



71-9263

April 22, 1999

Mr. Cass R. Chappell  
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Storage and Transport Systems Branch  
Division of Industrial and Medical Nuclear Safety, NMSS  
U.S. Nuclear Regulatory Commission  
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Subject: Docket 71-9263  
Certificate of Compliance Revision Application  
Model SPEC-150, Type B(U) Transportation Package  
Package Identification Number USA/9263/B(U)

Dear Mr. Chappell:

A consolidated revision application, dated April 22, 1999, is hereby submitted for Certificate of Compliance No. 9263, Revision No. 1, dated March 15, 1996, for the model SPEC-150, Type B(U) transportation package. The purposes of this application are threefold.

1. To provide a consolidated application as requested by the NRC. A detailed description of the consolidation of application information, including updated safety analysis puncture test information, is provided in Attachment No. 1.
2. To request "-85" designation to reflect compliance with IAEA Safety Series No. 6, 1985 Edition, (Revised 1990). A detailed description of the assessment of compliance with IAEA-85, including the thermal test requirements, is provided in Attachment No. 2.
3. To submit revised drawings to meet NUREG/CR-5502, *Engineering Drawings for 10 CFR Part 71 Package Approvals*. A detailed description and evaluation of the drawing changes is provided in Attachment No. 3. The drawing changes do not involve a package design change.

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We request priority review of this application. The reason for this request is that the SPEC-150 device is extremely critical to our business operations. It is an industrial radiography exposure device and it comprises the majority of our commercial business. SPEC is a small manufacturing company with less than 30 workers. Currently we manufacture two industrial radiography devices and one source changer. All three are Type B(U) packages. As of April 1, 1999 we can not fabricate any of them. We will submit consolidated applications for the other two packages soon, but we request priority review only of the SPEC-150 application, which is our primary radiography device. The other exposure device, the SPEC 2-T, is no longer authorized for use in the

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United States. The third device, the SPEC C-1 source changer, is primarily used to supply replacement sources to our customers, which is the other half of our business. As you can see, the SPEC-150 is essentially the only device we have to earn revenue. Based on current confirmed and pending orders we only have a four to six week supply of SPEC-150 cameras that were fabricated prior to April 1, 1999. Until we obtain "-85" approval, or have an indication of when the review will be completed, we are unable to solicit additional sales because we will be unable to provide a delivery commitment. I acknowledge that it is our own fault that we were unprepared for the April 1, 1999 deadline to obtain "-85" approval. This request is supported by the following reasons:

- The SPEC-150 package was designed to meet IAEA Safety Series No. 6, 1985 Edition, Revised 1990. There are no additional testing requirements that the SPEC-150 must meet in order to qualify as a Type B(U)-85, including the modified thermal test requirements.
- The initial application for the SPEC-150 package was prepared to qualify it for "-85" approval. The Application was approved in 1995 without the "-85" designation because the NRC had not yet started to issue "-85" approval at that time.
- The DOT issued USA/9263/B(U)-85 Certificate of Competent Authority for the SPEC-150 on February 29, 1996.
- The Atomic Energy Control Board of Canada issued Canadian Endorsement No. CDN/E170/-85 for the SPEC-150 on August 12, 1996.

We will greatly appreciate anything you can do to expedite the review of this application. Please let me know if there is anything we can do to facilitate this effort. Six (6) copies of this application are provided; one (1) containing color photocopies and five (5) containing black and white photocopies. Please let me know if additional information is needed.

Sincerely,

  
R.D. (Donny) Dicharry  
President

Attachments: No. 1: Consolidated Application Information.  
No. 2: IAEA-85 Assessment.  
No. 3: Revised Drawings Information.

Enclosure: Application dated April 22, 1999 (6 copies).

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Attachment No. 1  
**Consolidated Application Information**

The information in this consolidated application remains essentially unchanged from the information in the current application. There are no changes to any of the technical safety analysis information. The following editorial revisions and updated safety analysis (puncture test) are included in this consolidated application.

