STSB:NLO
71-9019

FEB 17 1994

General Electric Company
ATTN: Mr. Charles M. Vaughan
PO Box 780
Wilmington, NC 28402

Dear Mr. Vaughan:

This refers to your application dated December 3, 1993, as supplemented December 14, 1993, December 22, 1993, and January 12, 1994, requesting an amendment to Certificate of Compliance No. 9019, for the Model No. BU-7 package.

In connection with our review, we need the information identified in the enclosure to this letter.

Please advise us within 30 days from the date of this letter when this information will be provided. Additional information requested by this letter should be submitted in the form of revised pages. If you have any questions regarding this matter, we would be pleased to meet with you and your staff. Nancy Osgood is the project manager for our review of your application. Ms. Osgood may be contacted at (301) 504-2459.

Sincerely,

Cass R. Chappell, Section Leader
Cask Certification Section
Storage and Transport Systems Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

Enclosure: As stated

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Structural

1. The buckling analysis of the inner container (supplement dated December 14, 1993) shows a margin of only 15% against buckling under 21 psi external pressure. Section VIII of the ASME Code would require a thicker shell to resist 21 psi external pressure, and Section III of the Code would require a safety margin greater than 15% against buckling. The ASME Code applies to quality vessels, whereas the BU-7 inner container is not designed, fabricated, or inspected to the same standards as vessels which meet the ASME Code. Further, the buckling analysis does not account for possible deterioration of the container during service (note that most of the packages in use are at least 10 years old). Justify that the BU-7 containment system has an adequate margin of safety against buckling. Specify the code or standard used for design of the containment vessel of the BU-7 package. Show that this code or standard allows a margin of safety as small as 15% against buckling, and justify that this code or standard is appropriate to use for the containment system in the Model BU-7 package. Note that the integrity of the containment system is relied upon to ensure criticality safety under accident conditions.

2. For the 30-foot drop test, the BU-7 package was dropped on its top closure ring at approximately 45°. The closure ring was deformed on impact, and there was a slight opening of the drum lid. The subsequent puncture test was performed such that the package lid impacted the pin at a location away from the damaged area. The puncture test does not appear to have been performed in the orientation which would cause maximum damage to the package closure. The performance of the containment system (i.e., the ability of the inner container to exclude water) depends on the condition of the gasket after the fire test. The condition of the gasket after the fire test depends on the drum remaining closed. (Note that the insulating foam is charred all the way to the gasket after the fire test, as shown in Figures 35 and 36 of Appendix B of the application.) Justify that the 30-foot drop and puncture tests were performed in the most damaging orientation with respect to maximizing damage to the closure from the puncture test, and subsequently to the gasket from the fire test. Alternatively, perform additional 30-foot drop, puncture, and fire tests of the BU-7 package. The 30-foot drop and puncture tests should be performed in the orientation which produces maximum cumulative damage to the package closure.

3. The application (supplements dated December 14 and 22, 1993) discusses hydrostatic tests that were performed on BU-7 and BU-J packages. The application is not clear with respect to the details of the tests. Revise the application to clearly address the following:

   (a) Provide details of the hydrostatic tests performed on the BU-7 package. Include the package configuration, test setup, and package closure method.

(b) State whether the packages were newly fabricated or were packages which had been in service. Justify that the tests are representative of packages which are at the end of their service life.

(c) State how many specimens of each package type (BU-7 and BU-J) were tested. Note that Appendix B of the application dated December 3, 1993, states that only one BU-7 specimen was tested.

(d) Describe how the pass/fail determination was made.

(e) State how many specimens of each package type failed the test.

(f) Explain how the tests conducted on the BU-J package are relevant to the BU-7 package, considering any differences in the design, the dimensions, or the materials of construction.

4. Figure No. 10 in Appendix B of the application is incorrectly labelled. It does not appear that this is a photograph of drum No. K-1878 (see, for example, Figure No. 11 in the same appendix). In Figure No. 10, the bolt which secures the drum locking ring appears to be broken. Provide a description of the damage sustained by this bolt. If possible, provide an additional photograph which clearly shows that the bolt did not break due to the 30-foot drop test.

Criticality

1. The structural analysis of the product pails (Attachment B of supplement dated December 14, 1993) is not sufficient to show that the pails can reliably confine uranium oxide powder. Note that Figure 37 of the application clearly shows damage to the closure and deformation of the lid of the 5-gallon product pails following the accident test sequence. Note also that there are no test results available for the 3-gallon product pails. Revise the criticality analyses to consider that the uranium oxide powder may be released from the product pails under accident conditions.

2. Describe the method for benchmarking GEMER and identify the critical experiments used. Show that the biases presented in the application (including a bias of zero in cases where the code over-predicts k_{eff}) are proper and conservative for each of the H/U-235 ratios.

Operating Procedures

Specify the steps that will be taken before each shipment to verify that the product pails and inner container have been properly closed. Include a leak test to demonstrate that each inner container, as assembled for shipment, is water-tight. Specify the test method, the maximum acceptable leak rate, and the sensitivity of the leak test.

Acceptance Tests

1. Describe the method used to leak test each inner container before its first use. Specify the sensitivity of the leak test and the criteria for accepting the inner container. Include a sketch of the test set-up. Note that the leak test should be performed on the containment system as assembled for shipment, that is, all components of the containment system (drum, lid, and gasket) should be the components actually used for shipment. Also, the leakage flow direction during testing should be the same as in operation, i.e., into the inner container. Test methods using flow in the reverse direction should be justified.

2. The criticality analysis considers the presence of boron in the phenolic foam insulation. Revise the acceptance tests to include verification that boron is present and evenly distributed within the foam. State the criteria for accepting the foam.

Maintenance Program

1. Revise the maintenance program to include procedures for ensuring the reliable performance of the inner container as a water-tight containment system throughout its entire service life. These procedures should be performed annually and should include:

   a. A leak test which verifies that the inner container remains water-tight.

   b. Verification that the inner container welds, inner surface, and outer surface are free of corrosion, cracks, and other damage which could compromise the water-tightness of the package.

2. Revise the maintenance program to include annual inspection of the phenolic foam insulation. The annual inspection should include verification that the foam has not retained moisture, that the foam has not deteriorated, and that the boron content is within acceptable limits.

Drawings

Provide drawings of the 3- and 5-gallon pails. Include the following information on the drawings: dimensions, tolerances, material specifications, applicable codes and standards for fabricating and acceptance testing the pails, and details of the pail closure.