acceptance testing of the Cone Penetrometer Moisture Probe (CPMP) system. The system includes the probe and detectors, the winch system, the NIM bin electronics, the thermistor, the laptop computer, Input/Output (I/O) interfaces, LabVIEW[1] application with automatic scanning features and the calibration chamber. This Acceptance Test Procedure (ATP) will cover the function of all the components, and demonstrate data flow through the system, winch functions, and detector and temperature sensor sub-system functions in accordance with the Functional Design Criteria (FDC) specified in WHC-SD-WM-FDC-047.

1.2 SCOPE

Completion of this test will verify that all applicable features of the CPMP system are operating as specified in WHC-SD-WM-FDC-047. The scope of the acceptance testing is as follows:

- Perform probe calibration using the calibration chamber and operating system.
- Perform manual moisture probe operations.
- Perform automatic moisture measurement.
- Perform surface moisture measurement using the near detector.
- Verify the accuracy of the temperature sensor.

2.0 APPLICABLE/REQUIRED DOCUMENTS

Science Applications International Corporation (SAIC) drawings:

544200, Moisture Probe Assembly, CPMP

---

[1] LabVIEW is a trademark of National Instruments.

544100, Cone Penetrometer Deployment System, CPMP

544010, Calibration Block

D714-A, Source Remover

3.0 TEST CONTROLS

3.1 RESPONSIBILITIES

3.1.1 Project Engineer

Project Engineer: G. N. Boechler/G. A. Barnes responsibilities include:

- Overall control of testing.
- Provide liaison with facility used for testing.
- Provide liaison with Quality Assurance (QA) for testing activities as required.
- Approve test procedure and final report.
- Overall testing responsibilities and assignment of responsibilities.
- Review test results and prepare/issue test report.
- Monitor testing for compliance with the test procedures.

3.1.2 Test Performer

Test Performer: SAIC. Responsibilities include:

- Perform test in accordance with approved test procedure.
- Maintain a file of documented information pertinent to the tests.

3.1.3 Quality Engineer

Quality Engineer: M. L. McElroy. Responsibilities include:

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- Review and approve the test procedure and test report.
- Ensure that quality requirements are defined and satisfied for the test.

- Witness conductance of acceptance testing as required. Testing may proceed per this procedure without a QA engineer present.

3.1.4 Quality Control Inspectors

Quality Control Inspectors: SAIC Quality Control

- Provide signature verification, as identified in this ATP.
- The QA engineer or project engineer may request QC witness of testing not specifically required in the test procedure.

The test performers and project engineers for this test procedure shall be documented in the acceptance test report.

3.2 TEST DATA

3.2.1 All test data, pertinent observations, and off-normal events shall be recorded on the test procedure, Section 6.0 of this ATP. If additional space is required, the data shall be recorded on an observation/results data sheet (provided in Appendix A) or equivalent.

3.2.2 Data recorded on the observation/results data sheets shall be formally documented in the Acceptance Test Report (ATR).

3.2.3 Changes to the test procedure are permitted. The test performer shall red ink changes with the concurrence of the WHC project engineer. Approvals will be documented by the WHC project engineer's initials on the redlined item. Lack of immediate redline approval does not constitute a test hold.

3.3 TEST CONFIGURATION

3.3.1 The drawings and engineering documents which establish the process equipment test configuration are listed in Section 2.0.

3.3.2 Additional documents required to perform, document, or validate a test (sketches, calibration sheets, etc.) will be referenced in the ATR.

3.4 PROCEDURE CONTROL

3.4.1 A controlled test procedure package shall be used for testing and shall include the following:

- A single copy of this test procedure.
- Other information directly applicable to testing which is required.
- Functional Block Diagram.

3.5 RETEST PROCEDURE CONTROL

3.5.1 If retest is required, additional copies of applicable procedure sections or data sheets of this test procedure may be used or new procedures may be used.

3.5.2 The addition of procedure sections to be used for retest shall be added to the test procedure package, concurred with by the WHC QA representative, and formally released in the ATR.

3.5.3 Minor procedure changes such as editorial changes to a step, clarification of a step or steps, elimination or addition of a step or limited sequential changes of steps, shall be noted in the procedure by redline entries and noted in the exceptions sheet located in Appendix A giving the reason for the change.

3.6 OPEN ITEMS

Items and actions identified during the conduct of testing which require future resolution/completion shall be noted on comment sheets in appendix A. Identified open items shall subsequently be entered into the test completion report to assure final close-out.

3.7 TEST EQUIPMENT CONTROLS

It is the responsibility of SAIC to maintain calibration of all test equipment used for acceptance testing.

4.0 TEST FACILITY

Acceptance testing of the CPMP system will be conducted in the SAIC Campus Point E building high bay, San Diego, CA.

5.0 SAFETY

- Only the project engineer and/or their approved SAIC personnel shall operate the CPMP during performance of this ATP.
- Test personnel shall be briefed, prior to test performance, on the hazards unique to the CPMP equipment.
- SAIC is responsible for safety during acceptance testing.

5.1 EQUIPMENT PRECAUTIONS

5.1.1 The electrical supply service disconnect must be OFF when connecting or disconnecting any electrical equipment or cables.

5.1.2 Failure to hook up or remove the power and interconnecting cables in the sequence prescribed in this manual could result in generation of unacceptable equipment voltages and in electrical arcing or sparking.

6.0 TEST PROCEDURE

6.1 PREREQUISITES

Perform functional testing as follows:

6.1.1 Record additional observations on CPMP functional testing observation sheets (Appendix A), as required. Successful completion of the test is documented by the project engineer's signature on the master test procedure.

6.2 TEST SETUP

The CPMP shall be setup so that all operational functions that make moisture measurements (homing, calibrate, manual counting, full scan and surface scan) are tested in waste simulants.

6.2.1 Verify that the moisture content of the waste simulants used for this ATP have been verified and documented (Reference SAIC, PHASE 1 OF CONE PENETROMETER MOISTURE PROBE STUDY, FINAL REPORT, Rev. 1).

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REV 0

Verified by: _____
Test Performer

6.3 SYSTEM STARTUP

6.3.1 Power up the NIM Bin, detector high voltage power supply, and the motor system.

6.3.2 Verify that power lights are illuminated:

Verified by: _____
Test Performer

~~6.3.3~~ Press the computer's power switch to the ON position. The computer screen will display the LabView interface.
OK

~~6.3.4~~ LabView starts, and an "Open VI" dialogue box will be displayed.

~~6.3.5~~ Move to the directory "c:\hanford\" and open the library "mprobe.llb"

~~6.3.6~~ Open the VI "Cone Pen Moisture Probe.vi". The "VI" front panel will appear.
Opens Automatically.

1-11-96

6.4 SETUP MODE

6.4.1 From the front panel, click on SETUP

6.4.2 Note that Pen. Bottom, Start Depth, and End Depth are positions relative to the Pen. Top reference position (0.00 feet). In the dialogue box, enter the following information:

Tank Number: ZZ123

Riser Number: 99Z

Operator: (Enter the Test Performer)

Pen. Top: 0.00 (feet)

Pen. Bottom:- 7 ft (This will be the physical measurement, in feet, from penetrometer top to penetrometer bottom)

Start Depth:- 6 ft ~~(Same as Pen. Bottom)~~

1-11-96

End Depth: -2.00 (feet)

Count Time: 30.00 (seconds)

Step Distance: 1.00 (inch)

6.4.3 Verify that LabView accepts and displays this information and also displays the correct date and time:

Verified by: _____
Test Performer

6.4.4 Click on the button labeled "YES" to write to a data file.

6.4.5 Click on the button labeled "OK".

6.4.6 Verify that the SETUP display disappears and the FRONT PANEL is displayed:

Verified by: _____
Test Performer

6.4.7 Click on the button labeled "START".

6.4.8 A dialog box will appear giving the opportunity to re-run SETUP. Click on NO.

6.4.9 Verify that a dialogue box appears stating that the CPMP must be "HOMED" before a full scan can be performed and that the "Set Home Position" window is automatically opened:

Verified by: _____
Test Performer

6.5 HOMING

6.5.1 Position the moisture probe so that it can be lowered into a ~~single~~ drum of waste simulant that already has a cone penetrometer rod installed in it. The moisture content of the waste simulant should be approximately 20%wt. Record the documented moisture content of the waste simulant (by volume):

Moisture content: 4.2% %vol +/- 1.1 %vol

Dry simulant density: 1.59 g/cc

6.5.2 Use the UP or DOWN controls to move the probe into it's home position ~~(For this ATP, the HOME position will be at the Pen. Top position).~~ (DISTANCE TO TOP OF RISER

6.5.3 In the dialogue box, enter the Home Position (This is the physical measurement from the end of the moisture probe to the top of the cone penetrometer.

6.5.4 Record the dimension entered above.

Home Position: + 0.00 ft.

6.5.5 Click on the SET HOME POSITION button to set the home position.

6.5.6 Verify that the HOME button has turned green indicating that Homing is complete.

Verified by: _____
Test Performer

6.6 MANUAL OPERATIONAL TESTS

6.6.1 Click on the MANUAL MODE button to display the "Manual Counting and Motion Control" display.

6.6.2 Click on and hold down the DOWN button to initiate movement of the probe and to continue the motion. After the probe has moved downward a couple of feet, release the DOWN button.

6.6.3 Verify that the moisture probe moves down, the probe position indicators display probe movement downward and the moisture probe stops when the DOWN button is released.

Verified by: _____
Test Performer

6.6.4 Click on and hold down the UP button to initiate movement of the probe upward and to continue the motion. After the probe has moved upward a couple of feet, release the UP button.

6.6.5 Verify that the moisture probe moves up, the probe position indicators display probe movement upward and the moisture probe stops when the UP button is released.

Verified by: _____
Test Performer

6.6.6 Set ABSOLUTE POSITION button to "Distance" rather than "Position". Enter the following motion control parameters in the appropriate data input boxes.

Distance: -2.00 (feet)
Velocity: 4.00 (in/sec)

6.6.7 Click on the MOVE button.

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6.6.8 Verify that the moisture probe moves down 2 ft +/- 1/4" in approximately 6 sec.

Verified by: TMS
Test Performer

6.6.9 Enter the following motion control parameters in the appropriate data input boxes.

Distance: +1.00 (feet)
Velocity: 2.00 (in/sec)

6.6.10 Click on the MOVE button until the probe stops moving.

6.6.11 Verify that the probe moves up 1 ft +/- 1/4" in approximately 6 sec.

Verified by: TMS
Test Performer

6.6.12 Click on the QUIT button to return to the front panel.

6.6.13 Click on the HOME button.Verify that the moisture probe moves up to the "HOME" position.

Verified by: TMS
Test Performer

6.7 TEMPERATURE SENSOR VERIFICATION

6.7.1 Click on the MANUAL MODE button to display the "Manual Counting and Motion Control" display.

6.7.2 Insert the temperature sensor section of the moisture probe (not the entire probe) and a calibrated temperature sensor into an oven. Set the oven temperature to 121°C (250°F). Click on the COUNT button. After the temperature sensor readouts stabilize, record the readings.

Moisture Probe Temperature
(from FRONT PANEL display): 116.0

Calibrated Temperature Sensor: 115.5

6.7.3 Reduce the oven temperature to 40°C (104°F). After the temperature sensor readouts stabilize, record the

readings.

6.7.4 Moisture Probe Temperature (from FRONT PANEL display): 42.6

Calibrated Temperature Sensor: 43.3

6.7.5 Insert the moisture probe into a cone penetrometer rod that is at approximately room temperature.

6.7.6 Record the time it takes the temperature sensor to stabilize:

Time: See Appendix A

6.7.7 Place the moisture probe and calibrated temperature sensor in ice water (place the probe's temperature sensor in a plastic bag to protect it from the water). After the temperature sensor readouts stabilize, record the readings.

Moisture Probe Temperature (from FRONT PANEL display): .2 °C

Calibrated Temperature Sensor: .6 °C

6.7.8 Verify that the three moisture probe temperature sensor measurements recorded above are within 1.1°C of the calibrated temperature sensor.

Verified by: _____
Test Performer

6.7.9 Record the calibrated temperature sensor information below:

Calibration procedure used: V. V. Verbinski assumed from task notebook pg 114 dated 1-10-96 (attached)

Calibration expiration date: 1-12-96

Verified by: D D Cramer 1-11-96 V. V. Verbinski 1/12/96
SAIC Quality Control

6.8 MOISTURE PROBE CALIBRATION TESTS

6.8.1 Insert the moisture probe into the calibration block (SAIC Dwg 544010).

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6.8.2 Open the swinging door of the calibration block and install the Cf-252 source into the moisture probe using the SOURCE REMOVER (SAIC Dwg D214-A). Source already installed. JCB 1-11-96

6.8.3 Close the door of the calibration block.

6.8.4 From the front panel, click on the CALIBRATION button.

6.8.5 Click on OK to initiate calibration test.

6.8.6 After the "Done" light is illuminated (calibration will take 60 seconds), verify that "Near Count", "Far Count" and "Cal. Ratio" are within 2% of their corresponding Calibration data displayed and the "Cal. OK" light is illuminated.

Verified by: _____
Test Performer

6.8.7 Remove the moisture probe from the calibration block.

6.8.8 Click on OK to initiate calibration test.

6.8.9 After the "Done" light is illuminated (calibration will take 60 seconds), verify that an error message is displayed indicating that the moisture probe is out of calibration.

Verified by: _____
Test Performer

6.8.10 Insert the moisture probe into the calibration chamber and repeat step 6.8.5 and 6.8.7

6.8.11 Verify that the calibration data observed in steps 6.8.6, 6.8.9 and 6.8.10 can be retrieved from the PERMANENT CALIBRATION DATA FILE.

Verified by: _____
Test Performer

6.9 SCAN TESTS

6.9.1 Use Manual Mode to lower the moisture probe just into the penetrometer. From the front panel, click on the SCAN button. When the SETUP dialog box appears, click

on the NO button. Verify that a dialogue box appears asking if the system is ready for the scan. Click on OK.

6.9.2 Verify that the moisture probe is lowered to the bottom of the penetrometer, stops and begins moisture scans at 1 inch intervals for 30 seconds each until the moisture probe is at the top of the penetrometer rod.

Verified by: _____
Test Performer

6.9.3 Verify that the front panel display plots the correct moisture content (within 5%vol.) vs. depth and plots temperature vs. depth.

Verified by: TMS
Test Performer

6.9.4 Using a spreadsheet or graphics package, reproduce these plots from the data file and attach them to the master copy of this ATP.

