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1	1	Safety: T Romano	<i>[Signature]</i>	2/16/98	H1-15						
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Test Plan for the Sample Transfer Canister System

B. D. Flanagan

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Abstract: The Sample Transfer Canister will be used by the Waste Receiving and Processing Facility (WRAP) for the transport of small quantity liquid samples that meet the definition of a limited quantity radioactive material, and may also be corrosive and/or flammable. These samples will be 49 CFR 173.4, "Exception for small quantities."

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TEST PLAN FOR THE SAMPLE TRANSFER CANISTER SYSTEM

1.0 INTRODUCTION

The Sample Transfer Canister will be used by the Waste Receiving And Processing Facility (WRAP) for the transport of small quantity liquid samples that meet the definition of a limited quantity radioactive material, and may also be corrosive and/or flammable. These samples will be packaged and shipped in accordance with the U.S. Department of Transportation (DOT) regulation 49 CFR 173.4, "Exceptions for small quantities."

The Sample Transfer Canister is of a "French Can" design, intended to be mated with a glove box for loading/unloading. Transport will typically take place north of the Wye Barricade between WRAP and the 222-S Laboratory. The Sample Transfer Canister will be shipped in an insulated ice chest, but the ice chest will not be a part of the small quantity package during prototype testing.

2.0 PURPOSE/SCOPE

2.1 PURPOSE

The purpose of this test is to demonstrate that the Sample Transfer Canister will provide adequate protection to the inner receptacles as required under 49 CFR 173.4, "Exceptions for small quantities." The test procedure consists of a compressive load and drops in five required positions onto an unyielding surface to show the proven integrity of the canister system.

2.2 SCOPE

This test plan/procedure provides planning, pre-test, setup, testing, and post-testing guidelines and procedures for conducting the compression and drop tests for the Sample Transfer Canister. No radioactive or hazardous material are involved in this testing.

3.0 GENERAL REQUIREMENTS

3.1 TEST ARTICLE

The test article consists of the Sample Transfer Canister system. The system includes the metal Sample Transfer Canister, two 250 mL glass containers, bubble packing, and absorbent. To simulate the payload of the canister spilling, a water and red dye mixture will be used to determine if there are any leaks in the container. To ensure the payload simulant meets the maximum payload restriction of 30 mL or 30 g of material, approximately 125 mL of water and red dye per inner receptacle shall be used during the testing.

The Sample Transfer Canister is made of metal and is cylindrical in shape. The height is 10.5 in., the bottom diameter is 6.4 in., and the top 1.5 in. of the canister is 9.0 in. in diameter. The lid is sealed with a gasket and closed by a drop and lock method against positive stops.

3.2 TEST OBJECTIVE

The objective of this test is to determine whether the Sample Transfer Canister system can effectively meet the requirements stated in 49 CFR 173.4(a)(6). This will be accomplished by performing a compression test and five drop tests in the configurations described in Table 1 and evaluating any damage to the container and contents. Because the Sample Transfer Canister is cylindrical in shape the drop configurations meet the requirements as best as possible.

Table 1. Required Testing Configurations.

Compression Test	Place container system shall be placed on a hard flat surface. Stack 350 lb of lead bricks on top of container to simulate the stacking requirements of 49 CFR 178.606(c).
Drop #1 – Flat bottom	The container system shall be raised 71 in. above the drop pad (measured from the lowest point) with the bottom of the container facing down. The container should be oriented such that the line of impact through the center of gravity (cg) is perpendicular to the floor when released (flat drop).
Drop #2 – Flat top	The container system shall be raised 71 in. above the drop pad with the top (lid) of the container facing down. The container should be oriented such that the line of impact through the cg is perpendicular to the floor when released.
Drop #3 – Flat drop on side	The container system shall be raised 71 in. above the drop pad horizontally. The container shall be oriented such that at impact the container hits squarely with the top and bottom impacting simultaneously.
Drop #4 – Flat drop on side	The container system shall follow the steps of drop #3 but shall be rotated to a new impact location.
Drop #5 – Corner drop	The container system shall be raised 71 in. above the drop pad with the top (lid) facing down. The container shall be oriented such that the line of impact between the cg and the impacting edge is perpendicular to the floor when released.