1. Editorial Revisions

Editorial revisions have been made to delete ~~strike-outs~~ and **boldface underlined** information that was submitted in previous application supplements. Only current information that has been reviewed and approved by the NRC remain in this consolidated application (in standard font), with one exception regarding the puncture test, as follows.

2. Puncture Test

The exception is that a statement was added to the Chapter 2, Section 2.9.2 C "Puncture Test Summary" to reference the inclusion of the 1997 puncture test report in Appendix 9.6. The 1997 puncture test was performed to validate previous puncture tests that were described in the initial application. The 1997 puncture test report was initially submitted to the NRC as a supplement dated July 2, 1997.

3. Chapters 1 and 2.

Note that there are numerous references to drawings that are not included in this consolidated application. This is because, during the NRC's review of the initial application, numerous drawings were submitted and later removed in past supplements to the application. The deleted drawings were superseded by the four (4) drawing that are currently referenced in the Certificate of Compliance.

Attachment No. 2  
**IAEA-85 Assessment Information**

1. Chapter 2, Appendix 9.6

The Safety Analysis Report has been updated with the addition of a 1997 Puncture Test report that has been incorporated as Appendix 9.6. of this consolidated application. This information had previously been submitted to the NRC as a Supplement dated July 2, 1997. There are no other changes to the safety analysis information in Chapter 2.

2. Thermal Test Assessment.

The purpose of this assessment is to supply additional information to support our assertion that the SPEC-150 meets IAEA-85 thermal test requirements, with particular emphasis placed on the effects from forced convection (convective velocity).

Discussion:

The thermal analysis included in the previous application was mainly a comparison of the melting temperatures of package materials compared against the specified test temperature. While this analysis is valid, other effects such as high temperature oxidation of the Depleted Uranium casting was not discussed.

Analysis:

The primary concern is the temperature of the Depleted Uranium shield at the end of the test. A recent test on another manufacturer's design has demonstrated that shielding effectiveness can be compromised if the shield reaches a temperature where severe high temperature oxidation occurs. There are three modes by which the shield can increase in temperature during the test; conduction, convection, and radiation.

**Conduction:** The means for the shield to be heated by conduction is heat transfer from the Titanium housing of the device through the Aluminum epoxy potting compound used to constrain the shield and through the polyurethane foam encasing the shield. Assuming the temperature of the Titanium housing of the device to be 800° C, and considering the fact that only a small portion of the shield is in contact with the potting compound, and the thermal conductivity of the potting compound, significant temperature rise is not expected. Assuming the temperature of the Titanium housing of the device to be 800° C, an average foam thickness of 0.5 inch, and considering the thermal conductivity of the foam, significant temperature rise is again not expected.

**Convection:** Significant convective heat transfer is expected between the heat source and the Titanium housing of the device. Our analysis assumes forced convection (high convective velocity) to be the primary means of heat transfer to the housing. For this reason we assume the housing will quickly reach equilibrium temperature with the 800° C environment. Convective heat transfer cannot occur inside the device since there is no convective heat transfer medium. For this reason the temperature of the Depleted Uranium shield is not expected to increase due to direct convection.

**Radiation:** Radiation is expected to be the primary means of heat transfer between the housing and the Depleted Uranium shield. For purposes of radiative heat transfer the Aluminum epoxy potting compound and the polyurethane foam are assumed not to exist. Considering the large thermal mass of the shield and the 30 minute duration of the test, it is expected that the shield temperature will remain well below the oxidation/combustion threshold.

**Summary:**

To pass the thermal test, the SPEC-150 package was designed such that the Depleted Uranium shield is well protected from the primary means of heat transfer, convection. The device housing is robust enough not to be breached as a result of the 30 foot drop test(s) and 4 foot puncture test(s) that precede the thermal test. Multiple SPEC-150 devices have been drop and puncture tested and in no case has the housing been breached. A device that was subjected to the 30 foot drop and puncture tests in August, 1997 was dye penetrant tested and all welds remained intact.