6.9.5 Click on the HOME button to return the probe to the Home position.

6.9.6 Reposition the moisture probe over a double barrel that contains approximately 15%wt moisture content simulant in the bottom barrel and approximately 20%wt moisture content in the top barrel. Record the documented moisture contents (by volume):

Bottom barrel: 31 %vol. +/- 1.1 %vol.

Dry simulant Density: 1.85 g/cc

Top barrel: 42 %vol. +/- 1.1 %vol.

Dry simulant Density: 1.59 g/cc

6.9.7 Setup the moisture probe to perform a scan in the double barrel arrangement at 2 inch increments for 60 seconds each.

6.9.8 From the front panel, click on the SCAN button.

6.9.9 After the moisture probe starts the scan, click on the SUSPEND OPERATION button.

6.9.10 Verify that the moisture probe stops scanning.

Verified by: TMS
Test Performer

6.9.11 Click on the SUSPEND OPERATION button.

6.9.12 Verify that the moisture probe continues with the scanning operation and scans at 2 inch intervals for 60

seconds each until the moisture probe is at the top of the penetrometer rod.

Verified by: _____
Test Performer

6.9.13 Verify that the front panel display plots the correct moisture content (within 5%vol) vs. depth and plots temperature vs. depth.

Verified by: _____
Test Performer

6.9.14 Using a spreadsheet or graphics package, reproduce these plots from the data file and attach them to the master copy of this ATP.

6.10 MANUAL SCAN TESTS

6.10.1 From the front panel display, click on the MANUAL MODE button.

6.10.2 Click on the DOWN BUTTON to lower the moisture probe into the penetrometer rod (20%wt top barrel). When the moisture probe is approximately 2 ft into the penetrometer rod release the DOWN button.

6.10.3 Adjust the COUNT TIME to 30 seconds.

6.10.4 Click on the COUNT button.

6.10.5 Verify that the moisture probe performs a 30 second scan and that the measured moisture content is within 5%vol.

Verified by: _____
Test Performer

6.10.6 Repeat steps 6.10.2 and 6.10.4 in simulants with approximately 15%wt and 50%wt moisture content. Record the documented moisture contents (by volume) of the simulants:

15%wt simulant: 31 %vol. +/- 1.1 %vol.

Dry simulant Density: 1.85 g/cc

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50%wt simulant: 69 %vol. +/- 1.1 %vol.
Reads 68.81%

Dry simulant Density: 0.723 g/cc

6.10.7 Verify that the moisture probe measures the moisture content of the 15%wt and 50%wt simulants to within 5%vol.

Verified by: TMS
Test Performer

6.10.6 Click on the QUIT button.

6.11 ELECTRICAL SYSTEM OPERATION TEST

6.11.1 Connect the outputs of two function generators directly into the inputs (channel 1 and channel 2) of the Tennelec TC512 counter/timer.

6.11.2 Adjust the function generator for a frequency of 10.46 Kilohertz.

6.11.3 Verify the function generator frequency using a calibrated oscilloscope.

Verified by: TMS
Test Performer

6.11.4 Record Oscilloscope calibration information: Tek Model TDS 420

Oscilloscope calibration expiration: 1-12-96 SAIC 940000011
Verified by: DWraner 1-11-96
SAIC QC

6.11.5 Click on the START button to perform a MANUAL scan for 30 seconds.

6.11.6 When the manual scan is complete, verify that the NEAR DETECTOR and FAR DETECTOR count readings are 313,800 +/- 2000.

Verified by: TMS
Test Performer

CALC: 348810
ACT: 348100

6.11.7 Disconnect the function generators from the Tennelec TC512 counter/timer.

6.12 SURFACE SCAN TESTS

6.12.1 Fill the 20%wt and 30%wt (approximate) double barrel arrangement to the top with water.

6.12.2 Enter the Setup Menu and enter a 0.5 inch Step Distance and a 60 sec Count Time. Select SURFACE SCAN. Exit the Setup Menu.

6.12.3 Position the moisture probe over the 20%wt and 30%wt double barrel arrangement.

6.12.4 From the front panel, initiate the surface scan.

ref WHC-SD-WM-ATP-145
REV 0

6.12.5 Verify that the surface scan data (near counts vs depth) is plotted on the front panel.

Verified by: _____
Test Performer

6.12.6 Using a spreadsheet graphics package, verify that the surface level is indicated within +/- .25 inches and the surface moisture content (by volume and weight) is calculated to within 3%wt and 5%vol. Reproduce these surface plots and attach them to the master copy of this ATP.

Verified by: _____
Test Performer

6.12.7 Position the moisture probe over a barrel with approximately 30%wt moisture content waste simulant. Record the documented moisture content (by volume) of the waste simulant:

Moisture content: 54 % vol +/- 1.1 %

Dry simulant Density: 1.23 g/cc

6.12.8 From the front panel, initiate the surface scan.

6.12.9 After ~~Prior to~~ the end of the surface scan, enter the following comment into the comment box in the front panel: "CPMP FINAL ACCEPTANCE TEST"

6.12.10 Verify that the surface scan data (near counts vs depth) is plotted on the front panel.

Verified by: _____
Test Performer

6.12.11 Using a spreadsheet graphics package, verify that the surface level is indicated within +/- .25 inches and the surface moisture content (by volume and weight) is calculated to within 3%wt and 5%vol. Reproduce these surface plots and all raw data for the ATP and attach them to the master copy of this ATP.

Verified by: _____
Test Performer

6.12.12 Verify that the data file contains the comment entered in step 6.12.9 and that all data points contain a "Time Stamp".

Verified by: TMS
Test Performer

6.13 E-STOP TESTS

6.13.1 Setup the moisture probe for a scan in one of the test barrels. Start the scan from the front panel. During the scan, press the STOP BUTTON on the front panel.

6.13.2 Verify that the motion is stopped.

Verified by: TMS
Test Performer

6.13.3 Setup the moisture probe for a scan in one of the test barrels. Start the scan from the front panel. During the scan, press the manual red Emergency Stop Button.

6.13.4 Verify that the motion is stopped.

Verified by: TMS
Test Performer

6.14 TERMINATION OF OPERATION

6.14.1 Press the "Exit" button. This will return the user to the windows* interface.

6.14.2 Select "Exit Windows" from the file menu.

6.14.3 Choose OK to quit Windows.

6.14.4 Insert a 3-1/2" diskette into drive "A:"

6.14.5 At the DOS prompt (C:\>) type: copy c:\data\mm-dd-yy*.* a:. This will copy all files that were created for this ATP to the diskette.

6.14.6 Attach a hardcopy of the files to the MASTER COPY of this ATP.

6.14.7 Press the power button to turn-off the computer.

*Windows is a trademark of Microsoft Corporation

ref. WHC-SD-WM-ATP-145
REV 0

APPENDIX A

ref. WHC-SD-WM-ATP-145
REV 0

CPMP FUNCTIONAL TESTING
OBSERVATION/RESULTS SHEET

TEST STEP	OBSERVATION/RESULTS	INITIALS	DATE
6.7.6	PROBE INSERTED INTO CONE PEN.	MAB	1-12-96
	AT 20.0°C.		
	INITIAL TEMP 75°C. } 5 min 25 sec		
	FINAL TEMP 40°C }		
	PROBE INSERTED INTO DIFF. CONE PEN.		
	INITIAL TEMP 38°C } 10 min		
	FINAL TEMP 22°C }		
	INITIAL TEMP 22°C } 4 min		
	FINAL TEMP 21°C }		

ref. WHC-SD-WM-ATP-145
REV 0

CPMP FUNCTIONAL TESTING
COMMENT SHEET

ITEM	DESCRIPTION	RESOLUTION	INITIALS	DATE

Ref. WHC-SD-WM-ATP-145
REV 0

EXCEPTION TO CPMP ACCEPTANCE TEST

EXCEPTIONS				CORRECTION APPROVAL		
PARAGRAPH NO.	DATE	DESCRIPTION	RESOLUTION/DISPOSITION	ORGANIZATION	INITIALS	DATE
6.3.3 - 6.3.6	1/29/96	DELETE STEPS	STEPS NOT REQUIRED	WHC	JAB	1/29/96
6.4.2	1/29/96	START DEPTH CHANGE	START DEPTH WAS 1 FOOT ABOVE PEN. BOTTOM SO CABLE WOULDN'T GO SLACK	WHC	JAB	1/29/96
6.5.1	1/29/96	DOUBLE BARREL USED	BOTTOM BARREL OF DOUBLE BARREL SETUP USED. MOISTURE CONTENT IS THE SAME AS SINGLE BARREL AND SETUP WAS EASIER	WHC	JAB	1/29/96

TEST APPROVED - NO EXCEPTIONS:

PROJECT ENGINEER _____ DATE _____

QUALITY ASSURANCE _____ DATE _____

TEST WITNESS _____ DATE _____

TEST APPROVED - WITH EXCEPTIONS:

PROJECT ENGINEER 1-30-96 DATE

~~QUALITY ASSURANCE~~ SAIC 1/30/96 DATE

TEST WITNESS 1-30-96 DATE

6.6.6	1/29/96	"FINAL POSITION"	"FINAL" ADDED TO "POSITION" FOR CLARITY	WHC	JAB	1/29/96
6.8.2	1/29/96	SOURCE ALREADY LOADED	STEP 6.8.2 PERFORMED OUT OF SEQUENCE. TEST UNAFFECTED	WHC	JAB	1/29/96
6.12.9	1/30/96	COMMENT	COMMENT ENTERED AFTER SURFACE SCAN. THIS TEST WILL BE REDONE DURING CP ATP.	WHC	JAB	1/30/96

Advanced Test Equipment Service
10401 ROSELLE ST
SAN DIEGO CA 92121-1503
1-800-404-2832

CERTIFICATION NUMBER: C000000578
CALIBRTION CERTIFICATE
Date Due: 01/04/97
CALIBRATION DATE: 01/05/96

Printed:01/08/96
At:09:18:57

CERTIFIED FOR:
DICK CONSTANTINO
SAIC
4161 CAMPUS POINT CT
SAN DIEGO, CA 92121-1513 U.S.A.

CERTIFIED BY:
ADVANCED TEST EQUIPMENT SERVICE
10401 ROSELLE ST
SAN DIEGO, CA 92121-1503

Advanced Test Equipment hereby certifies that the following instrument(s) meet all manufacturer's published specifications and have been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology, have been derived from acceptable values of natural constants, or have been derived by ratio type of self-calibration techniques.

MFG	MODEL	SERIAL #	DESCRIPTION	READINGS BEFORE	READINGS AFTER
ASSOCIATED SP-1601		20344	11Dx13Hx12W,CO2,SOLID STATE CONTROL		

DIAL READINGS (DEG F)	LOW	HIGH
0	-1.9	2.2
25	23.3	28.1
50	47.4	50.6
75	68.5	73.0
100	98.5	99.8
125	121.2	123.3
150	147.6	149.1
175	168.3	179.8
200	193.5	207.1
225	222.8	234.2
250	246.2	255.9

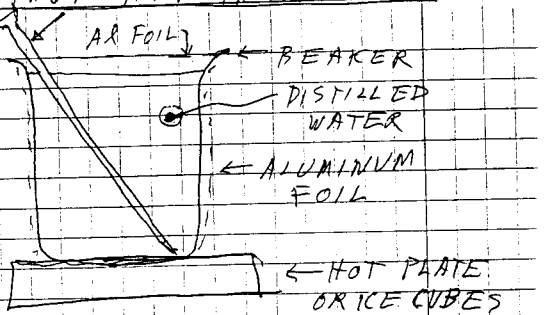
**********CORRECTION**********

Cert Date: 1-5-96
Cert Q.C.: J.R.
Temp: 71°
% R/H: 40
Rec Cycle: 1YR
Req Cycle: 1YR
Signature: Eric B Meyer
STANDARD CALIBRATION

Volume %	WT %	RATIO (Near/Far)	DENSITY	DRY DENSITY
< 31	14	13.87	2.16	1.85
42	21	26.21	2.01	1.59
47	25	34.69	1.84	1.37
< 54	31.5	52.39	1.77	1.23
69	47	95.76	1.41	0.723
100	100	199.87	1.00	0.00

114 1/10/96

CALIBRATED PLATINUM RDT THERMOMETER

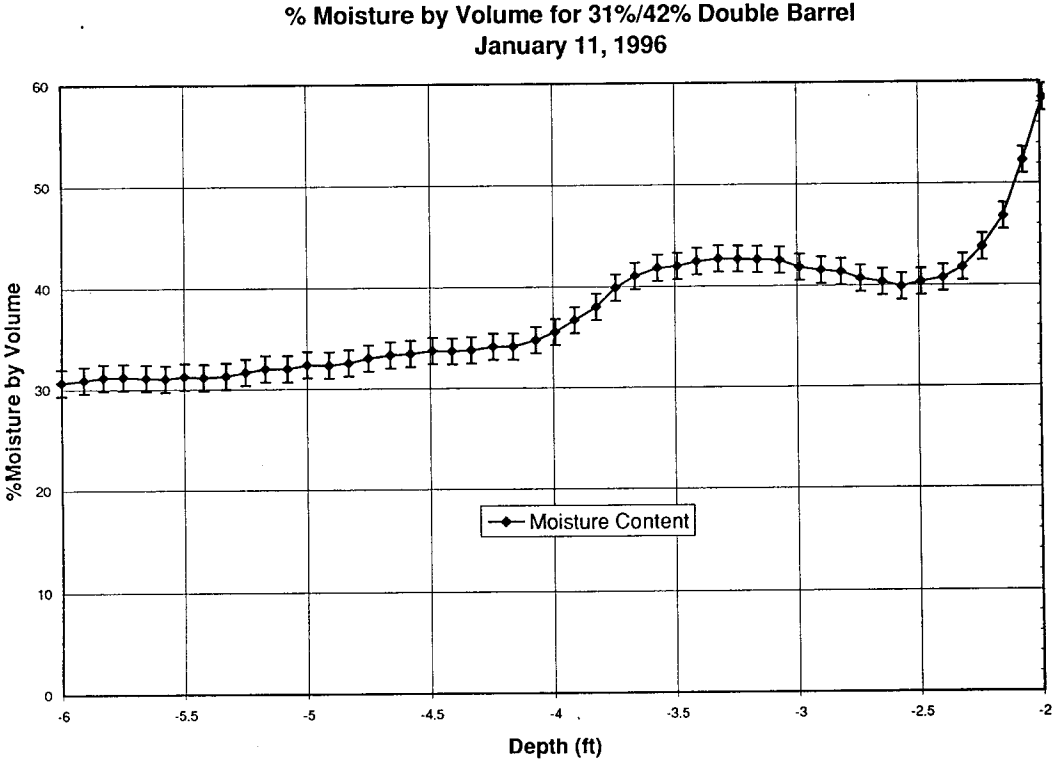


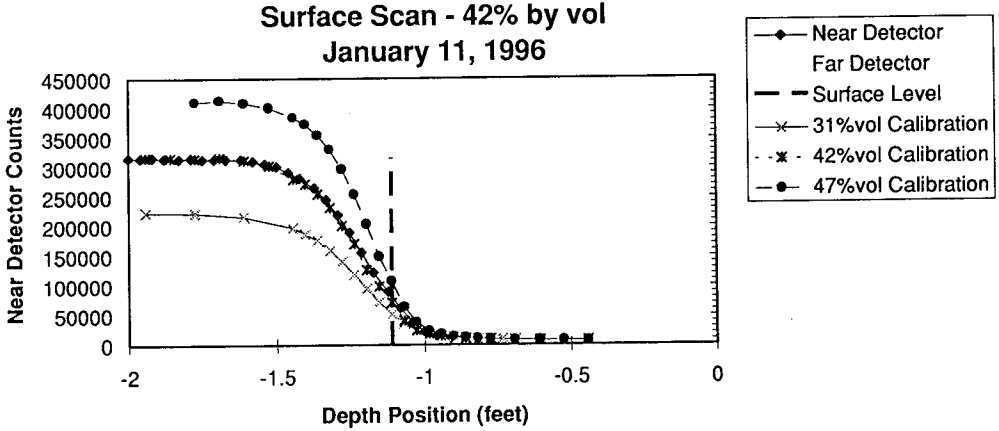
FOR 0°C, FILLED BEAKER WITH DISTILLED WATER, AND ICE CUBES MADE OF DISTILLED WATER (6" INSERTION INTO WATER)

