

## RMIS View/Print Document Cover Sheet

This document was retrieved from the Documentation and Records Management (DRM) ISEARCH System. It is intended for Information only and may not be the most recent or updated version. Contact a Document Service Center (see Hanford Info for locations) if you need additional retrieval information.

Accession #: D196038145

Document #: SD-WM-ATP-162

Title/Desc:

GAS CHARACTERIZATION SYSTEM 241AW101 FIELD  
ACCEPTANCE TEST PROCEDURE

Pages: 30

Sta. 21

|   |  |   |
|---|--|---|
| 2. To: (Receiving Organization)<br>Distribution   | 3. From: (Originating Organization)<br>Characterization Monitoring Development | 4. Related EDT No.:<br>613252                   |
| 5. Proj./Prog./Dept./Div.:<br>95C-EWW-451/Tank<br>Characterization/75240/N2144                                    | 6. Cog. Engr.:<br>TC Schneider   | 7. Purchase Order No.:<br>N/A                   |
| 8. Originator Remarks:<br>(ETN-95-0033, USQ Screening #TF-95-0046)<br>This ATP is being transmitted for approval. |  | 9. Equip./Component No.:<br>N/A                 |
| 11. Receiver Remarks:   |  | 10. System/Bldg./Facility:<br>241 General/101AW |
|   |  | 12. Major Assm. Dwg. No.:<br>H-14-100438        |
|   |  | 13. Permit/Permit Application No.:<br>N/A       |
|   |  | 14. Required Response Date:<br>2-16-96          |

| 15. DATA TRANSMITTED |                          |               |              |  | (F)                 | (G)                    | (H)                    | (I)                  |
|----------------------|--------------------------|---------------|--------------|--|---------------------|------------------------|------------------------|----------------------|
| (A) Item No.         | (B) Document/Drawing No. | (C) Sheet No. | (D) Rev. No. | (E) Title or Description of Data Transmitted                           | Approval Designator | Reason for Transmittal | Originator Disposition | Receiver Disposition |
| 1                    | WHC-SD-WM-ATP-162        | --            | 0            | GAS CHARACTERIZATION SYSTEM 241-AW-101 FIELD ACCEPTANCE TEST PROCEDURE | SQ                  | 1                      | 1                      | 1                    |

| 16. KEY  |  |                            |                                     |                          |                         |
|--|--|----------------------------|-------------------------------------|--------------------------|-------------------------|
| Approval Designator (F)                          |  | Reason for Transmittal (G) |                                     | Disposition (H) & (I)    |                         |
| E, S, O, D or N/A<br>(see WHC-CM-3-5, Sec. 12.7) |  | 1. Approval                | 4. Review                           | 1. Approved              | 4. Reviewed no/comment  |
|  |  | 2. Release                 | 5. Post-Review                      | 2. Approved w/comment    | 5. Reviewed w/comment   |
|  |  | 3. Information             | 6. Diet. (Receipt Acknow. Required) | 3. Disapproved w/comment | 6. Receipt acknowledged |

| 17. SIGNATURE/DISTRIBUTION<br>(See Approval Designator for required signatures) |       |  |                    |         |       |  |                    |         |       |        |       |
|---|-------|--|--------------------|---------|-------|--|--------------------|---------|-------|--------|-------|
| (G)   | (H)   | (J) Name (K) Signature (L) Date (M) MSIN |                    |         |       | (J) Name (K) Signature (L) Date (M) MSIN |                    |         |       | (G)    | (H)   |
| Reason  | Disp. |  |                    |         |       |  |                    |         |       | Reason | Disp. |
| 1   | 1     | Cog. Eng. KA White                       | <i>[Signature]</i> | 2-16-96 | S5-13 | DD Tate                                  | <i>[Signature]</i> | 2/26/96 | L6-37 | 1      | 1     |
| 1   | 1     | Cog. Mgr. RJ Nicklas                     | <i>[Signature]</i> | 2/26/96 | R1-43 |  |                    |         |       |        |       |
| 1   | 1     | QA CA Sams                               | <i>[Signature]</i> | 2-26-96 | S5-13 |  |                    |         |       |        |       |
| 1   | 1     | Safety SU Zaman                          | <i>[Signature]</i> | 2/28/96 | R3-08 |  |                    |         |       |        |       |
|   |       | Env.                                     |                    |         |       |  |                    |         |       |        |       |
| 1   | 1     | EK Straalsund                            | <i>[Signature]</i> | 2/25/96 | A6-37 |  |                    |         |       |        |       |
| 1   | 1     | TC Schneider                             | <i>[Signature]</i> | 2/29/96 | L6-37 |  |                    |         |       |        |       |

|   |  |   |   |
|---|--|---|---|
| <p>18. <i>[Signature]</i><br/>TC Schneider<br/>Signature of EDT Originator</p> <p>Date: 2/23/96</p> | <p>19. N/A<br/>Authorized Representative for Receiving Organization</p> <p>Date:</p> | <p>20. <i>[Signature]</i><br/>RJ Nicklas<br/>Cognizant Manager</p> <p>Date: 2/26/96</p> | <p>21. DOE APPROVAL (if required)<br/>Ctrl. No.</p> <p><input type="checkbox"/> Approved<br/><input type="checkbox"/> Approved w/comments<br/><input type="checkbox"/> Disapproved w/comments</p> |
|---|--|---|---|