**Conclusion:**

The device meets the IAEA-85 thermal test criteria because the Depleted Uranium shield is well protected from high convective velocity heat transfer, which is the primary means of heat transfer.

Attachment No. 3  
**Revised Drawing Information**

Revised drawings of the SPEC-150 packaging are hereby submitted for approval in this consolidated application. The design of the package remains unchanged. The primary purpose of the revisions is to increase compliance with NUREG/CR-5502, *Engineering Drawings for 10 CFR Part 71 Package Approvals*, and *Drawing Requirements Manual*, Ninth Edition, which is referenced in CR-5502. The detailed description and evaluation of the drawing changes is provided below.

1. Drawing No. 15B000, Revision (5), dated April 20, 1999  
SPEC-150 Type B(U) Package Isometric View.
  - A. The drawing format has been revised as depicted in Section 6 of *Drawing Requirements Manual* which is referenced in CR-5502.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.
  - B. The description of the mounting holes has been revised to clarify that four (4) upper and four (4) lower mounting holes exist. The hole specifications comply with the Appendix of CR-5502.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.
  - C. The illustration of the lock cap has been updated to meet the current approved design. The lock cap was modified in 1995 and the modification is referenced in Application Supplement dated December 20, 1995, which confirms that the lock cap is not part of the safety system of the package.

This drawing change does not affect the package safety system design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.
  
2. Drawing No. 15B002A, Revision (4), dated April 20, 1999  
SPEC-150 Exposure Device Full Sectional View
  - A. The drawing format has been revised as depicted in Section 6 of *Drawing Requirements Manual* which is referenced in CR-5502.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.
  - B. The foam specification has been changed from "Corofoam Foam Fill 2-3 lbs/Cu. Ft." to "Polyurethane Foam 2 Lbs/Cu Ft Min". This drawing change is to reference the foam in industry generic terms rather than company specific terms. The Corofoam product is a polyurethane foam. This change precludes the need to request an amendment in the event the Corofoam product is unavailable in the future.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.

- C. The potting compound specification has been changed from "Epoxy Potting Compound Devcon #10620" to "Aluminum Epoxy Potting Compound". This drawing change is to reference the compound in industry generic terms rather than company specific terms. The Devcon product is an Aluminum Epoxy Potting Compound. This change precludes the need to request an amendment in the event the Devcon product is unavailable in the future.  
This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.
- D. The tail has been deleted from weld symbols, except those with notes. This change conforms with the Appendix in CR-5502.  
This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.
- E. Note 1 has been removed and a note has been added to the weld symbol that reads "Cover 6 to base 5". This conforms with the symbols depicted in the Appendix of CR-5502 and Section 14 of *Drawing Requirements Manual* referenced in CR-5502.  
This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.
- F. Note 2 has been changed to Note 1 and reads "Maximum Weight: 53 Lbs." This change conforms with CR-5502, Section 3.2.  
This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.
- G. Inch marks have been removed from dimensions. The marks are redundant. The title block specifies "unless otherwise specified dimensions are in inches". This conforms with Section 14 of *Drawing Requirements Manual* referenced in CR-5502.  
This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.
- H. The illustration of the lock cap has been updated to meet the current approved design. The lock cap was modified in 1995 and the modification is referenced in Application Supplement dated December 20, 1995, confirming that the lock cap is not part of the safety system of the package.  
This drawing change does not affect the package safety system design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.
- I. The dimensional tolerance for the length of both package end flanges has been changed from "+/- 1/16" to "+3/16 -1/16". The increase in the flange length tolerance is needed to compensate for the inherent inaccuracy associated with cutting with a band saw. The housing cover is welded to the base, then both ends of the package are cut to the specified length. The intent of this change

is to reduce unnecessary scrap and rework.

The potential additional 1/8 inch length of each flange can only increase the strength of the package. The potential additional weight is insignificant and does not cause the package to exceed the allowable weight of 53 lbs. Therefore, this drawing change does not affect the ability of the package to meet the requirements of 10 CFR Part 71.

