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### RELEASE AUTHORIZATION

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WHC-SD-WM-ATP-092, REV.0

**Document Title:** 

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Receiver System, Phase II Testing

**Release Date:** 

October 31, 1994

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WHC Information Release Administration Specialist:

10/31/94

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#### 7. Abstract

This Acceptance Test Procedure is for the 241-SY-101 Flexible Receiver System. The procedure will test the strength of the containment bag assembly by subjecting the bag assembly to a load test.

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#### ACCEPTANCE TEST PROCEDURE 241-SY-101 FLEXIBLE RECEIVER SYSTEM PHASE II TESTING

#### 1.0 INSTRUCTION SECTION

#### 1.1 PURPOSE/SCOPE

The purpose of this acceptance test procedure is to provide a means of verifying that the Flexible Receiver System (FRS) is capable of performing its intended function adequately by meeting specified test criteria. Specifically, this procedure will test the strength of the containment bag and bag bottom closure mechanism. This test procedure encompasses test requirements for the Phase II test as defined in WHC-SD-WM-TP-257, Test Plan for Qualification Testing of the 241-SY-101 Flexible Receiver System.

The Phase II test consists of a load test of the containment bag for the FRS. It is postulated that 68 gallons of waste could be trapped inside the pump internals. The bag must be capable of supporting this waste if it shakes loose and drains to the bottom of the bag after the bag bottom has been cinched closed. All parts of this test must be completed before the FRS is either rejected or accepted. Testing is scheduled to begin in late-November, 1994 and will take approximately 3 days to complete.

#### 1.2 REFERENCES

- WHC, 1994a, Test Plan for Qualification Testing of the 241-SY-101 Flexible Receiver System, WHC-SD-WM-TP-257, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1994b, Flexible Receiver Drawing Tree, drawing H-2-821385, Rev. 0, Draft, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1994c, Flexible Receiver Bag Assembly, drawing H-2-821391, Rev. 0, Draft, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1994e, Flexible Receiver Installation, drawing H-2-821392, Rev. O, Draft, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1994f, Flexible Receiver Pump Cap, drawing H-2-821393, Rev. O, Draft, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1994g, Flexible Receiver Mock Pump Top, drawing H-2-821394, Rev. 0, Draft, Westinghouse Hanford Company, Richland, Washington.
- DOE-RL, 1992, Hanford Site Hoisting and Rigging Manual, DOE-RL-92-36, U.S. Department of Energy Field Office, Richland, Washington.

#### 1.3 RESPONSIBILITIES

#### 1.3.1 Equipment Removal System Cognizant Manager

- Responsible for overall control of the Equipment Removal System (ERS), including the testing of the FRS.
- Assigns responsibilities related to the ERS, which includes the FRS.

#### 1.3.2 Equipment Removal System Project Engineer

- Identifies and specifies testing requirements for the ERS.
- Approves test procedures and criteria changes as required.
- Provides technical expertise during testing of the FRS.
- Approves acceptability of test activities and results.

#### 1.3.3 FRS Cognizant Engineer

- Responsible for preparing test specifications and procedures.
- Identifies equipment and facilities for the acceptance test.
- Acts as a liaison between the participants in FRS testing.
- Ensures informal testing and inspection is complete.
- Provides guidance and technical expertise during the acceptance test.
- Designates a recorder for this ATP.
- Takes necessary action to clear exceptions to this ATP.
- Approves acceptability of test activities and results.

#### 1.3.4 Quality Assurance Manager

 Assigns and manages Quality Assurance representatives to participate in the FRS testing.

#### 1.3.5 Quality Assurance Representative

- Approves Acceptance Criteria changes.
- Witnesses the acceptance test.

- Evaluates results of testing and approves field changes and exceptions to the ATP.
- Assists in maintenance and control of test records.

#### 1.3.6 Safety Engineering

- Reviews the test procedure and specifications for safety conformance.
- Provides test facility inspection and support as needed to conduct testing within the safety standards of WHC.

### 1.3.7 Equipment, Design, and Fabrication Group Manager

- Assigns personnel to perform this acceptance test.
- Responsible for training of personnel who will be performing the test.

#### 1.3.8 Equipment, Design, and Fabrication Group Technicians

- Responsible for transporting equipment to the test facility.
- Responsible for equipment set-up and instrument calibration, if necessary.
- Assists the FRS cognizant engineer in performing this acceptance test.