## DISTRIBUTION SHEET

|  |  |                                  |
|--|--|----------------------------------|
| To<br>DISTRIBUTION   | From<br>Characterization Monitoring<br>Development | Page 1 of 1<br>Date Feb. 7, 1996 |
| Project Title/Work Order<br>95C-EWW-451, Tank Characterization / N2144 |  | EDT No. 600180<br>ECN No. N/A    |

| Name                           | MSIN  | Text<br>With All<br>Attach. | Text Only | Attach./<br>Appendix<br>Only | EDT/ECN<br>Only |
|--------------------------------|-------|-----------------------------|-----------|------------------------------|-----------------|
| RE Bauer                       | L6-37 |                             |           |                              | X               |
| GD Johnson                     | S7-15 |                             |           |                              | X               |
| JW Lentsch                     | S7-15 |                             |           |                              | X               |
| DT Lott                        | R3-25 | X                           |           |                              |                 |
| RJ Nicklas                     | R1-34 |                             |           |                              |                 |
| TL Ostrander                   | S3-10 | X                           |           |                              |                 |
| CA Sams                        | S5-13 |                             |           |                              | X               |
| TC Schneider                   | L6-37 | X                           |           |                              |                 |
| DD Tate                        | L6-37 |                             |           |                              | X               |
| JD Thorne                      | S5-10 | X                           |           |                              |                 |
| CV Vo                          | L6-37 | X                           |           |                              |                 |
| KA White                       | S5-13 | X                           |           |                              |                 |
| SU Zaman                       | R3-08 |                             |           |                              | X               |
| PA Clark                       | R3-49 | X                           |           |                              |                 |
| ICF Kaiser Const. Doc. Control | S2-53 | X                           |           |                              |                 |
| Central Files                  | A3-88 | X                           |           |                              |                 |

# GAS CHARACTERIZATION SYSTEM 241-AW-101 FIELD ACCEPTANCE TEST PROCEDURE

TC Schneider

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

EDT/ECN: 600180 UC: 2030  
Org Code: 75240 Charge Code: N2144  
B&R Code: EW3120072 Total Pages: 27

Key Words: Flammable, Hydrogen, Watch List, Nitrous Oxide, Tanks,  
Monitoring, Ammonia, Gas Characterization

Abstract: This document details the field Acceptance Testing of a gas characterization system being installed on waste tank 241-AW-101. The gas characterization systems will be used to monitor the vapor spaces of waste tanks known to contain measurable concentrations of flammable gases.

---

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact: WHC/BCS Document Control Services, P.O. Box 1970, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

Karen A. Holland      3/1/96  
Release Approval      Date



Release Stamp

Approved for Public Release

**GAS CHARACTERIZATION SYSTEM**  
**241-AW-101 FIELD ACCEPTANCE TEST PROCEDURE**

**IMPACT LEVEL 3SQ**

**Issued by**  
**Thomas C. Schneider**  
**Characterization Monitoring Development**  
**February 1996**

TABLE OF CONTENTS

|   |    |
|---|----|
| TEST EXECUTION SHEET . . . . .                          | 4  |
| 1.0 PURPOSE . . . . .                                   | 5  |
| 2.0 REFERENCES . . . . .                                | 5  |
| 2.1 DRAWINGS . . . . .                                  | 5  |
| 2.2 ENGINEERING CHANGE NOTICES . . . . .                | 6  |
| 3.0 RESPONSIBILITIES . . . . .                          | 6  |
| 3.1 WHC SYSTEM ENGINEER . . . . .                       | 6  |
| 3.2 TEST DIRECTOR . . . . .                             | 7  |
| 3.3 WHC SAFETY . . . . .                                | 8  |
| 3.4 RECORDER . . . . .                                  | 8  |
| 3.5 WHC . . . . .                                       | 9  |
| 3.6 CONSTRUCTION . . . . .                              | 9  |
| 3.7 OCCUPATIONAL SAFETY AND HEALTH . . . . .            | 9  |
| 4.0 ACCEPTANCE TEST PROCEDURE CHANGE CONTROL . . . . .  | 9  |
| 4.1 MAJOR PROCEDURE CHANGE . . . . .                    | 10 |
| 4.2 MINOR PROCEDURE CHANGE . . . . .                    | 10 |
| 5.0 TEST EXECUTION . . . . .                            | 10 |
| 5.1 WITHOUT EXCEPTION . . . . .                         | 10 |
| 5.2 WITH EXCEPTION/RESOLVED . . . . .                   | 11 |
| 5.3 WITH EXCEPTION/OUTSTANDING . . . . .                | 11 |
| 6.0 RECORDING AND RESOLVING EXCEPTIONS . . . . .        | 11 |
| 6.1 GENERAL . . . . .                                   | 11 |
| 6.2 RECORDING . . . . .                                 | 11 |
| 6.3 RETEST/RESOLUTION . . . . .                         | 12 |
| 6.4 APPROVAL AND ACCEPTANCE . . . . .                   | 12 |
| 6.5 DISTRIBUTION . . . . .                              | 12 |
| 7.0 SYSTEM DESCRIPTION . . . . .                        | 12 |
| 8.0 TEST CONDITIONS AND EQUIPMENT REQUIRED . . . . .    | 13 |
| 8.1 TEST CONDITIONS . . . . .                           | 13 |
| 8.2 EQUIPMENT REQUIRED . . . . .                        | 14 |
| 9.0 TEST PROCEDURE FOR THE ELECTRICAL SYSTEMS . . . . . | 14 |
| 9.1 GCS POWER DISTRIBUTION . . . . .                    | 14 |
| 9.2 ELECTRICAL HEAT TRACE CONTROL . . . . .             | 17 |
| 9.3 REVIEW . . . . .                                    | 17 |