3. Drawing No. 15B008, Revision (3), dated April 20, 1999.  
SPEC-150 Type B(U) Package Depleted Uranium Shield

A. The drawing format has been revised as depicted in Section 6 of *Drawing Requirements Manual* which is referenced in CR-5502.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.

B. Inch marks have been removed from dimensions. The marks are redundant. The title block specifies "unless otherwise specified dimensions are in inches". This conforms with Section 14 of *Drawing Requirements Manual* referenced in CR-5502.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.

C. The format of the Notes has been changed to conform with Section 9 of *Drawing Requirements Manual* which is referenced in CR-5502, and Section 2.2 of CR-5502.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.

D. A dimensional tolerance of "+/- 1/8" has been added. This change conforms with CR-5502, Sections 3.2 and 3.3.1.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.

E. A dimensional tolerance of "+/- 1/4" has been added to the 4-9/32 dimension. This change conforms with CR-5502, Sections 3.2 and 3.3.1. This tolerance is needed to compensate for the inherent inaccuracy associated with casting and cutting the hot top of DU shields by the vendor. The intent of this change is to reduce unnecessary scrap and rework.

The potential additional weight is insignificant and does not cause the shield to exceed the maximum allowable weight of 37-1/4 lbs or the package to exceed the allowable weight of 53 lbs. Therefore, this drawing change does not affect the ability of the package to meet the requirements of 10 CFR Part 71.

F. The coating specification has been changed from "Rustoleum High Performance Red Primer #5269" to "Acrylic Enamel Primer". This drawing change is to reference the coating in industry generic terms rather than company specific terms. The Rustoleum product is an Acrylic Enamel Primer. This change precludes the need to request an amendment in the event the Rustoleum



product is unavailable in the future.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.

- G. The following dimensions have been deleted: 1-61/64 hot top to center of S-tube, 1-15/16 height of upper ear, 4-9/32 diameter across shield, 3 inch radius of S-tube, 2-1/4 height of lower ear, 1 inch thickness of ears, and 2-3/4 hot top diameter. The purpose is to remove dimensions that do not pertain to the general arrangement of the shield. This is consistent with recent NRC approval of shield drawings of other similar package shields. This change conforms with CR-5502, Section 3.1.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.

- H. The weight has been changed from "Weight Range 36-1/4 to 37-1/4 lbs" to "Maximum Weight 37-1/4 Lbs." This change conforms with CR-5502, Sections 3.2 and 3.3.7.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.

- I. The material specification of the S-Tube and support sleeves has been changed from "Titanium Grade 2; ASTM B338 or Zircalloy" to "Titanium, Titanium Alloy or Zircalloy." The purpose for this change is to allow greater latitude to the depleted uranium shield vendors to select materials that enhance the casting process or durability of the S-tube. The S-tube does not provide structural support or shielding. The S-tube ends are not used to attach the shield to other structural components. Both ends of the S-tube are cut off before the shield is installed in the package.

This drawing change does not affect the package safety system design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.

4. Drawing No. 15B001-3, Revision (1), dated April 20, 1999.  
SPEC-150 Type B(U) Package Parts List

- A. The drawing format has been revised as depicted in Section 6 of *Drawing Requirements Manual* which is referenced in CR-5502.

This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.

- B. The description Item 13, the Lock Cap Assembly, has been changed to reflect the current design. The lock cap was modified in 1995 and the modification is referenced in Application Supplement dated December 20, 1995, which confirms that the lock cap is not part of the safety system of the package.

This drawing change does not affect the package safety system design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.

- C. Add "All dimensions are nominal" to the tolerance block. The dimensions are listed for reference only. Actual tolerances are specified on individual component drawings.  
This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.
- D. The Drawing Title is changed from "Materials List" to "Parts List". This conforms with Section 10 of *Drawing Requirements Manual* which is referenced in CR-5502.  
This drawing change does not affect the package design and therefore has no impact on the ability of the package to meet the requirements of 10 CFR Part 71.