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8 ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

Per the requirements of 10CFR71.85(c) [1], this section discusses the inspections and tests to be performed prior to first use of the Versa-Pac.

8.1 Fabrication Acceptance Tests

All Versa-Pac packaging materials of construction shall be examined in accordance with the requirements delineated on the drawings in Appendix 1.4.1, *Packaging General Arrangement Drawings*, per the requirements of 10CFR71.85(a) [1].

Source inspections and final release of the package will be performed, verifying the quality characteristics were inspected and that the packaging is acceptable. Any characteristic that is out of specification must be reported. It will then be dispositioned according to procedure. The following tests are performed by the fabricator prior to release of the packaging for use by the User.

8.1.1 Visual Inspection and Measurements

Prior to the initial use, a visual inspection is performed including the following items at a minimum:

a. Confirm that the package dimensions are in compliance with the appropriate drawings (This may be accomplished by a review of the Quality Assurance and Fabrication Records).

b. Insure that the visible seals (Internal and External) are in place.

c. Insure that all bolts and washers are the correct type and size per the drawing.

d. Insure that all required gaskets are in place and are in compliance with the drawings.

e. Verify that the nameplates and markings are correct.

8.1.2 Weld Examinations

As part of the normal course of fabrication, the Versa-Pac is subjected to visual inspections of all welds and magnetic particle inspection of those welds shown on the fabrication drawings to insure that the welds of the package are in compliance with the applicable codes and standards required by the drawings and specifications of the Versa-Pac. These inspections are recorded on the Fabrication Control Record as part of the Quality Assurance program [2].

8.1.3 Structural and Pressure Tests

The Versa-Pac does not contain any tie-down devices that are a structural part of the package. The Versa-Pac is handled, loaded, and unloaded using standard handling equipment.

The Versa-Pac is not a pressure-retaining package and no per unit pressure testing is required prior to use. As identified in Section 2.2.1, Mechanical Properties and Specifications, the drum design is qualified with a hydrostatic pressure, 29 psig (200 kPa), as part of the UN drum qualification testing.

No other Structural or Pressure testing is performed.

8.1.4 Leakage Tests

The Versa-Pac does not contain any seals or containment boundaries that require leak testing. Therefore, this section is not applicable.

8.1.5 Component and Materials Tests

The closed cell polyurethane foam, alumina silica paper, and gasket materials are acceptance in accordance with the drawing requirements. Inspect package containment components for any damage that would prove detrimental to their ability to properly function as required.

8.1.6 Tests for Shielding Integrity

Shielding tests are not applicable to the Versa-Pac. The Versa-Pac does not contain any biological shielding.

8.1.7 Thermal Acceptance Tests

The material properties utilized in Section 3.0, *Thermal*, are consistently conservative for the Normal Conditions of Transport (NCT) and Hypothetical Accident Condition (HAC) thermal analyses. As such, with the exception of the tests required for specific packaging components, as discussed in Section 8.1.5, *Component and Material Tests*, specific acceptance tests for material thermal properties are not required or performed.

8.1.8 Miscellaneous Tests

No other additional tests are required prior to use of the Versa-Pac.

8.2 Maintenance Program

This section describes the maintenance program used to ensure continued performance of the Versa-Pac. The Versa-Pac is maintained consistent with a 10CFR71 Subpart H Quality Assurance program [3]. Packages that do not conform to the license drawings are removed from service until they are brought back into compliance. Repairs are performed in accordance with approved procedures and consistent with the QA program.

The User shall establish written procedures for the periodic maintenance and inspection of the Versa-Pac requiring the following as a minimum:

8.2.1 Structural and Pressure Tests

The Versa-Pac does not contain any lifting/tie-down devices that require load testing. No pressure tests are necessary to ensure continued performance of the Versa-Pac.

8.2.2 Leakage Tests

No leakage tests are necessary to ensure continued performance of the Versa-Pac.

8.2.3 Component and Material Tests

8.2.3.1 Prior to Each Use

The following items shall be performed as a minimum prior to each package use for shipment:

a. Visually inspect the outer and inner surfaces as appropriate for rust or other superficial discontinuities. Properly trained personnel should repair any adverse indications as necessary in accordance with the drawing requirements.

b. Visually inspect all gaskets and pads for wear and/or deterioration and replace as necessary. Inner containment pads may be removed, if desired, for one-time-only shipments where the container is buried or otherwise destroyed.

c. Inspect all sealing surfaces for damage that would interfere with the safe use of the package.

d. During visual inspection, the exterior surfaces of the package should be inspected for any corrosion. If found, these areas should be evaluated in accordance with 8.2.3.2(d) below.

e. If using the VP-55-2R for the VP-55HC, visually inspect the threads on the 2R containment vessel pipe body and pipe cap or plug. If the threads are damaged continuously from the bottom of the thread to the top, reject the part. Repair minor damage using a thread-dressing tool.

8.2.3.2 Every Five Years

The Owner of the individual Versa-Pac shall perform and maintain a record of the following inspections at a minimum:

a. All inspections listed in Section 8.2.3.1.

b. Full visual of all accessible surfaces and welds for the presence of cracks or other unacceptable discontinuities. Any questionable condition of a weld shall be subject to further examination to assure proper compliance. Any weld defects shall be repaired in accordance with the appropriate procedures.

c. Check flanges and covers for warping and/or distortion that prevent proper closure.

d. During the visual inspection of exterior surfaces, if areas are suspected of having corrosion, the inspection should insure that corrosion has not reduced the outer package wall thickness by more than 10% of the nominal thickness over a 6” square area. When visual inspection cannot assure sufficient wall thickness, other methods of inspection should be utilized, such as ultrasonic testing, to assure acceptability.

e. All repairs shall be performed by sources that are competent and properly trained. Allowable repairs shall include repairs made to welds and base metal. Repairs that require welding shall be made by welders who are qualified in accordance with the ASME Boiler and Pressure Vessel Code [4] and/or Section 5 of AWS D1.1 [5]. The repair shop shall provide certification of weld procedures and welder qualifications.

f. Weigh the container to verify that the container is within 10 pounds of the original fabrication weight recorded on the nameplate.

g. If the package contains payload or is in transit at the test due date, the inspection may be deferred to allow unloading and/or transport of the package, as necessary.

8.2.4 Thermal Tests

No thermal tests are necessary to ensure continued performance of the Versa-Pac .

8.2.5 Miscellaneous Tests

Localized deformations in the outer drum of the Versa-Pac are permitted up to 1-inch provided the shell material is not breached. The package may be repaired in accordance with the drawings in Appendix 1.4.1, *Packaging General Arrangement Drawings*.

8.3 References

[1] Nuclear Regulatory Commission (NRC), Title 10, Part 71-Packaging and Transportation of Radioactive Material.

[2] Daher-TLI, "QUALITY ASSURANCE PROGRAM DESCRIPTION," QAPD1, Rev. 0, 2014.

[3] Nuclear Regulatory Commission (NRC), "Title 10, Part 71-Packaging and Transportation of Radioactive Material, Subpart H - Quality Assurance,".

[4] The American Society of Mechanical Engineers (ASME), "Boiler and Pressure Vessel Code, BPVC-IX -- Section IX, Welding and Brazing Qualifications," BPVC-IX, 2015.

[5] American Welding Society (AWS), "D1.1/D1.1M:2010, Structural Welding Code - Steel,".

8.4 List of Appendices

Not applicable.