|             |  |    |
|-------------|--|----|
| 10.0        | TEST PROCEDURE FOR THE PNEUMATIC SYSTEMS . . . . . | 18 |
| 10.1        | INITIAL CONDITIONS . . . . .                       | 18 |
| 10.2        | GC CARRIER GAS CONNECTIONS . . . . .               | 19 |
| 10.3        | CALIBRATION GAS CONNECTIONS . . . . .              | 20 |
| 10.4        | GCS SHUTDOWN . . . . .                             | 22 |
| 11.0        | TEST RECORD SHEETS . . . . .                       | 24 |
| 11.1        | TEST EXCEPTION SHEET . . . . .                     | 24 |
| 11.2        | TEST LOG SHEET . . . . .                           | 24 |
| APPENDIX A: | TEST EXCEPTION SHEETS . . . . .                    | 25 |
| APPENDIX B: | TEST LOG SHEET . . . . .                           | 26 |

**TEST EXECUTION SHEET**

GCS Unit Number: VTP-PNL-205Y

Reference Doc: WHC-SD-  
 WM-ATP-162

| TEST PERSONNEL              |            |           |         |      |
|-----------------------------|------------|-----------|---------|------|
| TITLE                       | PRINT NAME | SIGNATURE | INITIAL | DATE |
| WHC SYSTEM ENGINEER         |            |           |         |      |
| TEST DIRECTOR               |            |           |         |      |
| RECORDER                    |            |           |         |      |
| CONSTRUCTION REPRESENTATIVE |            |           |         |      |

| TEST EXECUTION              |            |           |      |
|-----------------------------|------------|-----------|------|
| TITLE                       | PRINT NAME | SIGNATURE | DATE |
| WHC SYSTEM ENGINEER         |            |           |      |
| TEST DIRECTOR               |            |           |      |
| RECORDER                    |            |           |      |
| CONSTRUCTION REPRESENTATIVE |            |           |      |

**WHC TEST APPROVAL AND ACCEPTANCE**

- \_\_\_\_\_ Without Exception
- \_\_\_\_\_ With Exception - Resolved
- \_\_\_\_\_ With Exception - Outstanding

System Engineer \_\_\_\_\_ Date \_\_\_\_\_

**GAS CHARACTERIZATION SYSTEM  
ACCEPTANCE TEST PROCEDURE**

**1.0 PURPOSE**

The purpose of this document is to demonstrate that the Gas Characterization System (GCS) is installed per the intended design. Actual test execution steps are in Sections 9.0 and 10.0.

**2.0 REFERENCES**

**2.1 DRAWINGS**

| <b>DRAWING NO.</b> | <b>TITLE</b>  |
|--------------------|---|
| H-14-100434        | Waste Tank Gas Characterization System Drawing Tree & Index     |
| H-14-100435        | Waste Tank Gas Characterization System Piping & Instr Diag      |
| H-14-100436        | Waste Tank Gas Characterization System One-line Diag            |
| H-14-100437        | Waste Tank Gas Characterization System Elementary Diag          |
| H-14-100438        | Waste Tank Gas Characterization System Assy                     |
| H-14-100439        | Waste Tank Gas Characterization System Instr/Valve PNL Assy     |
| H-14-100440        | Waste Tank Gas Characterization System GC Cab Assy              |
| H-14-100441        | Waste Tank Gas Characterization System Computer Cab Assy        |
| H-14-100442        | Waste Tank Gas Characterization System Junction Box Assy        |
| H-14-100443        | Waste Tank Gas Characterization System Wiring Diag              |
| H-14-100444        | Waste Tank Gas Characterization System GC Cab Wiring Diag       |
| H-14-100445        | Waste Tank Gas Characterization System Computer Cab Wiring Diag |
| H-14-100446        | Waste Tank Gas Characterization System Loop Diag                |
| H-14-100447        | Waste Tank Gas Characterization System Interconnection Diag     |
| H-14-100448        | Waste Tank Gas Characterization Installation                    |