1. 0° C READ 0.3°C
2. AT BOILING, READ 99.6 °C

Victor V Venkatesh 1/10/96

PLATINUM RDT THERMOMETER
CATALOG # G-08497-20
QUOTED ACCURACY: ± 0.5% FULL SCALE ± 1DIGIT (0.1°C)
[±0.1°C FOR -45.0 TO 199.9 °C, ± 0.5% FULL SCALE
±1.0°C FOR 200 TO 400°C, ± 0.5% FULL SCALE]


% Moisture by Volume for 31%/42% Double Barrel
January 11, 1996
%Moisture by Volume
60
50
40
30
20
10
0
-6
-5.5
-5
-4.5
-4
-3.5
-3
-2.5
-2
Depth (ft)
Moisture Content



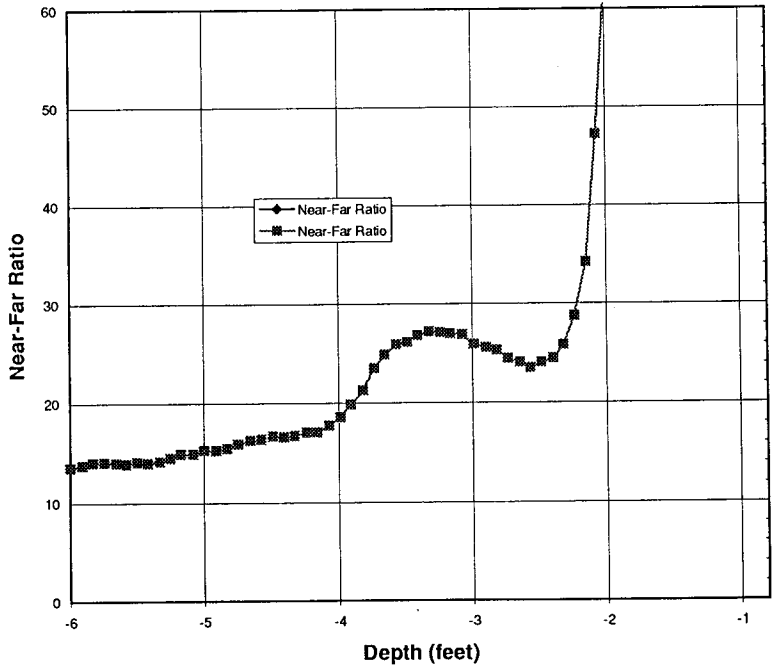
Actual location = -1.125 feet

Calculated location = -1.109 feet

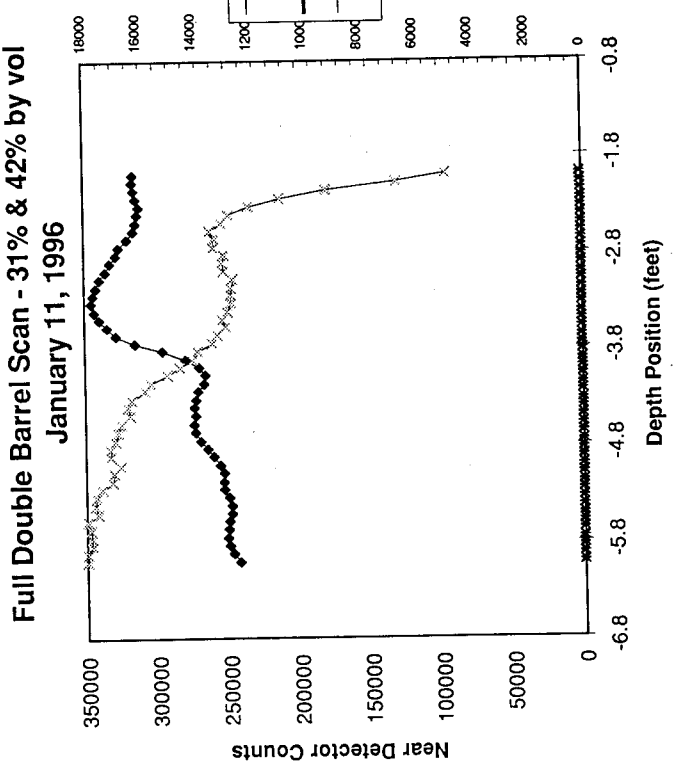
Δ = 0.016 feet = 0.19"

File: ZZ12399Z.062

Full Double Barrel Scan 31% & 42% (top) by volume
January 11, 1996



File: ZZ12399Z.XLS



CAL_DATA.DAT

Calibration Data File						
Created by Calibrate.vi						
New source inserted on: 01/11/96	5:23 PM					
Date/Time code: 2904243790						
Calibration Near/Far: 3536775/5943						
Date	Time	Near	Far	Ratio	% Moisture	Cal OK?
1/11/96	5:23:10 PM	3536775	5943	595.12	289.56	No
1/11/96	5:26:54 PM	3535328	5946	594.57	289.09	Yes
1/11/96	5:29:41 PM	671763	19539	34.38	46.85	No
1/11/96	5:31:36 PM	3528942	6072	581.18	277.72	No
1/11/96	5:35:20 PM	3529347	5879	600.33	294.14	Yes
1/11/96	5:36:39 PM	3527977	6015	586.53	282.2	Yes

ZZ12399Z.062

Date:Thursday, January 11, 1996								
Time:10:20:39 AM								
Tank Number:zz123								
Riser Number:99z								
Surface Elevation:-12								
Operator:Simmons, Tad M.								
Top of Penetrometer:0								
Bottom of Penetrometer:-7								
Time	Depth	Count Tim	Near	Far	Ratio	% Moisture	Temperature	
11:07:04 AM	-2.46	30	348100	4459	78.07	63.13	291.84	
11:23:16 AM	-2.07	30	348100	4459	78.07	63.13	291.84	
11:24:14 AM	-1.9	30	348100	4459	78.07	63.13	291.84	
11:27:26 AM	-6	30	347079	4491	77.28	62.86	18.7	
11:28:05 AM	-5.91	30	347058	4491	77.28	62.86	18.71	
11:28:45 AM	-5.83	30	347040	4492	77.26	62.85	18.67	
11:29:25 AM	-5.75	30	347015	4492	77.25	62.85	18.6	
11:30:04 AM	-5.66	30	346988	4492	77.25	62.85	18.66	
11:33:28 AM	-6	30	242432	17982	13.48	30.62	18.53	
11:34:07 AM	-5.91	30	246817	17952	13.75	30.88	18.66	
11:34:45 AM	-5.83	30	249465	17820	14	31.13	18.55	
11:35:25 AM	-5.75	30	250775	17825	14.07	31.19	18.65	
11:36:03 AM	-5.66	30	249902	17866	13.99	31.11	18.53	
11:36:42 AM	-5.58	30	249432	17974	13.88	31.01	18.64	
11:37:22 AM	-5.5	30	247595	17576	14.09	31.21	18.56	
11:38:01 AM	-5.42	30	247599	17693	13.99	31.12	18.57	
11:38:41 AM	-5.33	30	249494	17637	14.15	31.27	18.6	
11:39:20 AM	-5.25	30	252733	17427	14.5	31.62	18.58	
11:39:59 AM	-5.17	30	253018	17026	14.86	31.97	18.62	
11:40:39 AM	-5.08	30	252690	16985	14.88	31.98	18.61	
11:41:19 AM	-5	30	255427	16744	15.25	32.35	18.63	
11:41:56 AM	-4.91	30	259862	17090	15.21	32.3	18.52	
11:42:36 AM	-4.83	30	264127	17106	15.44	32.53	18.67	
11:43:15 AM	-4.75	30	268897	16920	15.89	32.97	18.55	
11:43:55 AM	-4.66	30	272557	16816	16.21	33.27	18.54	
11:44:34 AM	-4.58	30	273422	16717	16.36	33.41	18.53	
11:45:14 AM	-4.49	30	272063	16352	16.64	33.69	18.54	
11:45:53 AM	-4.41	30	273020	16467	16.58	33.63	18.54	
11:46:32 AM	-4.33	30	271883	16296	16.68	33.73	18.55	
11:47:12 AM	-4.24	30	270306	15842	17.06	34.09	18.63	
11:47:51 AM	-4.16	30	266200	15628	17.03	34.07	18.63	
11:48:31 AM	-4.07	30	265373	14997	17.7	34.7	18.64	
11:49:10 AM	-3.99	30	269522	14551	18.52	35.48	18.54	
11:49:50 AM	-3.91	30	279089	14074	19.83	36.69	18.55	
11:50:29 AM	-3.82	30	295205	13893	21.25	37.97	18.59	
11:51:09 AM	-3.74	30	314500	13399	23.47	39.88	18.67	
11:51:48 AM	-3.66	30	327954	13190	24.86	40.99	18.55	
11:52:28 AM	-3.57	30	334047	12886	25.92	41.79	18.57	
11:53:07 AM	-3.49	30	339592	12998	26.13	41.94	18.57	
11:53:46 AM	-3.41	30	343200	12805	26.8	42.42	18.67	
11:54:26 AM	-3.32	30	345111	12692	27.19	42.69	18.65	
11:55:05 AM	-3.24	30	344161	12688	27.12	42.65	18.6	
11:55:45 AM	-3.16	30	341879	12656	27.01	42.57	18.6	
11:56:24 AM	-3.07	30	339193	12605	26.91	42.5	18.59	
11:57:04 AM	-2.99	30	335100	12939	25.9	41.77	18.6	
11:57:43 AM	-2.9	30	331880	12989	25.55	41.51	18.62	
11:58:23 AM	-2.82	30	327628	12940	25.32	41.34	18.72	
11:59:02 AM	-2.74	30	325389	13309	24.45	40.66	18.61	
11:59:42 AM	-2.65	30	319524	13289	24.04	40.34	18.7	
12:00:21 PM	-2.57	30	315098	13426	23.47	39.87	18.64	
12:01:01 PM	-2.49	30	313155	13028	24.04	40.34	18.71	
12:01:40 PM	-2.4	30	312159	12759	24.47	40.68	18.64	
12:02:20 PM	-2.32	30	310984	12037	25.84	41.73	18.64	
12:02:59 PM	-2.24	30	313034	10892	28.74	43.71	18.73	
12:03:38 PM	-2.15	30	314469	9207	34.16	46.74	18.73	
12:04:18 PM	-2.07	30	315312	6680	47.2	52.28	18.75	
12:04:57 PM	-1.99	30	314875	4886	64.44	58.44	18.62	

YY12399Z.062

Date:Thursday, January 11, 1996								
Time:02:06:25 PM								
Tank Number:yy123								
Riser Number:99z								
Surface Elevation:-12								
Operator:Simmons, Tad M.								
Top of Penetrometer:0								
Bottom of Penetrometer:-7								
Time	Depth	Count Time	Near	Far	Ratio	% Moisture	Temperature	
2:08:22 PM	-6.5	60	479806	36420	13.17	30.32	18.69	
2:09:47 PM	-6.33	60	480328	36607	13.12	30.27	18.74	
2:10:58 PM	-6.17	60	478176	37082	12.9	30.05	18.63	
2:12:06 PM	-6	60	491962	40815	12.05	29.23	18.61	
2:13:16 PM	-5.83	60	501705	37567	13.35	30.5	18.6	
2:14:26 PM	-5.67	60	502906	37408	13.44	30.58	18.59	
2:15:35 PM	-5.5	60	494211	35865	13.78	30.91	18.67	
2:16:45 PM	-5.34	60	498153	35180	14.16	31.28	18.67	
2:17:55 PM	-5.17	60	506328	34359	14.74	31.84	18.54	
2:19:05 PM	-5	60	508867	33850	15.03	32.13	18.55	
2:20:15 PM	-4.84	60	523705	34965	14.98	32.08	18.62	
2:21:26 PM	-4.67	60	542944	34683	15.65	32.74	18.6	
2:22:36 PM	-4.5	60	547605	33690	16.25	33.32	18.59	
2:23:46 PM	-4.34	60	547488	33415	16.38	33.44	18.63	
2:24:56 PM	-4.17	60	533941	31730	16.83	33.87	18.5	
2:26:06 PM	-4	60	532010	29173	18.24	35.21	18.61	
2:27:17 PM	-3.83	60	578566	27527	21.02	37.77	18.57	
2:28:26 PM	-3.67	60	647679	26442	24.49	40.7	18.56	
2:29:36 PM	-3.5	60	676863	26005	26.03	41.87	18.59	
2:30:46 PM	-3.33	60	689788	25827	26.71	42.36	18.58	
2:31:56 PM	-3.17	60	686758	25005	27.46	42.88	18.66	
2:33:06 PM	-3	60	670800	25678	26.12	41.94	18.67	
2:34:16 PM	-2.83	60	660017	25875	25.51	41.48	18.67	
2:35:26 PM	-2.67	60	642979	26454	24.31	40.55	18.6	
2:36:36 PM	-2.5	60	627920	26252	23.92	40.24	18.65	
2:37:46 PM	-2.33	60	622884	25039	24.88	41	18.58	
2:38:56 PM	-2.17	60	625267	19691	31.75	45.48	18.71	
2:40:06 PM	-2	60	631934	12641	49.99	53.3	18.74	
3:00:56 PM	-6.5	60	480768	36458	13.19	30.33	18.69	
3:02:07 PM	-6.33	60	480017	36377	13.2	30.34	18.57	
3:03:17 PM	-6.16	60	477287	35818	13.33	30.47	18.58	
3:04:27 PM	-6	60	482436	35609	13.55	30.69	18.62	
3:06:00 PM	-5.83	60	498978	35541	14.04	31.17	18.63	
3:07:09 PM	-5.67	60	500396	35901	13.94	31.07	18.53	
3:08:27 PM	-5.5	60	496487	35548	13.97	31.09	18.63	
3:09:35 PM	-5.33	60	496981	35219	14.11	31.24	18.53	
3:10:45 PM	-5.16	60	505660	34463	14.67	31.78	18.58	
3:11:55 PM	-5	60	509004	33796	15.06	32.16	18.5	
3:13:05 PM	-4.83	60	520902	33883	15.37	32.46	18.54	
3:14:15 PM	-4.66	60	539061	33992	15.86	32.93	18.62	
3:15:25 PM	-4.5	60	544852	33347	16.34	33.4	18.51	
3:16:35 PM	-4.33	60	542460	32369	16.76	33.8	18.59	
3:17:44 PM	-4.16	60	534695	31496	16.98	34.01	18.61	
3:37:05 PM	-6	30	240434	17877	13.45	30.59	291.72	