3.3 ACCEPTANCE CRITERIA

The acceptance criteria for the drop is that the inner receptacles survive without breakage or leakage and without a substantial reduction in the effectiveness of the package. To ensure that the inner receptacles do not leak or break, a mixture of water and red dye shall be placed within the receptacles.

A visual inspection of the exterior will be made of the Sample Transfer Container after each test. Any deflection of the canister shall be measured and photographed. After completion of the five drop tests the canister shall be opened and the contents inspected for breakage or leakage of the inner receptacles.

3.4 PHOTOGRAPHY

The canister is to be photographed before each drop and after the drop to document any damage to the test article. Photographs should be concentrated around lid and areas of damage. Additional photographs will be taken during testing at the discretion of the cognizant engineer or a quality assurance (QA) representative.

The photography equipment will be supplied by the cognizant engineer.

3.5 SAFETY

The cognizant engineer shall coordinate with the Waste Management Federal Services, Inc., Northwest Operations (WMNW) safety engineer to review and establish safety requirements for the tests.

3.6 QUALITY ASSURANCE

Testing will be conducted under the WMNW quality assurance requirements as specified in EBU-QAP-001, *Quality Assurance Procedures*. Quality Assurance personnel will be notified of the proposed testing schedule and will witness the testing activities.

4.0 TEST REQUIREMENTS

4.1 TEST FACILITY

The test pad shall be composed of a hard unyielding surface such that all energy from the drop is applied to the container. A suitable test pad is located in the 300 Area of the Hanford Site.

4.2 REQUIRED TEST EQUIPMENT

Table 2 shows a partial list of equipment required for the drop tests. Equipment may be added or deleted from this list by the cognizant engineer, as required and documented.

Table 2. Required Equipment.

Item	Responsibility
Scale capable of measuring 50 lb in 1 lb increments.	
Still camera and film	
Rubber mallet	
Standard screwdriver	
Level	
Pliers	
Tape measure	
Black marking pen	
Safety glasses and hard hats for spectators	
Caution tape	
Broom	

4.3 TEST PERSONNEL

The following personnel listed in Table 3 will be required for this test. Personnel involved in the testing are required to print their names, then initial and date next to their printed names.

Table 3. Required Test Personnel.

Personnel	Names (Print)	Initial	Date
Cognizant Engineer: Bryan D. Flanagan			
QA Rep.: Tino Romano			
Technician: Juan M. Rodriguez			
Technician:			

QA = Quality assurance.

The cognizant engineer and QA representative are required to witness all testing described in this procedure.

5.0 PRE-TEST REQUIREMENTS

5.1 SAFETY

All test operations shall be conducted in a safe manner. The cognizant engineer shall be responsible for the safety of personnel and equipment at the test site, for ensuring all witness and

test support personnel are at assigned safe locations before lifting or dropping the test article, and for ensuring all personnel have required safety equipment (e.g., hard hats, eye protection).

5.2 TEST PERSONNEL

All test support personnel shall have received any required training prior to participating in the tests. All test operations shall be conducted by authorized personnel.

5.3 FACILITIES, EQUIPMENT, AND MATERIALS

Landlord concurrence for the use of the test facility shall be obtained by the cognizant engineer prior to any test activities.

The cognizant engineer shall schedule and arrange for the arrival of the Sample Transfer Canister system and all equipment needed during the testing.

5.4 TEST DATA SHEETS

All data sheets shall be witnessed and signed off by the cognizant engineer and the responsible QA representative after the completion of each test. All data sheets are located in Appendix A.

6.0 TEST PROCEDURE

6.1 COMPRESSIVE TEST PROCEDURE

6.1.1 Pre-Compressive Test Activities

The cognizant engineer shall complete a pre-test checklist (see Appendix A).

6.1.2 Compressive Test

The compressive test shall follow the test method of 49 CFR 178.606(c). The Sample Transfer Canister shall be placed on a flat hard surface (concrete floor) for a total minimum test period of 24 hours. The equivalent of 10 ft of stacked canisters shall be placed on the lid of the canister. The equivalent weight shall be determined during testing. The compressive test data sheet in Appendix A shall be completed.