## 2.2 ENGINEERING CHANGE NOTICES

The following Engineering Change Notice was prepared to document the system installation into the 241-AW tank farm:

ECN Number W-451-1

## 3.0 RESPONSIBILITIES

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

### 3.1 WHC SYSTEM ENGINEER

- 3.1.1 Designate a test director.
- 3.1.2 Coordinate testing with facility management.
- 3.1.3 Act as liaison between the participants in acceptance testing.
- 3.1.4 Distribute the approved testing schedule as soon as possible, but at least two days prior to testing.
- 3.1.5 Ensure field testing and inspection has been completed.
- 3.1.6 Schedule and conduct a pre-ATP meeting with test participants prior to start of testing.
- 3.1.7 Notify the persons performing and witnessing the test prior to the start of testing.
- 3.1.8 Notify all concerned parties when a change is made in the testing schedule.
- 3.1.9 Sign Test Execution Sheet when ATP is approved and accepted.
- 3.1.10 Take necessary action to clear exceptions to the ATP.
- 3.1.11 Sign Exception Sheet when exception has been resolved.

- 3.1.12 Provide a distribution list for the approved and accepted ATP.
- 3.1.13 Determine if a filed change is classified as Major or Minor.

### 3.2 TEST DIRECTOR

- 3.2.1 Coordinate all acceptance testing.
- 3.2.2 Confirm that field testing and inspection of the system or portion of the system to be tested has been completed.
- 3.2.3 Stop any test which may cause damage to the system until the test procedure has been revised.
- 3.2.4 Approve field changes to the ATP.
- 3.2.5 Obtain revisions to the ATP, as necessary, to comply with authorized field changes or to accommodate existing field conditions.
- 3.2.6 Evaluate recorded data, discrepancies, and exceptions.
- 3.2.7 Obtain from the WHC Project Engineer, any information or changes necessary to clear or resolve objections.
- 3.2.8 Sign Test Execution Sheet when ATP has been performed.
- 3.2.9 Sign Test Exception Sheet when acceptable retest has been performed.
- 3.2.10 Obtain required signatures on the ATP Master prior to reproduction and distribution.
- 3.2.11 Conduct daily prejob safety meetings with participating personnel. The meetings and attendees will be noted in the Test Log.

### 3.3 WHC SAFETY

- 3.3.1 Review and approve ATP.
- 3.3.2 Evaluate results of testing.
- 3.3.3 Review and approve any Major procedure changes. See section 4.0 for definition of Major and Minor procedure changes.

### 3.4 RECORDER

- 3.4.1 Perform all recording using black ink.
- 3.4.2 Record names of all designated personnel on Recorder's copy of ATP prior to start of testing.
- 3.4.3 Observe tests, record test data and maintain test log.
- 3.4.4 Sign the Test Execution Sheet and Exception sheet(s) as the Recorder.
- 3.4.5 Initial and date every test step on the Recorder's copy as it is completed, next to the step number or on a table, when provided. On tables where there is not room for both the initial and date, date may be entered in space provided at bottom of column.
- 3.4.6 Record authorized field changes to the ATP.
- 3.4.7 Record exceptions and test steps that are not performed on the Test Exception Sheet. Have the information transferred in ink or typed to the Master Exception Sheet(s). Additional Exception Sheets are to be added as needed.
- 3.4.8 Orally notify the Test Director at time the objection is made.
- 3.4.9 Assign page number to Data Sheets and Exception Sheets, after ATP is complete. Record Page numbers for these items and make corrections, as necessary, to page numbers shown for these pages in the index.

3.4.10 Transfer the final test results with Recorder's signature and dates for each step to the Master in ink or type. Submit the completed Master to the Test Director for approval signatures and distribution. Retain the Recorder's copy and a copy of the Master in the field project files.

### 3.5 WHC QA

3.5.1 Review and approve ATP.

3.5.2 Evaluate results of testing.

3.5.3 Review and approve any Major procedure changes. See section 4.0 for definition of Major and Minor procedure changes.

### 3.6 CONSTRUCTION REPRESENTATIVE

3.6.1 Organize and perform this acceptance test under coordination of the Test Director.

3.6.2 Confirm that all equipment required for performing this test (as listed in Section 8.2) will be available at start of testing.

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

3.6.4 Sign Test Execution sheet.

### 3.7 OCCUPATIONAL SAFETY AND HEALTH

Individuals shall carry out their assigned work in a safe manner to protect themselves, others, and the equipment from undue hazards and to prevent damage to property and environment. Facility line managers shall assure the safety of all activities within their areas to prevent injury, property damage, or interruption of operation.

### 4.0 ACCEPTANCE TEST PROCEDURE CHANGE CONTROL

Acceptance testing is to be conducted in accordance with the steps and requirements specified in this procedure. Field changes are designated as either Minor or Major.

#### 4.1 MAJOR PROCEDURE CHANGE

A major procedure change is defined as any change which affects the intent of the acceptance test procedure or affect Quality or Safety. Major field changes require written approval of the System Engineer, Test Director, Construction Representative, WHC Quality, and WHC Safety. Major field changes shall also be recorded as a test exception.