YY12399Y.220

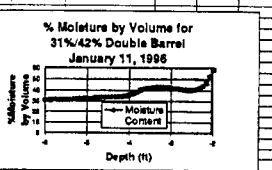
Date:Thursday, January 11, 1996								
Time:04:47:52 PM								
Tank Number:yy123								
Riser Number:99y								
Surface Elevation:-12								
Operator:Simmons, Tad M.								
Top of Penetrometer:0								
Bottom of Penetrometer:-7								
Comments:								
CPMP FINAL ACCEPTANCE TEST								
Time	Depth	Count Tim	Near	Far	Ratio	% Moisture	Temperature	
4:49:29 PM	-2	30	375730	4669	80.47	63.94	19.48	
4:50:09 PM	-1.96	30	374931	4047	92.64	67.98	19.24	
4:50:48 PM	-1.92	30	373820	3642	102.64	71.22	19.29	
4:51:27 PM	-1.87	30	373620	3688	101.31	70.79	19.15	
4:52:05 PM	-1.83	30	375371	3628	103.46	71.48	19.13	
4:52:45 PM	-1.79	30	373693	3357	111.32	73.96	19.11	
4:53:24 PM	-1.75	30	372996	3436	108.56	73.1	19.19	
4:54:02 PM	-1.71	30	372628	3417	109.05	73.25	19.2	
4:54:42 PM	-1.67	30	369683	3649	101.31	70.79	19.06	
4:55:21 PM	-1.63	30	368635	3648	101.05	70.71	19.15	
4:56:00 PM	-1.58	30	367233	3552	103.39	71.46	19.02	
4:56:39 PM	-1.54	30	366417	3667	99.92	70.35	19.05	
4:57:18 PM	-1.5	30	363252	3875	93.74	68.34	19.04	
4:57:56 PM	-1.46	30	357279	3480	102.67	71.23	19.08	
4:58:35 PM	-1.42	30	348039	3475	100.16	70.42	19.02	
4:59:14 PM	-1.38	30	335337	3172	105.72	72.2	19.11	
4:59:53 PM	-1.34	30	315043	3061	102.92	71.31	19.05	
5:00:32 PM	-1.29	30	286286	2759	103.76	71.58	19.15	
5:01:12 PM	-1.25	30	247703	2597	95.38	68.88	19.19	
5:01:51 PM	-1.21	30	209481	2318	90.37	67.24	19.15	
5:02:29 PM	-1.17	30	169807	2009	84.52	65.3	19.09	
5:03:08 PM	-1.13	30	130070	1684	77.24	62.85	19.1	
5:03:47 PM	-1.09	30	91765	1349	68.02	59.69	19.24	
5:04:26 PM	-1.05	30	59079	1030	57.36	55.94	19.21	
5:05:05 PM	-1.01	30	36642	906	40.44	49.61	19.12	
5:05:44 PM	-0.97	30	23566	782	30.14	44.56	19.14	
5:06:23 PM	-0.92	30	16370	733	22.33	38.92	19.29	
5:07:02 PM	-0.88	30	12373	704	17.58	34.58	19.19	
5:07:41 PM	-0.84	30	10099	629	16.06	33.12	19.21	
5:08:20 PM	-0.8	30	8508	664	12.81	29.97	19.3	
5:08:59 PM	-0.76	30	7529	688	10.94	28.16	19.23	
5:09:39 PM	-0.71	30	6763	626	10.8	28.03	19.37	
5:10:17 PM	-0.67	30	6335	709	8.94	26.26	19.39	
5:10:57 PM	-0.63	30	6035	621	9.72	26.99	19.33	
5:11:36 PM	-0.59	30	5634	559	10.08	27.33	19.42	
5:12:14 PM	-0.55	30	5481	564	9.72	26.99	19.46	
5:12:54 PM	-0.51	30	5305	523	10.14	27.4	19.42	
5:13:32 PM	-0.47	30	5091	492	10.35	27.59	19.52	
5:14:10 PM	-0.42	30	4822	378	12.76	29.92	19.53	
5:18:48 PM	-11.45	30	510429	5500	92.81	68.04	292.07	
5:42:41 PM	-11.45	30	510429	5500	92.81	68.04	292.07	

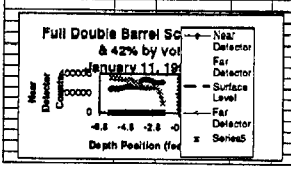
YY12399Z.220

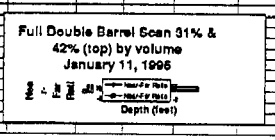
Date:Thursday, January 11, 1996								
Time:03:50:12 PM								
Tank Number:yy123								
Riser Number:99z								
Surface Elevation:-12								
Operator:Simmons, Tad M.								
Top of Penetrometer:0								
Bottom of Penetrometer:-7								
Time	Depth	Count Tim	Near	Far	Ratio	% Moisture	Temperature	
3:51:31 PM	-2	30	315414	6395	49.32	53.06	18.59	
3:52:10 PM	-1.96	30	315702	5238	60.27	56.97	18.68	
3:52:49 PM	-1.92	30	316157	4613	68.54	59.86	18.59	
3:53:28 PM	-1.88	30	315014	4340	72.58	61.26	18.57	
3:54:07 PM	-1.83	30	313811	4375	71.73	60.97	18.57	
3:54:46 PM	-1.79	30	315156	4456	70.73	60.62	18.6	
3:55:25 PM	-1.75	30	313609	4390	71.44	60.87	18.6	
3:56:04 PM	-1.71	30	313111	4569	68.53	59.86	18.6	
3:56:44 PM	-1.67	30	313473	4408	71.11	60.75	18.71	
3:57:23 PM	-1.62	30	313144	4524	69.22	60.1	18.6	
3:58:02 PM	-1.58	30	310440	4524	68.62	59.89	18.7	
3:58:41 PM	-1.54	30	305635	4482	68.19	59.74	18.62	
3:59:20 PM	-1.5	30	300974	4255	70.73	60.62	18.7	
3:59:59 PM	-1.46	30	291442	4197	69.44	60.18	18.72	
4:00:38 PM	-1.42	30	281143	3955	71.09	60.74	18.71	
4:01:17 PM	-1.37	30	264585	3667	72.15	61.11	18.68	
4:01:56 PM	-1.33	30	244381	3307	73.9	61.71	18.69	
4:02:35 PM	-1.29	30	218773	2988	73.22	61.48	18.6	
4:03:14 PM	-1.25	30	189684	2657	71.39	60.85	18.67	
4:03:54 PM	-1.21	30	156079	2251	69.34	60.14	18.7	
4:04:33 PM	-1.17	30	122148	2006	60.89	57.19	18.6	
4:05:11 PM	-1.12	30	90128	1559	57.81	56.1	18.69	
4:05:50 PM	-1.08	30	62248	1269	49.05	52.96	18.55	
4:06:29 PM	-1.04	30	38406	949	40.47	49.62	18.69	
4:07:08 PM	-1	30	22396	704	31.81	45.51	18.61	
4:07:48 PM	-0.96	30	15195	625	24.31	40.56	18.66	
4:08:27 PM	-0.91	30	11650	567	20.55	37.35	18.58	
4:09:06 PM	-0.87	30	9898	540	18.33	35.3	18.71	
4:09:45 PM	-0.83	30	8536	556	15.35	32.44	18.68	
4:10:23 PM	-0.79	30	7619	524	14.54	31.65	18.68	
4:11:02 PM	-0.75	30	6905	525	13.15	30.3	18.7	
4:11:41 PM	-0.71	30	6393	506	12.63	29.8	18.61	
4:12:21 PM	-0.67	30	6075	511	11.89	29.07	18.77	
4:12:59 PM	-0.63	30	5717	523	10.93	28.15	18.76	
4:13:38 PM	-0.58	30	5587	475	11.76	28.95	18.7	
4:14:17 PM	-0.54	30	5235	476	11	28.21	18.81	
4:14:56 PM	-0.5	30	5268	470	11.21	28.42	18.74	
4:15:35 PM	-0.46	30	4866	407	11.96	29.14	18.81	
4:16:14 PM	-0.42	30	4704	387	12.16	29.33	18.92	
4:16:53 PM	-0.38	30	4770	327	14.59	31.7	18.87	
4:17:32 PM	-0.34	30	4692	337	13.92	31.05	18.91	
4:18:11 PM	-0.29	30	4601	271	16.98	34.01	19.02	
4:18:50 PM	-0.25	30	4593	252	18.23	35.2	19.07	
4:19:29 PM	-0.21	30	4600	270	17.04	34.07	18.99	
4:20:08 PM	-0.17	30	4540	244	18.61	35.56	19.12	
4:20:47 PM	-0.13	30	4477	254	17.63	34.63	19.05	
4:21:26 PM	-0.09	30	4382	200	21.91	38.55	19.16	
4:22:05 PM	-0.05	30	4380	210	20.86	37.62	19.22	
4:22:44 PM	-0.01	30	4250	215	19.77	36.64	19.23	
4:46:08 PM	0.07	30	510429	5500	92.81	68.04	292.07	

ZZ123HZ.XLS

Date:Thursday, January 11, 1996		USED FOR PLOTTING %MOISTURE IN FULL SCAN											Plot the Surface Leve
Time:10:29:39 AM												201.2457	0
Tank Number:241SY		MAX NEAR CTS =	246482					Enter True		Location of Surface =	201.2457	201.2457	273482
Riser Number:99Z		MAX NEAR CTS =	279482	Enter Moisture				POSITION of					
Surface Elevation=-18		Half_Height Ce =	257927	Content (%vol) =		42		Half-Height =	201.14				
Operator:Simmons, Ted M.				Date Offset =		0.1666535							
Top of Penetrometer=2													
Bottom of Penetrometer=-7													
									Position of				
Time	Depth	Count Time	Near	Far	Ratio		% Moisture	Temperature	Half-Height	/Counts - Half Counts			
11:53:29 AM	-6		30	242492	17962	13.46	30.62	18.53			18499		
11:34:07 AM	-5.91		30	246817	17962	13.75	30.88	18.56			11110		
11:34:45 AM	-5.83		30	249465	17820	14	31.13	18.59			8462		
11:35:26 AM	-5.75		30	250778	17826	14.07	31.19	18.58			7152		
11:36:03 AM	-5.66		30	249902	17868	13.99	31.11	18.59			8028		
11:36:42 AM	-5.58		30	249452	17974	13.88	31.01	18.64		-7.02898745	8480		
11:37:22 AM	-5.5		30	247986	17576	14.09	31.21	18.56		-5.84995101	10332		
11:38:01 AM	-5.42		30	247599	17663	13.99	31.12	18.57		201.14	10528		
11:38:41 AM	-5.33		30	246484	17827	14.19	31.27	18.6		-4.929488 13	8453		
11:39:20 AM	-5.25		30	252753	17427	14.5	31.52	18.58			5184		
11:39:58 AM	-5.17		30	253018	17029	14.86	31.97	18.62			4909		
11:40:39 AM	-5.08		30	253890	16885	14.98	31.98	18.61			5237		
11:41:18 AM	-5		30	255427	16744	15.25	32.36	18.63			3500		
11:41:58 AM	-4.91		30	256852	17090	15.21	32.3	18.52			-1935		
11:42:36 AM	-4.83		30	264197	17106	15.44	32.53	18.67			-8200		
11:43:15 AM	-4.75		30	264887	16920	15.66	32.97	18.55			-10970		
11:43:56 AM	-4.66		30	272557	16418	16.61	33.27	18.54			-14430		
11:44:34 AM	-4.58		30	273428	16717	16.36	33.41	18.53			-15495		
11:45:14 AM	-4.49		30	277063	16382	16.84	33.99	18.54			-14136		
11:45:53 AM	-4.41		30	279020	16467	16.56	33.63	18.54					
11:46:32 AM	-4.33		30	271859	16296	16.68	33.79	18.58					
11:47:13 AM	-4.24		30	270506	15942	17.06	34.09	18.63					
11:47:51 AM	-4.16		30	264200	15428	17.03	34.07	18.63					
11:48:31 AM	-4.07		30	266373	14997	17.7	34.7	18.64					
11:49:10 AM	-3.99		30	269372	14861	18.12	35.48	18.54					
11:49:50 AM	-3.91		30	279089	14674	19.03	36.69	18.55					
11:50:29 AM	-3.82		30	282905	13893	21.25	37.97	18.59					
11:51:09 AM	-3.74		30	514500	13379	23.47	39.58	18.87					
11:51:48 AM	-3.66		30	327964	13190	24.86	40.99	18.55					
11:52:28 AM	-3.57		30	334047	12886	25.92	41.79	18.57					
11:53:07 AM	-3.49		30	339592	12998	26.13	41.94	18.57					
11:53:48 AM	-3.41		30	343200	12800	26.8	42.42	18.67					
11:54:26 AM	-3.32		30	345111	12892	27.19	42.69	18.66					
11:55:06 AM	-3.24		30	344161	12688	27.12	42.65	18.6					
11:55:45 AM	-3.16		30	341879	12554	27.01	42.57	18.6					
11:56:24 AM	-3.07		30	338153	12405	26.91	42.5	18.59					
11:57:04 AM	-2.99		30	332100	12539	25.9	41.77	18.6					
11:57:43 AM	-2.9		30	331840	12989	25.35	41.31	18.62					
11:58:23 AM	-2.82		30	327526	13540	25.32	41.34	18.72					
11:59:02 AM	-2.74		30	325389	13309	24.45	40.64	18.61					
11:59:42 AM	-2.65		80	319524	13249	24.04	40.34	18.7					
12:00:21 PM	-2.57		80	315099	13426	23.47	39.87	18.64					
12:01:01 PM	-2.49		30	313155	13028	24.04	40.34	18.71					
12:01:40 PM	-2.4		30	312159	12759	24.47	40.64	18.64					
12:02:20 PM	-2.32		30	310844	12037	25.84	41.73	18.64					
12:02:59 PM	-2.24		30	313034	10492	29.74	43.71	18.79					
12:03:38 PM	-2.15		30	314489	9207	34.16	46.74	18.79					
12:04:16 PM	-2.07		30	315212	6660	47.3	56.28	18.76					
12:04:57 PM	-1.99		30	314675	4886	64.44	64.44	18.62					