#### 1.3.9 Hoisting and Rigging Manager and Operators

- Responsible for providing a facility for testing.
- Responsible for providing a crane and rigging hardware for performing this acceptance test.
- Responsible for operating the crane during acceptance testing per the Hanford Site Hoisting and Rigging Manual, DOE-RL-92-36.

#### 1.3.10 Test Recorder

- Observes test, records test data using black ink, and maintains Test Log (Appendix D).
- Records names of all designated personnel on the Test Execution sheet (Appendix E) on the Test Control copy of the ATP prior to testing.

- Initials and dates every test step on the Test Control copy as it is completed, next to the step number or on a table, when provided.
- Records authorized field changes to the ATP.
- Records exceptions and test steps that are not performed on a Test Exception sheet (Appendix C). Additional Exception sheets will be reproduced as needed.
- Assigns page numbers to Test Data sheets and Test Exceptions sheets after the ATP is complete, and submits the completed Test Control copy of the ATP for approval signatures.

#### 1.4 SYSTEM DESCRIPTION

The FRS is one of six major components of the Equipment Removal System, which has been designed to retrieve, transport, and store the existing mixer pump that may require removal from Tank 241-SY-101. The FRS is designed to contain the waste during the removal and handling of the pump prior to insertion of the pump into the storage container.

The FRS consists of a containment bag, pump cap, blast shield, and gamma detector system. The containment bag is a long cylindrical fiber-reinforced plastic bag that is slipped over the pump as it is lifted from the tank. The bag is 1.8 m (70 in.) in diameter, and approximately 17.7 m (58 ft.) long. A manually operated cinching mechanism closes the bag bottom and pulls it up to one side of the pump. The pump cap is a two-piece sheet-metal cap that is used to seal off the top of the pump above the mounting flange and provides a sealing interface between the bag and pump. The blast shield is a large diameter steel cylinder that provides a sealing surface to the load distribution frame (LDF) and contains the spray water from the high pressure nozzles located in the LDF. The blast shield protects the containment bag from the impingement of the wash water blast and also supports the containment bag prior to the pump removal. The gamma detector system is mounted to the base of the blast shield to measure dose rates as the pump is lifted from the tank.

Other equipment associated with the FRS includes the lifting yoke, the yoke brace, and the aluminum stages. The lifting yoke is a below-the-hook lifting device that is used to lift the test mixer pump. It attaches to the two lugs on the pump mounting flange. The yoke brace secures the yoke to the upper pump column so that the crane can be disconnected from the yoke and the FRS can be lowered over the yoke and onto the LDF. The aluminum stages serve as access platforms for rigging and manual manipulation of attachment hardware.

#### 1.5 TEST CONDITIONS AND EQUIPMENT REQUIRED

The test for Phase II will be conducted at the Hoisting and Rigging Facility in the 600 Area. The test will be outside the building where water drainage can be provided.

Phase II testing for load holding capability of the containment bag will be performed by using a mock containment bag that is approximately 12.2 meters (40 feet) long and is without the elastic cords and absorbent lining material. The bag assembly will be suspended by a crane and the bottom of the bag will be cinched and raised to one side using the bag cinching mechanism. The bag will then be filled with a measured volume of water to load the bag with a test weight. The volume of water to be added is 908 L (240 gal.) or until the bag fails. This volume corresponds to a test weight of approximately 910 kg (2000 lb.). If failure occurs, the volume of water added will be recorded. The bottom of the bag will be closely observed during the test to identify any significant leakage or holes in the bag.

The following equipment will be required for this ATP:

- Mock primary containment bag of approximately 12.2 m (40 ft.) length equipped with a bag bottom cinching mechanism. The bags will be without the elastic cords and absorbent liner. The bag will feature a fill valve in the side near the bottom for connecting a hose to add water to the bag.
- Secondary bag, which connects primary bag above to the pump cap assembly.
- Test fixture to mock up top of pump.
- Pump cap assembly.
- Rigging for supporting the containment bag and test fixture.
- A crane with a minimum lift height of 12.2 m (40 ft) and 1800 kg (2-ton) lift capacity. As an alternate to the crane, a support structure to suspend the load may be used with a hoisting device for lifting and lowering the load.
- A water supply with hoses and connectors.
- A flow totalizer with a minimum accuracy of  $\pm$  5% and a minimum range of 950 L (250 gal.) for measuring the volume of water added to the bag.