#### 4.2 MINOR PROCEDURE CHANGE

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

### 5.0 TEST EXECUTION

The acceptance test procedures detailed in Sections 9.0 and 10.0 shall be performed in sequential steps starting with Section 9.0. The Test Director may direct performance of major sections of the procedure out of sequence if the testing does not compromise safety or the intent of the ATP. As required by Section 3.4, the Recorder will initial and date every test step in the space provided on the Recorder's copy of the ATP as each step is completed. Any steps that require verified readings must also be recorded in the EXPECTED RESULTS column of the test procedure.

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

#### 5.1 WITHOUT EXCEPTION

- 5.1.1 Check applicable space on Test Execution Sheet to show that the ATP has been performed and no exceptions have been recorded.

- 5.1.2 Sign and date Test Execution Sheet in the spaces provided.
- 5.1.3 Distribute requisite copies and send master of ATP to the ATR preparer.

## 5.2 WITH EXCEPTION/RESOLVED

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

## 5.3 WITH EXCEPTION/OUTSTANDING

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

## 6.0 RECORDING AND RESOLVING EXCEPTIONS

### 6.1 GENERAL

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

### 6.2 RECORDING

- 6.2.1 Number each exception sequentially as it occurs and record it on an Exception Sheet.
- 6.2.2 Enter name and organization of objecting party for each exception.

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

### 6.3 RETEST/RESOLUTION

6.3.1 Record the action taken to resolve each exception. Action taken may not be the same as planned action.

6.3.2 When action taken results in an acceptable retest, sign and date Retest Execution and Acceptance section of the Exception Sheet.

6.3.3 When action taken does not involve an acceptable retest, strike out the Retest Execution and Acceptance section of the Exception Sheet. Resolve exception as shown under 6.4 below.

### 6.4 APPROVAL AND ACCEPTANCE

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

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

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

### 6.5 DISTRIBUTION

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

## 7.0 SYSTEM DESCRIPTION

The Gas Characterization System (GCS) is a support structure for analytical gas monitoring activities on Hanford Underground Storage Tanks (UST). The system is designed to support three analytical instruments consisting of two gas chromatographs (GC) and one Fourier Transform Infrared (FTIR) spectrometer. Included in this support is a high flow rate sampling

line including a sealed bellows sample pump, electrical utilities, flow system panel with manual and electrically controlled valves, a bottle rack to house gases for GC column operation and calibration, flow instrumentation necessary to characterize the gas monitoring instruments, and computer communication and interface equipment to transfer measurement information to a remote location.

## 8.0 TEST CONDITIONS AND EQUIPMENT REQUIRED

### 8.1 TEST CONDITIONS

The Acceptance Test Procedure WHC-SD-WM-ATP-160 has been performed on the main system assembly at the vendors facility. The following conditions shall exist at the start of the acceptance testing:

- \_\_\_\_\_ 8.1.1 Systems being tested have been inspected for workmanship and for compliance with design.
- \_\_\_\_\_ 8.1.2 Continuity and megger tests have been performed on portions of the electrical systems being tested, as required.
- \_\_\_\_\_ 8.1.3 Leak tests on the pneumatic systems have been performed.
- \_\_\_\_\_ 8.1.4 Power is **OFF** to components of systems being tested. All circuit breakers and fuses are in the de-energized condition.
- \_\_\_\_\_ 8.1.5 All test instruments have a currently valid calibration stamp attached that indicates a calibration traceable to the National Institute of Standards and Testing.
- \_\_\_\_\_ 8.1.6 All process instruments have a currently valid calibration stamp attached that indicates a calibration traceable to the National Institute of Standards and Testing.
- \_\_\_\_\_ 8.1.7 Personnel responsible for directing and witnessing the performance of the tests described in this ATP have read and understand appropriate certified vendor information (CVI) pertaining to the operation of the equipment to be tested. (All HVAC and process monitoring and control instruments, not analytical and computing systems, should be understood.)
- \_\_\_\_\_ 8.1.8 All sample line valves, inside and outside of enclosure, are **CLOSED**.



the non sensitive items like the sample pump, HVAC unit, interior and exterior lighting and unconditioned GFCI power receptacles and sample gas line trace heat. In addition, it provides a 40 ampere feed to a 7.5 KVA power conditioning and isolation transformer, which in turn feeds VTP-JBX-210. The equipment supplied power through VTP-JBX-210 consist of the instrumentation sensitive to line transients, like the GC's, FTIR, temperature monitors and controllers, and computer equipment.