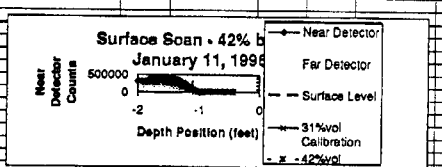






YY12398Z.XLS

Date:Thursday, January 11, 1996		LOCATION OF SURFACE LEVEL									
Time:03:50:12 PM											
Tank Number:yy123		MIN NEAR CTS =	4250					Enter True		Location of Surface =	-1.10922
Riser Number:99z		MAX NEAR CTS =	316157		Enter Moisture			POSITION of			
Surface Elevation:-12		Half_Height Cts =	160203.5		Content (%vol) =	42		Half-Height =	-1.21480939		
Operator:Simmons, Tad M.					Calc Offset =	0.1056939					
Top of Penetrometer:0											
Bottom of Penetrometer:-7											
Time	Depth	Count Time	Near	Far	Ratio	% Moisture	Temperature		Position of Half-Height	Counts - Half_Counts	
3:51:31 PM	-2	30	315414	6395	49.32	53.08	18.59				
3:52:10 PM	-1.96	30	315702	6236	50.27	56.87	18.68			-155496.5	
3:52:48 PM	-1.92	30	316157	4613	68.54	59.88	18.59			-155953.5	
3:53:28 PM	-1.88	30	315014	4340	72.56	61.26	18.57			-154810.5	
3:54:07 PM	-1.83	30	313811	4375	71.73	60.97	18.57			-153607.5	
3:54:48 PM	-1.79	30	315158	4456	70.73	60.62	18.6			-154954.5	
3:55:28 PM	-1.75	30	313609	4380	71.44	60.87	18.6			-153405.5	
3:56:04 PM	-1.71	30	313111	4569	68.53	59.86	18.6			-152907.5	
3:56:44 PM	-1.67	30	313479	4408	71.11	60.75	18.71			-153268.5	
3:57:23 PM	-1.62	30	313144	4524	69.22	60.1	18.6			-152940.5	
3:58:02 PM	-1.58	30	310440	4524	68.62	59.89	18.7			-150236.5	
3:58:41 PM	-1.54	30	305635	4482	68.19	59.74	18.62			-145431.5	
3:59:20 PM	-1.5	30	300674	4255	70.73	60.62	18.7			-140770.5	
3:59:59 PM	-1.46	30	291442	4197	69.44	60.18	18.72		-0.90927193	-131258.5	
4:00:38 PM	-1.42	30	281143	3955	71.09	60.74	18.71		-0.85028644	-120939.5	
4:01:17 PM	-1.37	30	264585	3667	72.15	61.11	18.88		-1.0549004	-104381.5	
4:01:56 PM	-1.33	30	244381	3307	73.9	61.71	18.69		-1.18334488	-84177.5	
4:02:35 PM	-1.29	30	218773	2988	73.22	61.49	18.5			-58569.5	
4:03:14 PM	-1.25	30	189684	2657	71.39	60.85	18.67		-1.20846165	-29480.5	
4:03:54 PM	-1.21	30	156079	2251	69.34	60.14	18.7		-1.21490639	4124.5	
4:04:33 PM	-1.17	30	122148	2008	60.86	57.19	18.6		-1.21468222	38055.5	
4:05:11 PM	-1.12	30	90128	1559	57.81	56.1	18.69		-1.22942458	70075.5	
4:05:50 PM	-1.08	30	62248	1269	49.05	52.96	18.55			97955.5	
4:06:29 PM	-1.04	30	38406	949	40.47	49.62	18.69			121797.5	
4:07:08 PM	-1	30	22396	704	31.81	45.51	18.61			137807.5	
4:07:48 PM	-0.96	30	15185	625	24.31	40.56	18.68			145008.5	
4:08:27 PM	-0.91	30	11850	567	20.55	37.35	18.58			148655.5	
4:09:06 PM	-0.87	30	9898	540	18.33	35.3	18.71				
4:09:45 PM	-0.83	30	8536	556	15.35	32.44	18.68				
4:10:23 PM	-0.79	30	7619	524	14.54	31.85	18.68				
4:11:02 PM	-0.75	30	6905	525	13.15	30.3	18.7				
4:11:41 PM	-0.71	30	6393	506	12.63	29.8	18.81				
4:12:21 PM	-0.67	30	6075	511	11.89	29.07	18.77				
4:12:56 PM	-0.63	30	5717	523	10.93	28.15	18.76				
4:13:34 PM	-0.58	30	5547	475	11.76	28.95	18.7				
4:14:17 PM	-0.54	30	5235	478	11	28.21	18.81				
4:14:56 PM	-0.5	30	5268	470	11.21	28.42	18.74				
4:15:35 PM	-0.46	30	4886	407	11.96	29.14	18.81				
4:16:14 PM	-0.42	30	4704	387	12.16	29.33	18.92				
4:16:53 PM	-0.38	30	4770	327	14.59	31.7	18.87				
4:17:32 PM	-0.34	30	4692	337	13.92	31.05	18.91				
4:18:11 PM	-0.29	30	4601	271	16.98	34.01	19.02				
4:18:50 PM	-0.25	30	4593	252	18.23	35.2	19.07				
4:19:29 PM	-0.21	30	4600	270	17.04	34.07	18.99				
4:20:08 PM	-0.17	30	4540	244	18.61	35.56	19.12				
4:20:47 PM	-0.13	30	4477	254	17.63	34.63	19.05				
4:21:26 PM	-0.09	30	4382	200	21.91	38.55	19.16				
4:22:05 PM	-0.05	30	4380	210	20.86	37.82	19.22				
4:22:44 PM	-0.01	30	4250	215	19.77	36.64	19.23				



YY12396Z.XLS

	0		
	.8157		
	7297		
	178954		
	89126.8		
	.431%vol		
		30	Shifted
	Near	Norm Near	Depth
.333	178954	222927.1	-1.942549
66667	176551	222425.07	-1.775883
-0.5	173454	218280.8	-1.609216
.3333333	158242	197125.68	-1.442549
.91666667	150721	187756.6	-1.400883
-0.25	141055	175715.44	-1.359216
.2083333333	128812	160464.06	-1.317549
-0.166666667	113647	141572.67	-1.275883
-0.125	94919	118242.77	-1.234216
-0.083333333	77172	96134.928	-1.192549
-0.041666667	58443	72810.013	-1.150883
0	42486	52941.978	-1.109216
0.041666667	28755	35820.762	-1.067549
0.083333333	19802	24667.836	-1.025883
0.125	14388	17928.547	-0.984216
0.166666667	11557	14396.62	-0.942549
0.208333333	10086	12559.447	-0.900883
0.25	8964	11166.66	-0.859216
0.291666667	8533	10629.754	-0.817549
0.333333333	8137	10136.447	-0.775883
0.375	7481	9321.7103	-0.734216
0.416666667	7297	9090.0401	-0.692549

MIN NEAR CTS =	6189	7709.779	
MAX NEAR CTS =	253794	316157	
Half Height Cts =	129991.5	161933.4	
Calibration Data for 42%vol			
Time =	30		Shifted
Depth	Near	Norm Near	Depth
-0.633333333	253704	316044.9	-1.942549
-0.75	253562	315806.4	-1.859216
-0.866666667	252877	315014.7	-1.775883
-0.583333333	253794	316157	-1.692549
-0.5	250110	311567.8	-1.609216
-0.416666667	242686	302319.5	-1.525883
-0.333333333	224579	279783.2	-1.442549
-0.291666667	217480	270932.3	-1.400883
-0.25	204448	254686.6	-1.359216
-0.208333333	185562	231158.8	-1.317549
-0.166666667	161407	201105.8	-1.275883
-0.125	136884	170532	-1.234216
-0.083333333	101647	126624	-1.192549
-0.041666667	78410	98922.86	-1.150883
0	57508	71639.03	-1.109216
0.041666667	32864	40945.72	-1.067549
0.083333333	19455	24235.54	-1.025883
0.125	14177	17660.61	-0.984216
0.166666667	11561	14401.8	-0.942549
0.25	8502	10964.85	-0.859216
0.333333333	7771	9680.313	-0.775883
0.5	6545	8153.256	-0.609216
0.666666667	6189	7709.779	-0.442549

MIN NEAR CTS =	5560		
MAX NEAR CTS =	332109		
Half Height Cts =	129091.5		
Calibration Data for 47%vol			
Time =	30		Shifted
Depth	Near	Norm Near	Depth
-0.666666667	329519	410489.4	-1.77588
-0.583333333	332109	413715.8	-1.69255
-0.5	328479	409183.8	-1.60922
-0.416666667	321920	401023.1	-1.52588
-0.333333333	308768	384639.4	-1.44255
-0.291666667	298615	373112.7	-1.40088
-0.25	284956	354817.4	-1.35922
-0.208333333	265001	330085.3	-1.31755
-0.166666667	238568	297189.8	-1.27588
-0.125	203694	253736.8	-1.23422
-0.083333333	163688	203909.9	-1.19255
-0.041666667	119890	149349.7	-1.15088
0	86602	107894.2	-1.10922
0.041666667	51892	64643.06	-1.06755
0.083333333	30969	38578.79	-1.02588
0.125	19487	24275.4	-0.98422
0.166666667	14393	17934.95	-0.94255
0.208333333	11220	13977.01	-0.90088
0.25	9598	11953.96	-0.85922
0.291666667	8547	10647.19	-0.81755
0.333333333	7804	9721.822	-0.77588
0.416666667	7001	8721.306	-0.69255
0.5	6376	7945.221	-0.60922
0.583333333	6116	7621.333	-0.52588
0.666666667	5590	6963.591	-0.44255

APPENDIX B

ref. WHC-SD-WM-ATP-146

Master Test Procedure

RELEASE AUTHORIZATION

Document Number:	WHC-SD-WM-ATP-146, Rev. 0
Document Title:	Prototype Cone Penetrometer Moisture Probe Acceptance Test Procedure
Release Date:	September 14, 1995

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

T.L. Ontiveros — September 14, 1995

4/14/95
Sta. 37 35

ENGINEERING DATA TRA

Page 1 of 1

EDT 140841

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	Characterization Equipment Development	N/A
5. Proj./Prog./Dept./Div.:	6. Cog. Engr.:	7. Purchase Order No.:
N4B41	R.Y. Seda	N/A
8. Originator Remarks:		9. Equip./Component No.:
ETN-94-0027 For Review		N/A
		10. System/Bldg./Facility:
		N/A
11. Receiver Remarks:		12. Major Assm. Dwg. No.:
		N/A
		13. Permit/Permit Application No.:
		N/A
		14. Required Response Date:
		September 11, 1995

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-ATP-146	N/A	0	Prototype Cone Penetrometer Moisture Probe Acceptance Test Procedure	Q	4/1		

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
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(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
4/1	1	Cog.Eng. R.Y. Seda			MSIN H5-09	J. Silko			MSIN S7-54	3	
4/1	1	Cog. Mgr. C.E. Hanson		9/14/95	MSIN H5-09	~~E. D. Bissell~~			MSIN S7-12	4/1	1
4/1	1	QA M.L. McElroy		9-13-95	MSIN S7-07	D. Hamilton		9-13-95	MSIN S7-12	4/1	1
		Safety									
		Env.									
4/1	1	G.N. Boechler		9/5/95	MSIN H5-09						
~~4/3~~		D. Bowser			MSIN S7-54						

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
R.Y. Seda 9-5-95 Signature of EDT Originator — Date	Authorized Representative for Receiving Organization — Date	C.E. Hanson 9/14/95 Cognizant Manager — Date	☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments

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

SUPPORTING DO(...tal Pages 30

2. Title	3. Number	4. Rev No.
Prototype Cone Penetrometer Moisture Probe Acceptance Test Procedure	WHC-SD-WM-ATP-146	0

5. Key Words	6. Author
Cone Penetrometer, Moisture Probe, Acceptance Test Procedure	Name: R.Y. Seda Signature Organization/Charge Code N4B41

7. Abstract

This procedure shall be used for acceptance testing of the prototype cone penetrometer moisture probe instrument. The prototype cone penetrometer moisture probe includes all the necessary hardware to operate the system except for the hardware/software required to operate the automated production model.

8. RELEASE STAMP

OFFICIAL RELEASE
BY WHC
DATE 9/14/95
Sta. 37 35

Date Received by IRA: 9/14/95

INFORMATION RELEASE REC

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- ☐ Summary
- ☐ Abstract
- ☐ Visual Aid
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- ☐ Software
- ☐ Other

B. Document ID Number (include rev., vol., etc.): WHC-SD-WM-ATP-146 Rev 0

C. List attachments (i.e., copyright permission, copyright transfer)

D. Document Title: Prototype Cone Penetrometer Moisture Probe Acceptance Test Procedure

E. WHC Project or Program: N4B41

F. New or novel (patentable) subject matter? [N] No or Yes
If "Yes", has disclosure been submitted by WHC?
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Will material be handed out? ☐ No or Yes

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Applied Technology-Export Controlled Information or International Program	☐			☐
Other	☐			☐
Other	☐			☐

6. Applied Technology Material Referenced
☒ No ☐ Yes

7. Release Level
☒ Public ☐ Limited Distribution

8. Author/Requestor
R. Seda (Print and Sign) 9/14/95 Date

9. Responsible Manager
C.E. Hanson (Print and Sign) 9/14/95 Date

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Date Canceled

Date Disapproved

ref: WHC-SD-WM-ATP-146 Rev 0
Document ID Number

markings to be affixed or removed.

