SAFETY EVALUATION REPORT

Docket No. 71-9204
Model No. CNS 10-160B Package
Certificate of Compliance No. 9204
Revision No. 12

INTRODUCTION

By application dated May 11, 2007, supplemented July 18, 2007, Energy*Solutions* (the applicant) requested an amendment to Certificate of Compliance No. 9204, for the Model No. CNS 10-160B. The applicant requested the transfer of the certificate for the Model No. 10-160 B from Duratek to Energy*Solutions*; the addition of text that addresses subsequent shipment of payload containers that were originally qualified for shipment under the provisions of Condition No. 11 of the certificate; addition of alternative seal materials; and the addition of a leak test to demonstrate leak tight conditions using helium.

GENERAL INFORMATION

By application dated May 11, 2007, and supplemented by additional information through letter dated July 18, 2007, Energy*Solutions* requested an amendment to Certificate of Compliance No. 9204 for the Model No. CNS 10-160B. Energy*Solutions* submitted the amendment request for approval of a revised certificate to reflect the proposed changes.

The applicant requested that the certificate for the Model No. CNS 10-160B package be transferred from Duratek to Energy*Solutions*. This change was a result of Energy*Solutions* acquiring Duratek in 2006. In the application, Energy*Solutions* stated that the Model No. CNS 10-160B package was maintained in accordance with the NRC approved Duratek Quality Assurance Program until May 31, 2007, when the Energy*Solutions* Quality Assurance Program became effective. There are no changes to the operation and maintenance of the Model No. CNS 10-160B package. Furthermore, Energy*Solutions* also accepts responsibility for maintenance of the certificate, the SAR for the package design, and the quality assurance records in accordance with the requirements of 10 CFR 71.91(c).

The proposed amendment adds text to Appendix 4.10.2 of the application to specify that TRU payload containers approved under this appendix and subsequently shipped to another site remain acceptable for shipping provided the payload container has not been opened.

The proposed change to the application includes replacement of currently used seal material from “silicone” to three types of “elastomer” material; Ethylene Propylene Rubber, Butyl Rubber, and Silicone Rubber. The seal material currently used is silicone rubber, Class 2A, Grade 50-70 which has a low temperature resistance to about -80° F and a high temperature resistance to approximately 425° F. In the application supplement the applicant showed that all three materials, Ethylene Propylene Rubber, Butyl Rubber and Silicone Rubber have maximum heat resistance temperature of 400° F. The amendment would change the maximum temperature for the proposed seal materials for both normal conditions of transport (NCT) and hypothetical accident conditions (HAC) to 400° F from 450° F based on thermal analysis.

The proposed amendment will add a periodic leak test to demonstrate leak tight conditions using helium. The periodic leak test is intended to demonstrate whether the leak-tight criterion per ANSI N14.5-1997 is met.

STRUCTURAL EVALUATION

The applicant requested a change in seal material from silicone to elastomer. No other structural design changes were requested.

THERMAL EVALUATION

The proposed amendment to the certificate includes replacement of currently used seal material from “silicone” to three types of “elastomer” material; Ethylene Propylene Rubber, Butyl Rubber, and Silicone Rubber. The seal material currently used is silicone rubber, Class 2A, Grade 50-70 which has a low temperature resistance to about -80° F and a high temperature resistance to approximately 425° F.

The applicant reports that all temperatures and stresses within the package due to NCT are within allowable service ranges for all components and materials used in the cask. Specifically, the seal temperature range from -40 ^{o} F to 168° F and are within the required elastomer seal operating region of -40° F to 250° F. All structural materials are below their melting points.

Manufacturer’s specifications, referenced in the “Parker O-Ring Handbook,” and the TRUPACT-II test report, “Design Development and Certification Testing of the TRUPACT-II Package,” show that all three materials have a maximum heat resistance temperature of 400° F. The maximum temperature of the seal material will not exceed the maximum calculated temperature of 252° F. The seal temperature is conservatively determined to be equal to the maximum calculated temperature of the cask body plus 100° F for an analyzed maximum of 352° F. Since the analyzed maximum seal temperature is set at 352° F, setting the seal temperature limit at 450° F unnecessarily restricted the options for the types of materials that can be used for seals. Therefore the maximum seal temperature limit for HAC is set at 400° F with a duration of one hour.

Based on the review of the statements and representations in the application for the amendment, the staff finds that the thermal design has been adequately described and evaluated and has a reasonable assurance that the package meets the thermal requirements of 10 CFR Part 71.

CONTAINMENT EVALUATION

The proposed amendment adds a leak test to demonstrate leak tight conditions using helium as an option for the periodic leak test. The proposed addition to the SAR, Section 4.9 *Periodic Verification Leak Rate Determination for Leak Tight Status,* describes the method for performing a periodic leak test to demonstrate that the criteria per ANSI N14.5 – 1997 for leak-tight requirements are met.

The test is performed with a mass spectrometer leak detector. Calibration of the leak detector shall be performed using a leak rate standard traceable to NIST. The leak standard’s setting shall correspond to the leak-tight leak test rate acceptance criterion of 1.0 x 10^{-7} atm-cm^{3}/sec of air. The detector sensitivity is less than or equal to 5.0 x 10^{-8} atm-cm^{3}/sec. The test is

conducted by evacuating the cask cavity to a 90% vacuum, then pressurizing the cask cavity with helium to +1 psig – 0 psig. The annulus between the O-rings is evacuated until the vacuum is sufficient to operate the helium mass spectrometer leak detector and the helium concentration in the annulus is monitored. The monitored leak rate must satisfy the leak criterion specified in proposed Section 4.9 of the application. If installed, the vent and drain lines will be tested using the above procedure by evacuating and pressurizing the inlet (cavity) side of the lines and monitoring the helium concentration at the outlet side of the cap screw. The applicant agrees that for any condition that results in leakage in excess of the leak criterion, it shall be corrected before the use of the cask.

As part of the general procedure for loading and unloading of the Model No. CNS 10-160B package, the applicant will perform leak testing as specified in Section 8.2.2.1 of the application when the seals are replaced (including seals on the optional vent and drain ports). The test shall be performed prior to acceptance and operation of a newly fabricated package, in accordance with ASTM E-427 using halogen leak detector or ASME E-499 using helium leak detector depending on the test gas used. The detector shall be capable of meeting the applicable sensitivity requirements specified in Figures 4.4, 4.8 or 4.12 in Chapter 4 of the application. Calibration of the leak detector shall be performed using a leak test rate standard traceable to NIST. The detector probe shall be moved along the interior surface of the inner seal according to the specifications of ASTM E-427 or ASME-499.

As part of the periodic maintenance, the package shall be leak tested as described in Section 8.1.3 of the application after its third use. In addition, the containment system, before actual use for shipment, shall have been leak tested according to Section 8.1.3, or to leak-tight leak test described above within the preceding 12-month period.

Based on the review of the statements and representations in the application for an amendment, the staff finds that the containment design has been adequately described and evaluated and has a reasonable assurance that the package meets the regulatory requirements for containment design.

CONCLUSION

Condition No. 5(a)(2) was revised to show that the seal material is elastomer. Condition No. 5(a)(3) was changed to reflect Revision 13, as the latest version of Drawing No C-110-D-29003-010. Conditions No. 10(b) was revised, and Condition No. 10(c) was added for clarity regarding leak testing.

Based on the statements and representation contained in the application, as supplemented, the staff concludes that the Model No. 10-160B package meets the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9204, Revision No. 12,
on September 26, 2007.