The initial condition of this test assumes that the power source has been connected, the sample pump and heat trace element has been connected to the appropriate circuits, all VTP-DP-210 line and load breakers are open, all VTP-JBX-210 breakers and fuses are open, and all fuses in the computer cabinet analog and discrete drawers 1 and 2 are open.

| PROCEDURE STEP  | EXPECTED RESULTS   | SIGNATURE | COMMENTS |
|---|--|-----------|----------|
| 9.1.1 Close the EDS-MCC-202 C2 circuit breaker to supply system power.  | EDS-MCC-202 C2<br>CLOSED   |           |          |
| 9.1.2 Measure and record the incoming voltage at the disconnect switch.   | L1-L2 240 _____<br>L1-Neu 120 _____<br>L2-Neu 120 _____<br>Neu-Gnd 0 _____                                 |           |          |
| 9.1.3 Close the disconnect switch and the DP-210 main breaker. Measure and record the DP-210 buss voltages.   | L1-L2 240 _____<br>L1-Neu 120 _____<br>L2-Neu 120 _____<br>Neu-Gnd 0 _____                                 |           |          |
| 9.1.4 Close CB-6 in DP-210 to energize the interior lights.   | Interior lights<br>operate   |           |          |
| 9.1.5 Close DP-210 CB-10 and perform a manual test of the GFCI breaker to assure proper operation. Verify by measuring and recording the voltage across receptacle hot and neutral. Reset GFCI breaker. | North Wall RCPT<br>L-Neu 0 _____<br>Neu-Gnd 0 _____<br>South Wall RCPT<br>L-Neu 0 _____<br>Neu-Gnd 0 _____ |           |          |
| 9.1.6 Open CB-10 in DP-210.   | CB-10 OPEN   |           |          |

| PROCEDURE STEP  | EXPECTED RESULTS                                  | SIGNATURE | COMMENTS |
|---|---|-----------|----------|
| 9.1.7 Close DP-210 CB-12 and perform a manual test of the exterior GFCI receptacle. Verify by measuring and recording the voltage across the receptacle hot and neutral. Reset the GFCI receptacle. | Exterior RCPT<br>L-Neu 0 _____<br>Neu-Gnd 0 _____ |           |          |
| 9.1.8 Open CB-12 in DP-210.   | CB-12 OPEN  |           |          |
| 9.1.9 Remove the plug from SV-203 and Open the following valves: SV-203, SV-204, SV-212, SV-213 and SV-218  | SV-203 Plug removed and listed valves OPEN        |           |          |
| 9.1.10 Disconnect the pump (P-210) outlet sample line at the closest convenient Swagelock fitting.  | Sample outlet line disconnected                   |           |          |
| 9.1.11 Close the double pole breaker CB-5/7 in DP-210. Verify that sample pump P-210 operates.  | P-210 operational                                 |           |          |
| 9.1.12 Open CB-5/7 in DP-210.   | CB-5/7 OPEN                                       |           |          |
| 9.1.13 Replace the plug on SV-203 and close the following valves: SV-203, SV-204, SV-212, SV-213 and SV-218   | SV-203 Plug replaced and listed valves CLOSED     |           |          |
| 9.1.14 Reconnect pump outlet sample line.   | Sample outlet reconnected                         |           |          |
| 9.1.15 Close the double pole breaker CB-1/3 in DP-210. Verify that the HVAC thermostat is set to heat only to 70° F.  | CB-1/3 CLOSED and thermostat set to 70° F.        |           |          |
|   |   |           |          |

## 9.2 ELECTRICAL HEAT TRACE CONTROL

The sample gas heat trace has been installed prior to this test. The heat trace element will provide the heat source to verify that the controller temperature sensing element responds properly to a change in temperature.

| PROCEDURE STEP  | EXPECTED RESULTS  | SIGNATURE | COMMENTS |
|---|---|-----------|----------|
| 9.2.1 Close DP-210 circuit breaker 9 to provide the main heat trace power.  | Breaker 9 CLOSED  |           |          |
| 9.2.2 Close FU-6 in JBX-210 to energize the heat trace controller TIC-210. Verify that the LED display on the controller is indicating a nominal ambient temperature. Record that temp. | FU-6 CLOSED<br><br>Indicated temp.<br><br>_____         |           |          |
| 9.2.3 Adjust the temperature control set point 1, to 10 degrees above the indicated temperature.  | Set Point 1<br>ADJUSTED                                 |           |          |
| 9.2.4 Verify that the indicated temperature begins to increase within three minutes.  | Temperature<br>INCREASES.                               |           |          |
| 9.2.5 Verify that the heat trace controller functions. Record the indicated temperature when the controller begins to control, (nominally 10 minutes).                                  | Indicated Temp.<br><br>_____<br>(NOMINAL 10°<br>CHANGE) |           |          |
| 9.2.6 Open DP-210 circuit breaker 9 and JBX-210 FU-6.   | Breaker 9 and<br>FU-6 OPEN                              |           |          |
|   |   |           |          |

## 9.3 REVIEW

Check that steps 9.1 through 9.2 inclusive have been completed.

\_\_\_\_\_  
 Test Director Signature

## 10.0 TEST PROCEDURE FOR THE PNEUMATIC SYSTEMS

This procedure will functionally verify that all newly installed process lines and devices perform to the design intent.

### 10.1 INITIAL CONDITIONS

The initial conditions will establish the power and the pneumatic alignment to perform the pneumatic system verifications.