10. LEGENDS/NOTICES/MARKINGS (Required b

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12. ADDITIONAL INFORMATION/COMMENTS:

PROTOTYPE CONE PENETROMETER MOISTURE PROBE ACCEPTANCE TEST PROCEDURE

September 1995

CONTENTS

Appendixes

**PROTOTYPE CPMP INSTRUMENT
ACCEPTANCE TEST PROCEDURE**

1.0 INTRODUCTION

1.1 PURPOSE

This procedure shall be used for acceptance testing of the prototype cone penetrometer moisture probe instrument. The prototype cone penetrometer moisture probe includes all the necessary hardware to operate the system except for the hardware/software required to operate the automated production model. The prototype hardware includes the probe and detectors, the winch system [not including the computer controlled motor drive system], the NIM bin electronics, the thermistor, the laptop computer and I/O interfaces. The prototype does not include the hardware and software required to calibrate the probe nor all the software required to scan the waste, and acquire and process the data during field operation. The prototype test will cover the function of all the components, and demonstrate data flow through the system, winch function, and detector and temperature sensor sub-system function.

The production acceptance test procedure is covered under WHC-SD-WM-ATP-145, which will demonstrate overall system function, including the Labview software and automatic scanning features of the system. Functional criteria specified in WHC-SD-WM-FDC-047 will be verified in the production acceptance test procedure.

1.2 SCOPE

Completion of this test will verify that the mechanical and electrical features of the Prototype CPMP instrument are operating as designed. The scope of the acceptance test is as follows:

* Basic equipment functions and mechanical interfaces will be verified.
* Performance of electronic components will be demonstrated.
* The winch system will be demonstrated.
* The probe detectors will be demonstrated

2.0 APPLICABLE/REQUIRED DOCUMENTS

SAIC drawings

544200, Moisture Probe Assembly, CPMP

544100, Cone Penetrometer Deployment System, CPMP

3.0 TEST CONTROLS

3.1 RESPONSIBILITIES

3.1.1 Project Engineer

Nick Boechler
Rosa Seda

Note: Either project engineer may perform test performer activities.

* Overall responsibilities for maintaining and controlling testing.
* Provide liaison with facility used for testing.
* Provide liaison with Quality Assurance (QA) for testing activities as required.
* Approve test procedure and final report.
* Overall testing responsibilities and assignment of responsibilities.
* Review test results and prepare/issue test report.
* Monitor testing for compliance with the test procedures.

3.1.2 Test Performer [as approved by the project engineer(s)]

* Perform test in accordance with approved test procedure.
* Maintain a file of documented information pertinent to the tests.

3.1.3 Quality Engineer: M. L. McElroy

* Review and approve the test procedure and test report.

* Ensure that quality requirements are defined and satisfied for the test.

* Witness conductance of acceptance testing as required. Testing may proceed per this procedure without a QA engineer present.

3.1.4 Quality Control Inspectors

* Monitor test activities and provide signature verification, as required.

* The QA engineer or project engineer may request QC witness of testing not specifically required in the test procedure.

3.1.5 The test performers and project engineers for this test procedure shall be documented in the acceptance test report.

3.2 TEST DATA

3.2.1 All test data, pertinent observations, and off-normal events shall be recorded on the test procedure, section 6.0 of this ATP. If additional space is required, the data shall be recorded on an observation/results data sheet (provided in Appendix A) or equivalent.

3.2.2 Data recorded on the observation/results data sheets shall be formally documented in the ATR.

3.2.3 The data recorded during the ~~friction~~ test shall be released in the ATR as raw or reduced data.

3.2.4 Changes to the test procedure are permitted. The test performer shall red ink changes with the concurrence of the WHC project engineer. Approvals will be documented by the WHC project engineer's initials on the redlined item. Lack of immediate redline approval does not constitute a test hold.

3.3 TEST CONFIGURATION

3.3.1 The drawings and engineering documents which establish the process equipment test configuration are listed in Section 2.0.

3.3.2 Additional documents required to perform, document, or validate a test (sketches, calibration sheets, etc.) will be referenced in the ATR.

3.4 PROCEDURE CONTROL

3.4.1 A controlled test procedure package shall be used for testing and shall include the following:

* A single copy of this test procedure.

* Other information directly applicable to testing which are required.

* Functional Block Diagram, Fig. 3-1.

3.5 RETEST PROCEDURE CONTROL

3.5.1 If retest is required, additional copies of applicable procedure sections or data sheets of this test procedure may be used or new procedures may be used.

3.5.2 The addition of procedure sections to be used for retest shall be added to the test procedure package, concurred with by the WHC QA representative, and formally released in the ATR.

3.5.3 Minor procedure changes such as editorial changes to a step, clarification of a step or steps, elimination or addition of a step or limited sequential changes of steps, shall be noted in the procedure by redline entries and noted in the exceptions sheet located in Appendix B giving the reason for the change.

3.6 OPEN ITEMS

3.6.1 Items and actions identified during the conduct of testing which require future resolution/completion shall be noted on comment sheets. Identified open items shall subsequently be entered into the test completion report to assure final close-out.

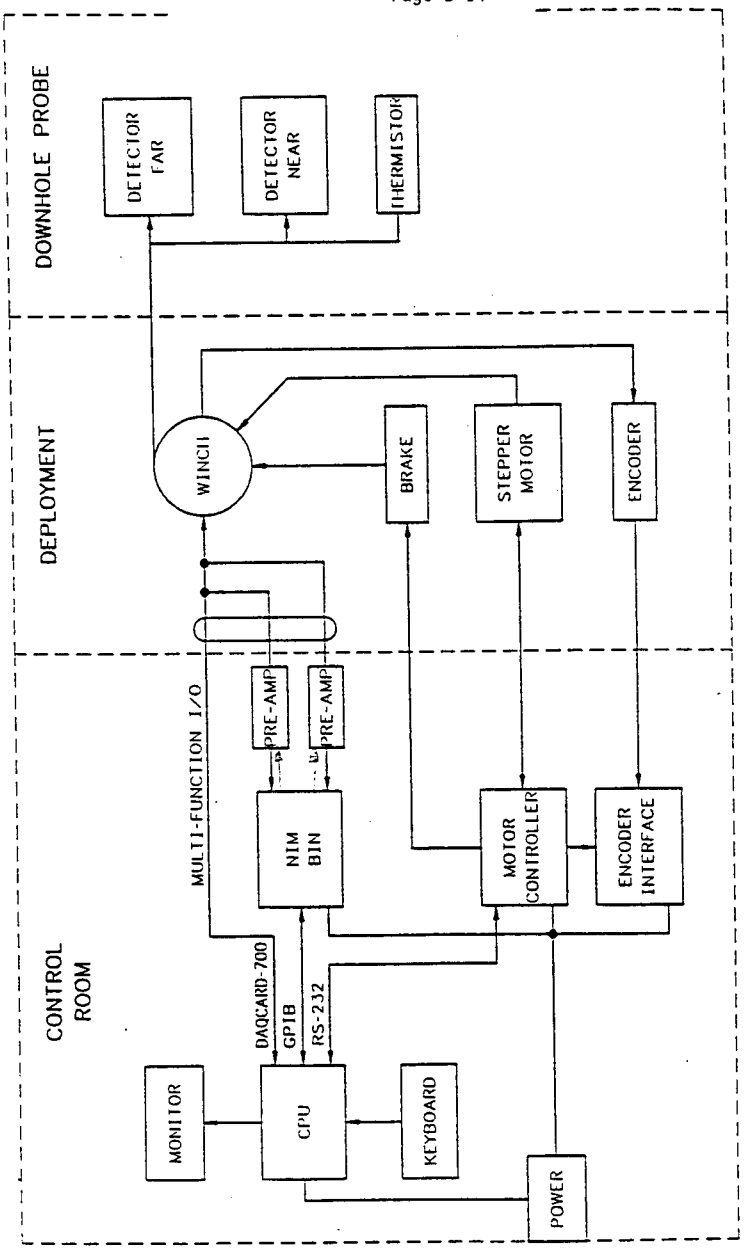


FIGURE 3-1 CPMP FUNCTIONAL BLOCK DIAGRAM

4.0 TEST FACILITY

Acceptance testing of the Prototype CPMP instrument will be conducted in the SAIC Campus Point E building high bay, San Diego, CA. After acceptance testing has been completed and approved, the accepted assemblies will be held at the SAIC facility until completion of the production unit test.

5.0 SAFETY

* Only the project engineers and/or their approved personnel shall operate the Prototype CPMP during performance of this ATP.

* Test personnel shall be briefed, prior to test performance, on the hazards unique to the Prototype CPMP equipment.

* Science Applications International Corporation (SAIC) is responsible for safety during conduction of the acceptance test.

6.0 TEST PROCEDURE

6.1 PREREQUISITES

Perform functional testing as follows. Record additional observations on Prototype CPMP functional testing observation sheets (Appendix A), as required. Successful completion of a given test is documented by project engineer signature on the master data sheet.

Completed: _____ 9/29/05
Test Performer Date

6.2 VISUAL EXAMINATIONS AND MEASUREMENTS

6.2.1 Electronics and Computer Equipment

Review the following equipment and verify identification. Note any discrepancies in Appendix A.

6.2.2 Computer

Manufacturer: Ascentia
Model No. 910N, 4175 CT10
Serial No. 225DNW011916

GPIB Interface
Manufacturer: Natl Instr.
Model No. PCMCIA-GPIB
Serial No. 4063

Multifunctional I/O
Manufacturer: Natl. Instrs
Model No. DAQ card-700
Serial No. 3700

RS-232 Interface
Manufacturer:
Model No. Built into computers
Serial No. (see computer)

Completed: [signature] 9/27/95
Test Performer Date

6.2.3 NIM Bin Electronics

Preamps
Manufacturer: Tenelec
Model No. TC 175
Serial No. 2519 & 2520, Rev. 23

Amplifier
Manufacturer: Tenelec
Model No. TC 246
Serial No. 3614 & 3616

Delay Amplifier
Manufacturer: Tenelec
Model No. TC 215
Serial No. 207

Dual counter and timer
Manufacturer: Tenelec
Model No. TC 512
Serial No. 317

High Voltage Power Supply
Manufacturer: Tenelec
Model No. TC 952
Serial No. 596

NIM Bin
Manufacturer: Tenelec
Model No. TB 3
Serial No. 7889

Completed: [signature] Test Performer 9/27/95 Date

6.2.4 Detectors

Neutron detectors
Manufacturer: TGM
P/n10EB20/13.
Serial No. Nwr-9504-63, FAR-9451-40

Thermistor
Manufacturer: Newark Electronics
Model. No. 29F204.
Serial No. NA
Calibrated: Y (Y/N) Calibration Date: Manf. Data

Completed: [signature] Test Performer 9/27/95 Date

6.2.5 Source/Container

Manufacturer: Frontier Technology, M/N Z10
Serial No. FTC-CF-3570

Type A DOT approved shipping container
Manufacturer: Frontier Technology
M/N 50240,
Serial No. 91.
Completed: [signature] Test Performer 9/27/95 Date

6.2.6 Probe Body

Manufacturer: SAIC
Drawing No.: 544200, Moisture Probe Assembly, CPMP
Serial No. 1

Completed: [signature] Test Performer 9/27/95 Date

6.2.7 Winch

Manufacturer: SAIC
Drawing No.: 544100, Cone Penetrometer Deployment System, CPMP Serial No. 1

Including:
Reduction gear
Manufacturer: Bayside
Model No.: RA 90-100
Serial No. 2197

Brake
Manufacturer: Warner
Model ~~Drawing~~ No.: ERS-49
Part ~~Serial~~ No. ~~1~~ 3155-170-001

Completed: DPJohnson — Test Performer — 9/21/95 — Date

6.3 ELECTRICAL SYSTEM PREOPERATIONAL CHECKOUT

6.3.1 Wiring Check

Verify the hook up of the NIM bin electronics, detectors, motor/encoder controllers and the computer interface using the system electronics block diagram, Fig. 6-1.

Completed: DPJohnson — Test Performer — 9/21/95 — Date

see exceptions — QC Signature — Date

6.4 SYSTEM STARTUP TEST

6.4.1 Computer start-up

Turn-on computer and display Lab View Front Screen.

Completed: DPJohnson — Test Performer — 9/21/95 — Date

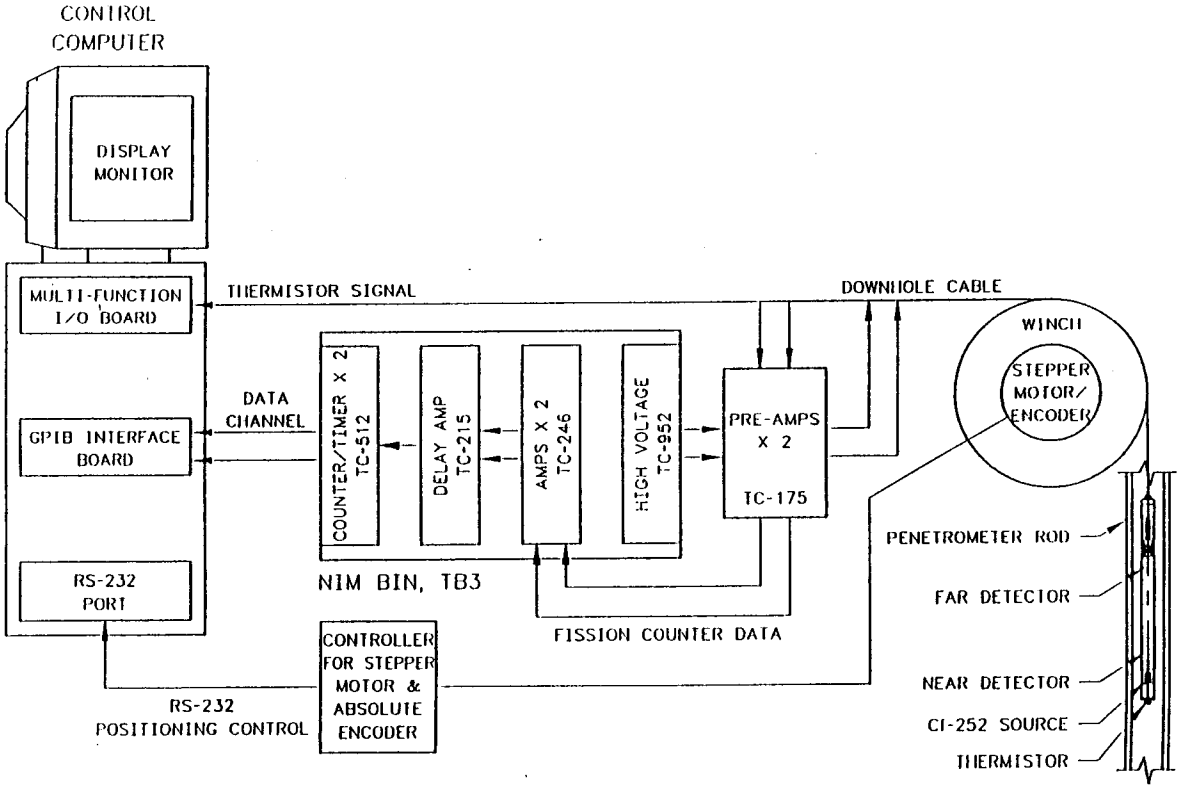


FIGURE 6-1 MOISTURE PROBE ELECTRONIC INTERFACE BLOCK DIAGRAM

6.5 OPERATIONAL TESTS

6.5.1 Motor Tests

Operate drum a minimum or 3 revolutions per test and observe for any anomalies. Load the cable with a simulated force similar to the moisture sensor weight (5 lbs for moisture sensor and 0.1 lbs/ft for cable).