#### 1.6 ACCEPTANCE TEST

The test is to be performed per the following sequence of step-by-step instructions.

#### 1.6.1 Preliminary Conditions

The following shall be satisfactorily completed before performing Section 1.6.2.

\_\_\_\_ 1.6.1.1 All equipment (listed in Section 1.5) required for the test is located at the test site.

	1.6.1.2	for workmanship and for compliance with design.
-	1.6.1.3	The pump cap assembly has been inspected for workmanship and for compliance with design.
	1.6.1.4	All rigging meets the inspections requirements in the Hanford Site Hoisting and Rigging Manual, DOE-RL-92-36.
	1.6.1.5	All nameplates, equipment tags, etc. are installed/attached.
	1.6.1.6	All test instruments requiring calibration have a currently valid calibration stamp attached that indicates a calibration traceable to the National Institute of Standards and Technology.
	1.6.1.7	Personnel responsible for directing and witnessing the performance of the test described in this ATP have read and understand their roles.
	1.6.1.8	The location for the test will provide adequate drainage for draining the water from the bag and for a sudden release of a large volume of water in the event of a bag failure.
	1.6.1.9	If the ATP is performed outside the 200 Areas, the Safety Organization for that area shall provide overview at the ATP. If the ATP is performed in the 200 Areas, TWRS Industrial Health and Safety will provide overview. The safety representatives have performed a job walk down, a Pre-Job Safety Meeting has been conducted, and a Hanford Job Hazard Analysis Checklist has been completed.
<del></del>	1.6.1.10	All personnel have hard hats to be worn during crane operation.
1.6.2	Bag Asse	mbly Setup
	1.6.2.1	Verify that all of the steps in section 1.6.1 are complete.
<u></u>	1.6.2.2	Install pump cap assembly on the mock pump test fixture by inserting and tightening the provided bolts per drawing H-2-821392.
	1.6.2.3	Attach secondary bag to pump cap using pump cap band clamp per drawing $H\!-\!2\!-\!821392$ .
	1.6.2.4	Attach secondary bag to primary bag using band clamp per drawing H-2-821392.
•	1.6.2.5	Bundle/compress the secondary bag on top of the pump cap assembly.
	1.6.2.6	Attach rigging to the mock pump test fixture and lift the bag assembly to an elevation that will locate the bottom of the

		bag approximately 0.610 meters (2 feet) above the ground. Using the bag cinching mechanism, cinch the bottom of the bag
	1.6.2.7	Connect the hose from the building standard water supply to the flow totalizer. Connect the hose from the flow totalizer to the fill valve on the bag. Verify that the flow totalizer is located a safe distance from the bag in case of bag failure.
1.6.2	Test Pro	cadura
1.0.3		
<del></del>	1.6.3.1	Verify that all of the steps in section 1.6.2 have been performed.
	1.6.3.2	Verify that the flow totalizer is functional and record the initial totalizer reading.
	1.6.3.3	Add 908 L (240 gal.) to the initial totalizer reading and record this value on the test data sheet.
	1.6.3.4	A technician is required to man the water supply valve for the duration of this test. Open the water supply valve and start adding water to the bag. Approximate fill rate should be 38-76 L/min. (10 - 20 gpm). Verify that the flow totalizer is indicating flow and volume.
NOTE:	exceeding manning t	he totalizer indication as the bag is filling to avoid the maximum volume of 908 liters (240 gal.). The technician he water valve shall be ready to respond quickly to shut the the bag fails so that the final totalizer reading will be
	1.6.3.5	Observe the bag for leaks while filling and record comments from observations on the Test Log (Appendix D). The totalizer's volume indication at the occurrence of the leak should be recorded with the comments. Also, a rough estimate of the leak rate should be recorded.
	1.6.3.6	Shut off water supply valve after flow totalizer reading exceeds value recorded in step 1.6.3.3. Record final totalizer reading on the test data sheet. The volume of water added to the bag has reached 908 liters (240 gallons), and the test is considered complete.
***************************************	1.6.3.7	Lower the bag assembly to the ground and inspect for damage. Record a description of any damage on the Test Log. If no damage to the bag assembly occurred and no leaks occurred during the test, the bag has met its acceptance criteria for this test. If leakage occurred, an estimate of the total volume that leaked should be recorded on the test data sheet.
	1.6.3.8	As the last step in this test, review the test to verify that

#### 1.7 TEST DATA SHEETS

The Test Data Sheets are to provide a record of the test and to document any procedure steps requiring verification. Instructions for filling out the data sheets are provided below. The Test Data Sheets are provided in Appendix B.