10.1.1 Verify the following breaker, switch and fuse line up.

DP-210 Breakers OPEN: 5/7, 8, 9, 10 and 12  
DP-210 Breakers CLOSED: MAIN, 1/3, 2/4 and 6  
DP-210 Switches CLOSED: 27 and 29

JBX-210 Breakers CLOSED: CB-A, CB-B, CB-C, CB-D and CB-E  
JBX-210 Fuses OPEN: FU-4, FU-5, FU-6 and FU-7  
JBX-210 Fuses CLOSED: FU-1, FU-2, FU-3, FU-8 and FU-9

Analog Drawer 1 Fuses CLOSED: FU-1, FU-2, FU-3, FU-4 and FU-5  
Discrete Drawer 2 Fuses CLOSED: FU-1 and FU-2

Breakers, Fuses and Switches are aligned:

Test Director Signature

10.1.2 Verify the following valve line up.

All the system valves shall be CLOSED with the exception of the following:

The following listed valves shall be OPEN:

|        |         |         |         |
|--------|---------|---------|---------|
| SV-213 | SV-221  | SV-226  | SV-231  |
| SV-236 | FIV-220 | FIV-230 | FIV-250 |

The listed valves are aligned:

Test Director Signature

10.2 GC CARRIER GAS CONNECTIONS

| PROCEDURE STEP  | EXPECTED RESULTS                                | SIGNATURE | COMMENTS |
|---|---|-----------|----------|
| 10.2.1 Visually verify that N <sub>2</sub> carrier gas bottles are connected through the manifold to PCV-260. | N <sub>2</sub> bottles connected                |           |          |
| 10.2.2 Visually verify that He carrier gas bottles are connected through the manifold to PCV-262.             | He bottles connected                            |           |          |
| 10.2.3 Obtain the control screen for NT-220 (GC1) on the system monitor. Select INSTRUMENT STATUS.            | GC1 INSTRUMENT STATUS DISPLAYED                 |           |          |
| 10.2.4 Verify that the Column Pressures indicate near zero. Record indicated column pressures.                | Col A Press _____<br>Col B Press _____          |           |          |
| 10.2.5 Open N <sub>2</sub> bottle isolation valves.   | Bottle valves OPEN                              |           |          |
| 10.2.6 Open SV-264 and set PCV-260 to 80 psig.  | SV-264 OPEN<br>PCV-260 set to 80 psig           |           |          |
| 10.2.7 Open SV-260.   | SV-260 OPEN                                     |           |          |
| 10.2.8 Verify that the Column Pressures indicate between 20 and 30 psig. Record the pressures.                | Col A Press _____<br>Col B Press _____          |           |          |
| 10.2.9 Close the N <sub>2</sub> bottle isolation valves and allow the carrier gas press. to bleed off.        | N <sub>2</sub> Carrier Gas Bottle Valves CLOSED |           |          |
| 10.2.10 Obtain the control screen for NT-230 (GC2) on the system monitor. Select INSTRUMENT STATUS.           | GC2 INSTRUMENT STATUS DISPLAYED                 |           |          |
| 10.2.11 Verify that the Column Pressures indicate near zero. Record indicated column pressures.               | Col A Press _____<br>Col B Press _____          |           |          |
| 10.2.12 Open He bottle isolation valves.  | Bottle valves OPEN                              |           |          |

| PROCEDURE STEP  | EXPECTED RESULTS                              | SIGNATURE | COMMENTS |
|---|---|-----------|----------|
| 10.2.13 Open SV-266 and set PCV-262 to 80 psig.   | SV-266 OPEN<br>PCV-262 set to 80 psig         |           |          |
| 10.2.14 Open SV-262.  | SV-262 OPEN                                   |           |          |
| 10.2.15 Verify that the Column Pressures indicate between 20 and 30 psig. Record the pressures.                       | Col A Press _____<br>Col B Press _____        |           |          |
| 10.2.16 Close the He bottle isolation valves and allow the carrier gas press. to bleed off.                           | He Carrier Gas<br>Bottle Valves<br>CLOSED     |           |          |
| 10.2.17 Shut down the operating system control for NT-220 from the System Keyboard/Monitor.                           | NT-220 Operating<br>System Shut Down          |           |          |
| 10.2.18 Shut down the operating system control for NT-230 from the System Keyboard/Monitor.                           | NT-230 Operating<br>System Shut Down          |           |          |
| 10.2.19 Close the following valves after the carrier gas pressures have decayed:<br>SV-260, SV-262, SV-264 and SV-266 | SV-260, SV-262,<br>SV-264, & SV-266<br>CLOSED |           |          |

### 10.3 CALIBRATION GAS CONNECTIONS

The following section will verify that the calibration gas connections are properly constructed per the appropriate design drawings.