Sequence

1 Rotate the drum in the clock wise direction utilizing the computer control on slow speed. 1 ½"/s

Record Rotation speed 1 ½"/s

3 Rotate the drum in the clock wise direction utilizing the computer control on high speed.

Record rotation speed 9"/s

2 Rotate the drum in the counter clock wise direction utilizing the computer control on slow speed.

Record rotation speed 1 ½"/s

4 Rotate the drum in the counter clock wise direction utilizing the computer control on high speed.

Record rotation speed 9"/s

Completed: _____ 9/21/95
Test Performer Date

6.5.2 MOTOR CONTROLLER TESTS

Operate drum a minimum of one half revolution for the following tests.

Load the cable with a simulated force similar to the moisture sensor weight (5 lbs for moisture sensor and 0.1 lbs/ft for cable).

Rotate the drum in the clock wise direction utilizing the computer control in a timed (start delay start delay) mode.

Record delay time 10 sec.

Record distance cable traveled 4'-10"

Record number of intervals 29 (2"/interval) 3335/27 = 11.55

Record rate of rotation 6"/sec.

Rotate the drum in the counter clock wise direction utilizing the computer control in a timed (start delay start delay) mode.

Record delay time 10 sec.

Record distance cable traveled 4'-10" 330/29 = 11.4 s/inch

Record number of intervals 29 (2"/interval)

Record rate of rotation 2"/sec.

Completed: [signature] Test Performer 9/21/95 Date

6.5.3 WINCH TESTS

Position a simulated cone penetrometer pipe in the center and approximately three feet from the drum and thread the cable through it. Load cable with simulated sensor package load (5 lbs for moisture sensor and 0.1 lbs/ft for cable).

Repeat the following steps a minimum of three times.

With the drum fully loaded or with the sensor in it's simulated stored position, reel out 65 feet of cable.

Record length 65' 9"/s

Record time 83 sec.

Record rate of travel 9.4"/sec.

With the drum fully unloaded or with the sensor in it's simulated lowered position, reel in 65 feet of cable.

Record length 65'

Record time 83 sec.

Record rate of travel 9.4"/sec.

With the drum fully loaded or with the sensor in it's simulated stored position, reel out 65 feet of cable.

Record length 65'

Record time 83 sec.

Record rate of travel 9.4 "/sec.

With the drum fully unloaded or with the sensor in it's simulated lowered position, reel in 65 feet of cable.

Record length 65'

Record time 83 sec

Record rate of travel 9.4 "/sec.

With the drum fully loaded or with the sensor in it's simulated stored position, reel out 65 feet of cable.

Record length 65'

Record time 83 sec.

Record rate of travel 9.4 "/sec.

With the drum fully unloaded or with the sensor in it's simulated lowered position, reel in 65 feet of cable.

Record length 65'

Record time 83 sec.

Record rate of travel 9.4"/sec.

Completed: DR Johnson 9/25/95
Test Performer Date

6.6 MEASUREMENTS

6.6.1 Sensor Tests

Lower the Moisture Sensor assembly (including source) into six different waste simulants. While

the sensor is in the waste simulant, take timed count readings. Plot the Near\Far ratio against the water % by weight and verify a linear curve exists. Reference Phase 1 final report (Figure 20), dated March 20, 1995.

Note: 1) This can be a hand operation and without the winch.
2) Counts and ratios shall be recorded and controlled from the computer

Barrel 1

Record % water	100%
Record count time	10 sec
Record far count	1,126 cts. *
Record near count	195,406 cts. *
Record near\far ratio	173.5

Barrel 2

Record % water	47%
Record count time	10 sec
Record far count	1,909 cts. *
Record near count	143,864 cts *
Record near\far ratio	75.4

* avg. 3 measurements

Barrel 3

Record % water	31%
Record count time	10sec.
Record far count	2,682 cts *
Record near count	117,529 cts *
Record near\far ratio	43.8

Barrel 4

Record % water	25%
Record count time	10sec.
Record far count	3,312 cts. *
Record near count	95,516 cts *
Record near\far ratio	28.8

Barrel 5

Record % water	19%
Record count time	10sec
Record far count	4172 cts. *
Record near count	97,460 cts. *
Record near\far ratio	23.4

Barrel 6

Record % water	14%
Record count time	10sec.
Record far count	5,635 cts. *
Record near count	67,593 cts. *
Record near\far ratio	12.0

* avg. 3 measurements

Completed: _____ 9/21/95
Test Performer Date

6.6.2 Temperature Display

Display and record output from the thermistor on the computer screen at two temperatures.

Temperature 1 22°C Temperature 2 36.0 °C

Completed: _____ 9/21/95
Test Performer Date

6.7 SOFTWARE

6.7.1 Lab View/Windows Software

Record the Version of Lab View being used for system development so that WHC can verify their use license. Version 3.1.1.

Verify the Window PC software being used and supply to ARA as interface information for their computer system design.

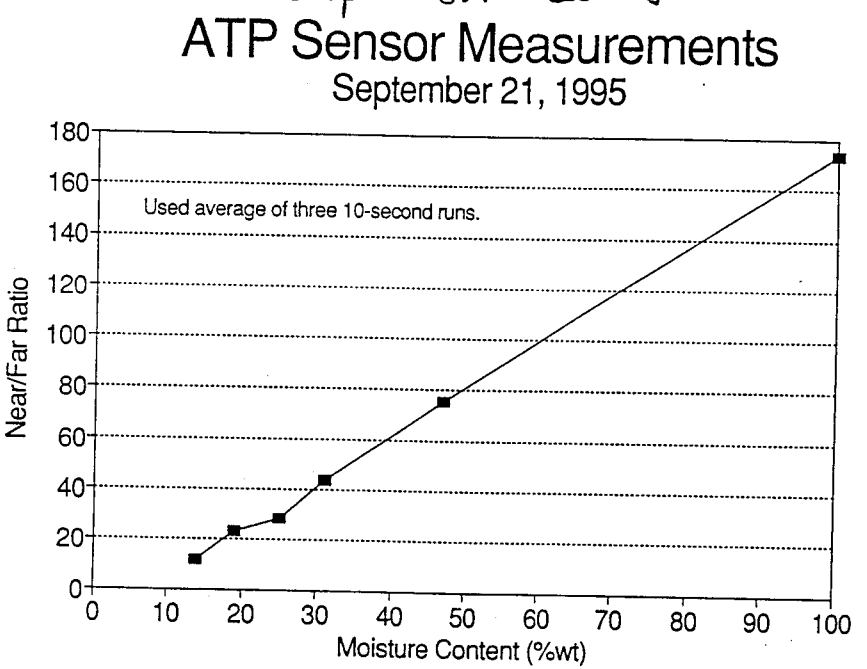
Windows Version 3.1

Completed: _____ 9/21/95
Test Performer Date

APPENDIX A

**PROTOTYPE CPMP FUNCTIONAL TESTING
OBSERVATION/RESULTS SHEET
COMMENT SHEET**

Step 6.6.1 – results



PROTOTYPE CPMP FUNCTIONAL TESTING
OBSERVATION/RESULTS SHEET

TEST STEP	OBSERVATION/RESULTS	INITIALS	DATE
3.2.3	delete "friction"	[illegible] ATP	9/21/95
6.3.1	delete QC sign-off	[illegible] ATP	9/21/95
6.5.2	@ 2 sec. count times	[illegible] ATP	9/21/95
	processing delays were		
	encountered @ 1 sec.		
	no delays were encountered		
P			

PROTOTYPE CPMP FUNCTIONAL TESTING
COMMENT SHEET

ITEM	DESCRIPTION	RESOLUTION	INITIALS	DATE

APPENDIX B

Exception to Acceptance Test

EXCEPTION TO PROTOTYPE CPMP ACCEPTANCE TEST

EXCEPTIONS				CORRECTION APPROVAL		
PARAGRAPH NO.	DATE	DESCRIPTION	RESOLUTION/DISPOSITION	ORGANIZATION	INITIALS	DATE
Pg 24	9/21	Change QA for DOE signature for final approval	DOE approval equivalent to QA	Engineering	[signature]	9/21/95

TEST APPROVED - NO EXCEPTIONS:

[signature] 9-21-95
PROJECT ENGINEER DATE

[signature] 09-21-95
~~QUALITY ASSURANCE~~ D.O.E. DATE

[signature] 9/21/95
TEST WITNESS DATE

TEST APPROVED - WITH EXCEPTIONS:

PROJECT ENGINEER DATE

QUALITY ASSURANCE DATE

TEST WITNESS DATE

APPENDIX C

Prototype CPMP Drawings

PARTS LIST

SAIC Science Applications International Corporation

PL544200 REV A

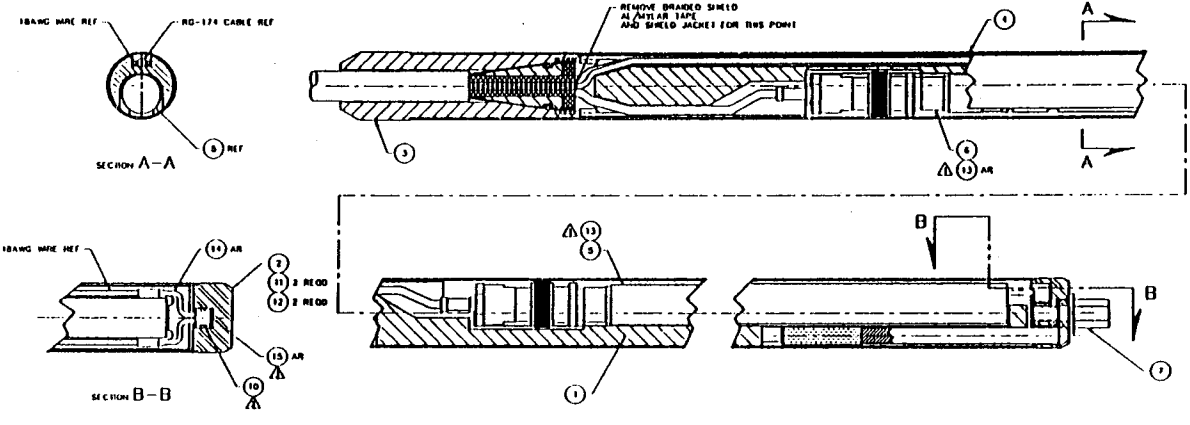
TITLE MOISTURE PROBE ASSEMBLY CPMPS

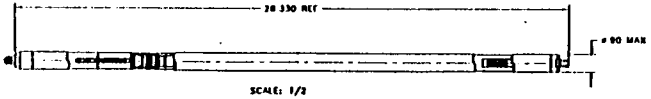
SHEET 1 OF 1

ITEM NO.	QTY REQ'D -1				CAGE CODE	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	MATERIAL/SPEC/ REFERENCE DESIGNATION
1	1					544201-1	HOLDER, MOISTURE PROBE	SAIC
2	1					544202-1	END CAP - BOTTOM	SAIC
3	1					544205-1	CONNECTOR, CABLE	SAIC
4	1					544206-1	COVER, MOISTURE PROBE	SAIC
5	1					544207-1	FISSION COUNTER	SAIC
6	1					544207-2	FISSION COUNTER	SAIC
7	1					544210-1	SOURCE HOLDER ASSEMBLY	SAIC
8								
9								
10	1					AD592CN	TEMPERATURE TRANSDUCER	ANALOG DEVICES
11	2					#4-40 x .38 LG	SCREW, SOCKET HEAD CAP	SST, ANY GRADE
12	2					#4, .202 OD MAX	WASHER, SPLIT LOCK	SST, ANY GRADE
13	AR					SCOTCH SUPER 33+	VINYL ELECTRICAL TAPE, .006 THK	3M
14	AR					FPS-012	HEAT SHRINK, .093 TO .187 ID	SPC TECHNOLOGY OR EQUIV.
15	AR					TYPE 44	HEAT SINK COMPOUND	GC ELECTRONICS
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								

NOTES:

1. WRAP ONE LAYER WHITE ELECTRICAL TAPE (ITEM 13) TO ITEM 5
2. TRIM ITEM 7 ON TEMPERATURE TRANSDUCER (ITEM 10) PRIOR TO INSTALLATION
3. PLACE TEMPERATURE TRANSDUCER (ITEM 10) TO END CAP (ITEM 2) WITH HEAT SINK COMPOUND (ITEM 15) WHERE SHOWN





SEE SEPARATE PARTS LIST PL544200

SAIC Science Applications International Corporation	MOISTURE PROBE ASSEMBLY CPMPS		
APPLICATION	D	60695	544200 A

PARTS LIST

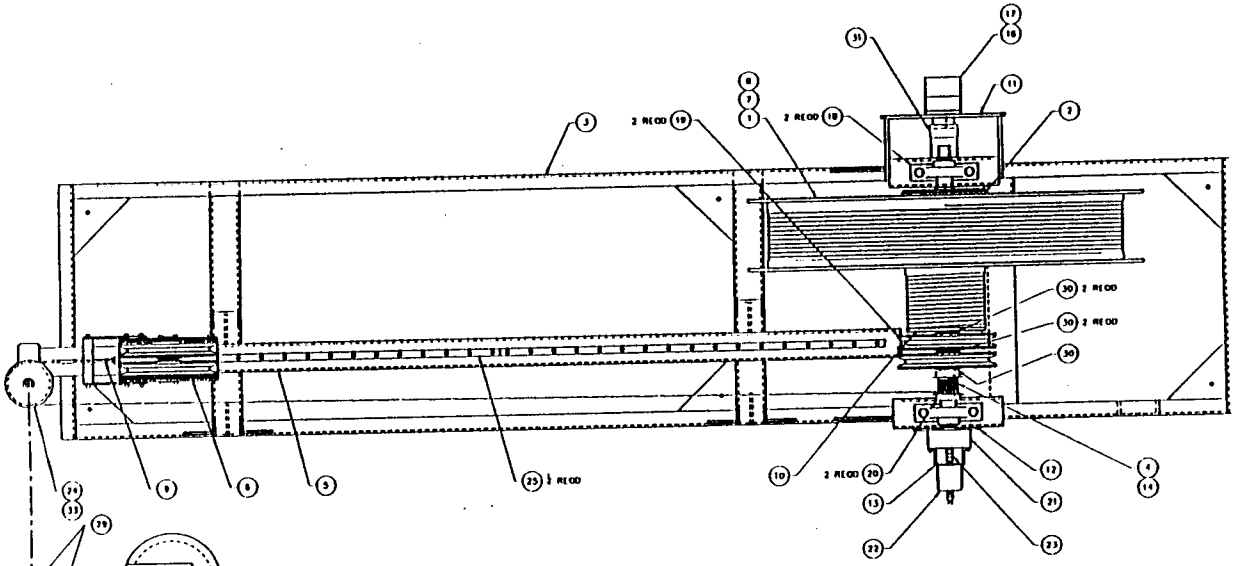
Science Applications International Corporation