6.2 DROP TESTS

6.2.1 Pre-Drop Test Activities

The cognizant engineer shall complete a pre-test checklist prior to the start of the drop tests (see Appendix A).

6.2.2 Drop Tests

Each of the five drop tests shall follow the requirements described in 49 CFR 173.4(a)(6). The five drops include:

- (A) One drop flat on the bottom;
- (B) One drop flat on the top;
- (c) One drop flat on the side;
- (D) Another drop flat on the side at a different location than drop (C);
- (E) One drop on the top (lid) edge of the canister .

Each drop shall be from a minimum height of 71 in. onto the unyielding test pad. For each drop test the cognizant engineer shall complete a drop test data sheet from Appendix A.

6.2.3 Post-Test Activities

The cognizant engineer shall complete the post-test data sheet for the acceptance or failure of the acceptance criteria (see Appendix A).

7.0 REFERENCES

49 CFR 173.4, 1996, "Exceptions for small quantities," *Code of Federal Regulations*, as amended.

49 CFR 178.606, 1996, "Stacking Test," *Code of Federal Regulations*, as amended.

EBU-QAP-001, *Quality Assurance Procedures*, Waste Management Federal Services, Inc., Northwest Operations, Richland, Washington.

APPENDIX A. FORMS FOR TESTING.

Pre-Test Checklist

Pre-Test Checklist for _____ test(s).	Initial
1. Hold a pre-test meeting with all personnel involved with the testing. The Cognizant Engineer shall review the test procedures and discuss potential hazards involved with the tests. 2. Identify safety zones to test personnel and observers. 3. Remove dirt and debris from testing area. 4. Set up photographic equipment and verify operation. 5. Inspect and verify all equipment needed is available and operational. 6. Visually inspect Sample Transfer Canister for any damage. Note any marks which could be mistakenly listed as damage after testing.	
Cognizant Engineer: _____ Date: _____ QA Representative: _____ Date: _____	

Compression Test Data Sheet

Date/Time Started:	Date/Time Ended:	Initials
1.	Prepare inner glass receptacles with water and red dye mixture. Secure lid with masking tape. Amount of simulant added per receptacle: _____ mL	
2.	Load canister with absorbent, bubble wrap, and inner glass receptacles	
3.	Verify lid is securely closed.	
4.	Weigh test article on scale. Weight: _____ lb Scale calibration #: _____ Expiration date: _____	
5.	Record weight of stacked items using above scale: Brick Weight Brick Weight Board _____	
6.	Place test article in testing area. Secure testing area with caution tape.	
7.	Minimum amount of weight to be stacked on test article is 11.5 x weight = _____ lb (11.5 = number of canisters needed to reach 10 ft in height)	
8.	Amount of weight stacked on test article = _____ lb	
9.	Allow a minimum of 24 hours to pass with the weight stacked on the canister.	
10.	Upon arriving to test site after 24 hours, confirm test site has not been disturbed. Yes: _____ Other: _____ _____	
11.	Record any damage to test article: _____ _____ _____ _____ _____ _____	

Data sheet has been completed.

Cognizant Engineer: _____ Date: _____

QA Representative: _____ Date: _____

Drop Test Data Sheet

	Drop # _____ of 5 Date/Time: _____	Initials
1.	Location of test: _____ _____	
2.	Drop Configuration: _____ _____ _____	
3.	Weight of canister and payload: _____ lb Scale calibration #: _____ Expiration date: _____	
4.	Actual drop height of drop (71 in. minimum): _____ in.	
5.	Record comments and damage to the canister: _____ _____ _____ _____ _____ _____	
6.	Record damaged areas with the camera.	
Data sheet has been completed. Cognizant Engineer: _____ Date: _____ QA Representative: _____ Date: _____		

Post Test Data Sheet

Date/Time: _____	Initials
1. Verify all testing has been completed and all data sheets have been signed.	
2. Open canister and evaluate the condition of the contents: _____ _____ _____ _____ _____ _____	
3. Record any damage to the contents with the camera.	
Post Data sheet has been completed. Cognizant Engineer: _____ Date: _____ QA Representative: _____ Date: _____	

DISTRIBUTION SHEET

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