| PROCEDURE STEP  | EXPECTED RESULTS                                 | SIGNATURE | COMMENTS |
|---|--|-----------|----------|
| 10.3.1 Visually verify that H <sub>2</sub> cal. gas bottle is connected to PCV-261. | H <sub>2</sub> cal. gas<br>PROPERLY<br>CONNECTED |           |          |
| 10.3.2 Open the H <sub>2</sub> cal. gas bottle isolation valve.                     | Bottle isolation<br>valve OPEN                   |           |          |
| 10.3.3 Adjust PCV-261 to nominally 5 psig.  | PCV-261 set to<br>5 psig                         |           |          |
| 10.3.4 Remove the plug from SV-229 and open SV-229.                                 | SV-229 PLUGGED<br>and OPEN                       |           |          |

|   |  |  |  |
|---|--|--|--|
| 10.3.5 Open SV-228 and verify no gas flow from SV-229.  | SV-228 OPEN with NO FLOW                       |  |  |
| 10.3.6 Open SV-261 and verify that gas flows from SV-229.   | SV-261 OPEN with FLOW                          |  |  |
| 10.3.7 Close the H <sub>2</sub> cal. gas bottle isolation valve and allow the cal. gas pressure to bleed off.   | Bottle isolation valve CLOSED                  |  |  |
| 10.3.8 Close SV-261, SV-228, SV-229 and plug SV-229.  | SV-261, SV-228, SV-229 CLOSED & SV-229 PLUGGED |  |  |
| 10.3.9 Visually verify that CH <sub>4</sub> cal. gas bottle is connected to PCV-263.                            | CH <sub>4</sub> cal. gas PROPERLY CONNECTED    |  |  |
| 10.3.10 Open the CH <sub>4</sub> cal. gas bottle isolation valve.   | Bottle isolation valve OPEN                    |  |  |
| 10.3.11 Adjust PCV-263 to nominally 5 psig.   | PCV-263 set to 5 psig                          |  |  |
| 10.3.12 Remove the plug from SV-239 and open SV-239.  | SV-239 PLUGGED and OPEN                        |  |  |
| 10.3.13 Open SV-238 and verify no gas flow from SV-239.   | SV-238 OPEN with NO FLOW                       |  |  |
| 10.3.14 Open SV-263 and verify that gas flows from SV-239.  | SV-263 OPEN with FLOW                          |  |  |
| 10.3.15 Close the CH <sub>4</sub> cal. gas bottle isolation valve and allow the cal. gas pressure to bleed off. | Bottle isolation valve CLOSED                  |  |  |
| 10.3.16 Close SV-263, SV-238, SV-239 and plug SV-239.   | SV-263, SV-238, SV-239 CLOSED & SV-239 PLUGGED |  |  |
|   |  |  |  |

#### 10.4 GCS SHUTDOWN

The following section will secure the GCS system following the ATP performance. It is assumed that the system configuration is the condition following Section 10.3.

| PROCEDURE STEP   | EXPECTED RESULTS                             | INITIAL | COMMENTS |
|--|--|---------|----------|
| 10.4.1 Turn OFF all analytical and computing instruments at their local ON/OFF switch. | All A and C instruments OFF                  |         |          |
| 10.4.2 CLOSE the nitrogen carrier gas bottles isolation valves.                        | Nitrogen gas bottles isolation valves CLOSED |         |          |
| 10.4.3 CLOSE the helium carrier gas bottles isolation valves.                          | Helium gas bottles isolation valves CLOSED   |         |          |
| 10.4.4 CLOSE all GCS pneumatic line valves, inside and outside.                        | All system valves CLOSED                     |         |          |

| PROCEDURE STEP   | EXPECTED RESULTS  | INITIAL | COMMENTS |
|--|---|---------|----------|
| <p>10.4.5 VERIFY the following breaker, switch and fuse positions:</p> <p>DP-210 Breakers and Switches<br/>           OPEN 5/7, 8, 9, 10 &amp; 12<br/>           CLOSED MAIN, 1/3, 2/4, 6, 27 &amp; 29</p> <p>JBX-210 Breakers and Fuses<br/>           OPEN FU-7<br/>           CLOSED CB-A, CB-B, CB-C, CB-D, CB-E, FU-1, FU-2, FU-3, FU-4, FU-5, FU-6, FU-8 and FU-9</p> <p>ANALOG DRAWER<br/>           CLOSED FU-1, FU-2, FU-3, FU-4 and FU-5</p> <p>OPEN FU-6, FU-7, FU-8, FU-9 and FU-10</p> <p>DISCRETE DRAWER<br/>           CLOSED FU-1 and FU-2</p> | <p>BREAKERS, SWITCHES AND FUSES IN THE POSITION LISTED.</p> |         |          |
|  |   |         |          |

10.4.6 The Test Director, by his signature below, states that the GCS equipment installation complies with the design documents and is functional.

\_\_\_\_\_  
 Test Director

\_\_\_\_\_  
 Date

## 11.0 TEST RECORD SHEETS

### 11.1 TEST EXCEPTION SHEET

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

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

Test Exception Sheets are included in Appendix A.

### 11.2 TEST LOG SHEET

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

Test Log Sheets are included in Appendix B.