- 1. <u>Date</u>: Record the date the test is performed.
- 2. <u>Test Section Title</u>: There are several sections of this acceptance test being performed, e.g., the preliminary conditions, equipment setup, etc.
- 3. <u>Test Unit Number</u>: Record the unit number of the test unit, if any.
- 4. Test Performed By: Print the name of the person performing the test.
- 5. <u>Procedure Step Number</u>: This column contains the test steps requiring verification.
- 6. <u>Attribute</u>: This column contains the item being verified or the parameter being measured/recorded.
- 7. <u>Value</u>: This column is for recording the quantitative or qualitative measure of the item being verified, i.e. a line voltage may have a value of 120V, whereas a pump may have a value of ON or OFF.
- 8. Range: This column indicates the anticipated value of the item being measured. If a value is recorded for later analysis, there may not be a tolerance associated with it.
- 9. <u>Accept/Reject</u>: Indicate whether the value obtained is acceptable in comparison with the Range. If a value is recorded for later analysis, the accept/reject decision may be determined later.
- 10. <u>Comment</u>: Provide any pertinent observations or comments. If the value is rejected, give a justification for denial.
- 11. <u>Complete Sig/Init</u>: Initial in this column to indicate the step has been completed.

#### 1.8 TEST EQUIPMENT SHEETS

The Test Equipment Sheets provide a record of equipment used for the acceptance test. The Test Equipment Sheets are provided in Appendix A and can be copied as needed. Provide a description of the equipment used and record the equipment serial number. For instrumentation, record the calibration expiration date, if applicable.

#### 2.0 CHANGE CONTROL AND EXCEPTIONS TO ACCEPTANCE TEST SECTION

Acceptance testing is to be conducted in accordance with the steps and requirements specified in this procedure. Any required field changes or other discrepancies must be recorded as an exception and resolved/approved following the method described in this section.

#### 2.1 TEST EXECUTION

The acceptance test procedures detailed in Section 1.6 shall be performed in sequential steps starting with Section 1.6.1. As required by Section 1.3.10, the Recorder will initial and date every test step in the space provided on the Test Control copy of the ATP as each step is completed. Any step that requires verification must also be recorded on the Test Data Sheet. The Test Execution Sheet (Appendix E) will be completed per the following directions.

#### 2.1.1 Without Exception

- 2.1.1.1 Check applicable space on the Test Execution Sheet (Appendix E) to show that the ATP has been performed and <u>no</u> exceptions have been recorded.
- 2.1.1.2 Sign and date in the spaced provided in the Test Execution and Test Approval and Acceptance sections of the Test Execution Sheet.
- 2.1.1.3 Distribute the Test Control copy of the ATP as required.

#### 2.1.2 With Exception/Resolved

- 2.1.2.1 Check applicable space on the Test Execution Sheet to show that the ATP has been performed with exceptions recorded and resolved.
- 2.1.2.2 Sign and date in the spaced provided in the Test Execution and Test Approval and Acceptance sections of the Test Execution Sheet.
- 2.1.2.3 Distribute the Test Control copy of the ATP as required.

#### 2.1.3 With Exception/Outstanding

- 2.1.3.1 Check applicable space on the Test Execution Sheet to show that the ATP has been performed with exceptions recorded, part or all of which are presently outstanding, unresolved.
- 2.1.3.2 Sign and date in the spaces provided in the Test Execution section of the Test Execution Sheet.
- 2.1.3.3 Distribute the Test Control copy of the ATP as required.

2.1.3.4 After all outstanding exceptions have been resolved, sign and date in the spaces provided in the Test Approval and Acceptance section of the Test Execution Sheet.

#### 2.2 RECORDING AND RESOLVING EXCEPTIONS

#### 2.2.1 GENERAL

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

#### 2.2.2 RECORDING

- 2.2.2.1 Number each exception sequentially as it occurs and record it on an Exception Sheet.
- 2.2.2.2 Enter name and organization of objecting party for each exception.
- 2.2.2.3 Enter planned action to resolve each exception when such determination is made.