PL544100 REV A

SHEET 1 OF 1

TITLE DEPLOYMENT SYSTEM ASSEMBLY CPMPS

ITEM NO.	QTY REQ'D -1				CAGE CODE	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	MATERIAL/SPEC/ REFERENCE DESIGNATION
1	1					544101-1	REEL, WELDMENT	SAIC
2	1					544102-1	SHAFT, WELDMENT	SAIC
3	1					544103-1	WELDMENT, FRAME	SAIC
4	1					544104-1	REEL, TAKE-UP	SAIC
5	1					544105-1	MOUNT, RAIL	SAIC
6	1					544106-1	TROLLEY ASSEMBLY	SAIC
7	2					544110-1	JAW, CABLE CLAMP	SAIC
8	2					544111-1	WEDGE, CABLE CLAMP	SAIC
9	1					544112-1	CABLE ASSEMBLY	SAIC
10	1					544113-1	HUB	SAIC
11	1					544114-1	MOTOR MOUNT	SAIC
12	1					544115-1	BRAKE MOUNT	SAIC
13	1					544118-1	MOUNT, ENCODER	SAIC
14	1					544119-1	CABLE STOP	SAIC
15								
16	1					SX83-135-A	MOTOR, STEPPER	COMPUMOTOR
17	1					RA90-100	GEARHEAD	BAYSIDE
18	2					VAK1-3/8"	BEARING, PILLOW BLOCK	FAFNIR
19	2					473730	SHEAVE	McKISSICK
20	2					1C150S	COLLAR, SHAFT (1.5 DIA)	CLIMAX
21	1					BR-3-B (24 VDC)	BRAKE, ELECTRIC	LINTECH
22	1					AR-C	ENCODER, ABSOLUTE	COMPUMOTOR
23	1					6041S-2	COUPLING, BELLOWS	BERG
24	1					LP0438	PULLEY (WITH RB506950 BRG)	SAVA - INDUSTRIES
25	1					HSR20CA255M+1000LM	SQUARE RAILS & 2 MED LOAD BRGS	THK
26								
27								
28	1							
29	2					A7B7-S202002	THRUST WASHER (.63 ID)	STERLING
30	5					A7B7-S484004	THRUST WASHER (1.5 ID)	STERLING
31	1					KM-80/102	COUPLING	GAM/JACOB
32								
33	1					5/8 DIA x 5/8 LONG	SHOULDER SCREW	SST, ANY GRADE



SEE SEPARATED PARTS LIST PL544100

SAIC Science Applications International Corporation	DEPLOYMENT SYSTEM ASSEMBLY CONE PENETROMETER DEPLOYMENT SYSTEM CPMPS		
	D 60695	544100	A

APPENDIX C

DESIGN CRITERIA MATRIX

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
1	1.3	The moisture sensor package shall fit within the cone penetrometer 1 inch (2.5 cm) inner diameter rod and interface with the cone penetrometer equipment. The sensor will be lowered into the rod after all cables associated with the cone penetrometer system have been removed	6.9.1					TEST
2	1.3	The system shall be designed to be mounted on the top of the cone penetrometer or installed on the back of a full sized pick up truck and shielded from the weather. The pick up truck system shall interface with Multifunctional Instrument trees and Core Sample Truck Drill String					X	ANALYSIS

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
3	2.1	The moisture sensor shall indicate water level, moisture content, surface moisture and temperature as a function of tank depth. Water level shall be measured within + 1/4 inch (.64 cm). Moisture content and surface moisture shall be measured within: ± 3% water by weight for 0-25% moisture content by weight ± 5% water by weight for 25-50% moisture content by weight	6.12.6 6.9.13 6.9.3 6.10.7					TEST
4	2.1	Temperature sensor shall measure temperatures between 50 and 212 F (10 and 100 °C). A + 2 °F (1.1 °C) accuracy shall be required for these sensors. These temperatures shall be measured within the rod and shall be compensated for the heat transfer associated with the rod/waste interface.	6.7.6 6.7.8					TEST

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
5	3.1.1	The moisture sensor system shall be equipped with computer data storage and retrieval capabilities. The data acquisition system shall be capable of acquiring and logging moisture content, depth, water level and temperature. The data shall be recorded as a function of depth versus moisture content, depth versus water level and depth versus temperature.	6.12.6 6.9.13 6.9.3 6.10.7					TEST

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
6	3.1.1	The data acquisition system shall contain the following hardware:						
		1) One operator station.					X	VISUAL
		2) Input/Output channels to accommodate moisture probe sensors, thermistor, and positioning control.					X	ANALYSIS
		3) A data acquisition computer shall have a minimum of 200 Mb hard drive and a 1.4 Mb floppy disk.	6.8.6				X	ANALYSIS
		4) The data acquisition system shall survive the conditions listed in section 3.1.3. The computer equipment shall be protected against dust.	6.12.12					TEST
		5) The data acquisition system shall incorporate calibration software.					X	ANALYSIS
		6) The data acquisition system shall provide real time graphical and numerical displays of data, available during tank scanning.				SECT 8 & 11	X	ANALYSIS TEST
		7) The data acquisition system shall be capable						

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
7	3.1.2	The system shall be equipped to calibrate the probe (moisture calibration) in an automated fashion before each usage. Instrument calibration software for the moisture sensor shall be provided. These sensors include two B-10 lined neutron probes and a temperature probe. The software shall be compatible with the sensors and shall interface with the data acquisition software.	6.8.6 6.8.9					TEST
8	3.1.2	The sensor calibration system shall be capable of generating report-quality instrumentation calibration plots. Real time graphical and numerical display of instrumentation and calibration values shall be provided. Time-stamped comments or notes in the form of a daily ASCII file to be used as a daily operator's log shall be recorded. Calibration data shall automatically store data into a unique data file.	6.8.11					TEST

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
9	3.1.2	Pre-installation calibration for the temperature thermocouple shall be a one point temperature verification. Initial thermocouple calibration shall be verified by three different temperature points	6.7.8					TEST
10	3.1.2	The system shall be capable of calibrating itself to other deployment piping (e.g. Multifunctional Instrument trees and Core Sample Truck Drill String)						
11	3.1.3.1	Two components (calibration and data acquisition) shall be developed for the cone penetrometer moisture probe system. The data acquisition software acquires, stores and retrieves data acquired during a moisture survey. Details on the system are described in section 3.1.1. The calibration software calibrates the neutron sensors and temperatures specified in section 3.1.2. Section 3.1.3 contains information on software functions, assumptions and interfaces.					X	ANALYSIS

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
12	3.1.3.2	This product is independent and totally self contained. The major components of the system are the data acquisition system and the calibration system. The cone penetrometer software, which is covered under WHC-S-0241, shall interface with the moisture probe software			7.18			TEST
13	3.1.3.3	The system shall perform the following functions: sensor data acquisition and logging, and sensor calibration. The sensors include two neutron sensors and a thermistor or thermocouple. From the neutron sensors, the moisture content, surface moisture, and water level shall be determined. Temperature shall be determine from thermocouple or thermistor readings.	6.12.6 6.9.13 6.9.3 6.10.7					TEST

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
14	3.1.3.6	The data acquisition software shall:						
		* Be user friendly					X	ANALYSIS
		* provide real time graphical and numerical displays of data, available during tank scanning.	6.9.10 6.12.12				X	ANALYSIS TEST
		* be capable of recording time-stamped comments or notes in the form of a daily ASCII file. Each data point shall have a time stamp. The data acquisition system shall allow the operator to pause and resume data collection and record such events in the data file.				X	X	ANALYSIS ANALYSIS TEST
		* support both ASCII and binary file formats. The data acquisition system shall generate individually unique data file names with system and chronological significance.						

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
15	3.1.3.6	The calibration system shall be capable of: * generating report-quality instrumentation calibration plots. Real time graphical and numerical display of instrumentation and calibration values shall be provided. Time-stamped comments or notes in the form of a daily ASCII file to be used as a daily operator's log shall be recorded. Calibration data shall automatically store data into a unique data file. * Pre-installation calibration for the temperature thermocouple shall be a one point temperature verification. Initial thermocouple calibration shall be verified by three different temperature points.	6.9.10 6.12.12					TEST

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
16	3.1.3.7.1	The system shall contain a menu driven user interface. The content of this interface shall contain information pertinent to the operation of the system as well as project specific test setup parameters. The user shall input project specific parameters such as operator's name, date, tank, and riser location, and operation mode (automatic survey, manual survey, surface survey or calibration).	6.4.3					TEST
17	3.1.3.7.1	Output shall include probe output (see section 3.1.3.8.1) as a function of depth and derived quantities such as moisture content and surface moisture as a function of depth. Hardcopy page layouts shall contain all the output information listed above as well as the user input.	6.12.6 6.9.13 6.9.3 6.10.7					TEST
18	3.1.3.7.3	The CP software shall interface with the moisture probe software, has been generated using National Instrument LabView software.			7.18			T

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
19	3.1.3.7.4	The sampling rate shall be software adjustable.	6.4.3					TEST
20	3.1.3.8.4	The system shall be available upon demand, which may include weekends, annual and off-hour availability.					X	ANALYSIS
21	3.1.4	The moisture sensor shall be either unaffected or compensated for any error due to temperatures ranging from 50 °F to 212 °F (10 to 100 °C) and radiation fields ranging from 0 to 2000 R/hr. All down hole equipment sensor shall withstand these environmental conditions for a period of 500 hours without any functional degradation.				SECT 5		TEST
22	3.1.5	The vendor shall provide maintenance procedures and a spare part list.					X	ANALYSIS

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
23	3.1.6	The moisture sensor shall be automated and shall be operable by personnel in Personal Protective Equipment (PPE) as required by a Radiation Work Permit (RWP). A positioning devices shall be provided with a resolution of + 0.1 inch (.25 cm) vertical sensor location.	6.6.8		3.3.3			TEST TEST
24	4.2	The source shall be removable from the sensor. The operation including the storage container shall comply with DOE (Hanford Site Radiological Control Manual (HSRCM-1)) requirements. The system shall be designed to provide ALARA radiation to personnel using the guidance of the WHC Radiological Design Guide WHC-SD-GN-DGS-30011.					X	ANALYSIS

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
25	4.3	The supplier shall ensure that any fastener with headmarks matching those on the attached U. S. Custom Fasteners Headmarks list (Figure 1) are not utilized on this contract. These fasteners are not acceptable and will cause rejection of the CP system/components or spare parts which use these fasteners.			6.2.12			TEST
26	4.4	All parts which are exposed to environmental conditions listed in this performance specification shall be non-corrosive. Dissimilar metals shall be insulated against galvanic corrosion. No aluminum or other reactive metals shall be utilized in the fabricated components which may potentially be exposed to tank waste.					X	ANALYSIS
27	4.5	All electrical controls shall be visibly labeled and mounted inside the cone penetrometer skid enclosure.			6.2.7			VISUAL

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
28	5.1	Copies of the following documents shall be submitted to WHC for review and approval prior to start of fabrication. * Engineering calculations 2 copies * Assembly drawings showing general equipment layout, subassembly details, one line diagrams, elementary electrical diagrams, piping and instrumentation diagrams (P&ID), critical interface dimensions and identification of all major components. 6 sets * Material					X	ANALYSIS

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
29	5.2	Six (6) sets of the data listed below shall be submitted to the WHC at the time indicated. All outstanding issues and concerns shall be satisfactorily resolved prior to the times indicated. * Training manuals (1 month prior to WHC possession). * Acceptance test procedure (1 month prior to start of acceptance testing). * Acceptance test report (upon testing completion). * Operating and maintenance procedures (1 month prior to WHC possession). * Calibration procedures (3 month prior to start of acceptance					X	ANALYSIS

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
30	5.3	A detailed acceptance test procedure (ATP) shall be prepared by the supplier and submitted to WHC for review and approval no less than four (4) weeks prior to the test. WHC shall be notified at least 5 working days before a supplier's ATP is performed and that WHC personnel shall be allowed to witness the ATP. All sensors shall be calibrated with WHC approved calibration procedures for the test or have WHC approved calibration procedures. The acceptance test shall verify the following: * Moisture probe performs all functions specified in this functional design criteria. These functions are specified in paragraphs 1.0 through 4.0. * All sensors described in section 2.1, shall be demonstrated to						X	ANALYSIS

ITEM	WHC-SD-WM-FDC-047 PARAGRAPH	REQUIREMENT	WHC-SD-WM-ATP-145	WHC-SD-WM-ATP-146	WHC-SD-WM-ATP-151	SAIC PHASE1 REPORT	SAIC O&M MANUAL (VI 22700)	METHOD USED
31	5.4	Six (6) copies of the inspection and test data results shall be submitted to WHC for review and approval seven (7) days prior to shipment. The supplier shall not ship any equipment until WHC approval of these items is received via written confirmation.					X	ANALYSIS
32	6.0	The supplier shall provide operating manuals, troubleshooting manuals and other training materials at least one month prior to delivery. The operating procedures shall include emergency situations and step by step operation of the moisture probe system.					X	ANALYSIS

REFERENCES

WHC-SD-WM-FDC-047, "Functional Design Criteria Cone Penetrometer Production Moisture Sensor", Rev. 1.

WHC-SD-WM-ATP-145, "Cone Penetrometer Production Moisture Probe Acceptance Test Procedure", Rev. 0.

WHC-SD-WM-ATP-146, "Prototype Cone Penetrometer Prototype Moisture Probe Acceptance Test Procedure", Rev. 0.

WHC-SD-WM-ATP-151, "Cone Penetrometer Acceptance Test Procedure", Rev. 0.

SAIC, Phase 1 of Cone Penetrometer Moisture Probe Study, final report, Rev. 1, Task MJB-SWV-370248-001, February 1996