#### 2.2.3 RETEST/RESOLUTION

- 2.2.3.1 Record the action taken to resolve each exception. Action taken may not be the same as planned action.
- 2.2.3.2 When action taken results in an acceptable retest, complete Retest Execution section of the Exception Sheet.
- 2.2.3.3 When action taken does not involve an acceptable retest, strike out the Retest Execution and Acceptance section of the Exception Sheet. Resolve exception per section 2.2.4 below.

#### 2.2.4 APPROVAL AND ACCEPTANCE

- 2.2.4.1 The Cognizant Engineer is responsible for resolving exceptions to the ATP and obtaining final approval and acceptance of exceptions by checking one of the following on the Exception Sheet:
  - Acceptable Retest Performed: Applicable when Retest Execution and Acceptance section is completed.
  - Exception Accepted-As-Is: Requires detailed explanation.
  - Other: Requires detailed explanation.
- 2.2.4.2 The Cognizant Engineer signs and dates the Exception Sheet and obtains other approvals, if required.

# 2.2.5 DISTRIBUTION

Attach completed Exception Sheets to the Test Control copy of the ATP and distribute for final approval.

# APPENDIX A - TEST EQUIPMENT SHEET (Copy as needed)

#### **TEST EQUIPMENT**

1EST EQUIPMENT							
Serial Number	Description	Calibration Exp. Date					
·							

# APPENDIX B - TEST DATA SHEETS

# TEST DATA SHEET

Date of tes	t:		Test Unit Number:						
Test Section Flexible Acceptan	Receiver Phase	II	R = Recorder E = Cognizant Engineer Q = Quality S = Safety						
Test Performed By:			O = Other Defined:						
Procedure Step Number	Attribute	Value	Range	Accept/ Reject	Comment	Complete Sig/Init			
1.6.2.1	Section 1.6.1		Completed (yes)			E Q			
1.6.3.1	Section 1.6.2		Completed (yes)			E Q			
1.6.3.2	Totalizer initial reading		Record	NA		E Q			
1.6.3.3	Projected final totalizer reading		Record	NA		E Q			
1.6.3.4	Flow totalizer function		Functional (yes)			E Q			
1.6.3.6	Final totalizer reading		greater than value in step 1.6.3.3			E Q			
1.6.3.7	Bag assembly inspection		Damage (none)			E Q			
1.6.3.8	Section 1.6.3		Completed (yes)			E Q			

# APPENDIX C - TEST EXCEPTION SHEET (Copy as needed)

# TEST EXCEPTION SHEET #\_\_\_

Test Title: Flexible	Accepta Receive	nce Test r System	Test	Test Item Number:								
		EXCE	PTIONS				RESOL	UTION				
Procedure Step Number	Step							Planned Action Action Ta				
OBJECTING  RETEST EX	•	AND ACC	EPTANCE:	R	ecorde	er		Date	e			
Date of tes	t:			Test Unit	Number:							
Test Section Test Perform	R = Recorder E = Cognizant Engineer Q = Quality S = Safety O = Other Defined:											
Procedure Step Number	Attr	ibute	Value	Rang	e	Accept/ Reject	Commer	nt	Complete Sig/Init			
CORRECTION												
ACCE				·								
OTHE Expl	R AIN:			·								
Quality		4	Date	C	ogniza	ant Engi	neer	Date	е			
Safety		***	Date									

# APPENDIX D - TEST LOG SHEET (Copy as needed)

#### TEST LOC

TEST LOG							
DATE/TIME	COMMENTS						
,							
·							

# APPENDIX E - TEST EXECUTION SHEET

### **TEST EXECUTION SHEET**

Date: Test Unit Number:	Document Number: WHC-SD-WM-ATP-092, Rev. 0						
TEST	PERSONNEL						
Cognizant Engineer:	Recorder:						
Safety:	Quality:						
Others:							
TEST EXECUTION							
Without WithExceptionException	With on/Resolved Exception/Outstanding						
Cognizant Engineer Date	Recorder Date						
Safety Date	Quality Date						
TEST APPROVAL AND ACCEPTANCE							
Cognizant Engineer Date	Quality Date						
Safety Date							