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20 April 2011

Pierre Saverot, Project Manager
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
11555 Rockville Pike, Mailstop: EBB-3D-02M
Rockville, MD 20852

RE: Type B Package Application for Models Sentry 110, Sentry 330 and 867
Docket: 71-9357
TAC: L24487

Dear Mr. Saverot:

The following is submitted in response to your letter requesting additional information dated 7 March 2011. Table 1 entries shown in blue are additional drawing changes not specifically asked for in question 1 of your letter.

1. Corrections/Changes to Drawing R86000 (see Revision C enclosed)

Table 1

Item	Issue	Action Taken
Sheet 1		
Rivet	Description clarified as part of response to question #9 regarding the thermal test evaluation.	Added "OPEN-END" to Rivet part name and added "1/8 DIA" to rivet callout in field of drawing
Sheet 2		
Note 1	Replace "OR" by "AND" Replace "V111" by "VIII"	"V111" replaced by "VIII" on Revision C, sheet 2 Note 1. We used "OR" on the drawing because typically our welding is obtained to the AWS standard but the shell of these packages was obtained from a supplier that was certified to the ASME standard instead. The ASME standard is intended for pressure applications, and since this component is not required to meet these pressure requirements, welding to either AWS or ASME will produce satisfactory welds for this package. The use of "AND" is not applicable as welding will be either to AWS or to ASME but not certified to both standards.
Shield Disk	Specify material standard, grade/type for copper	Copper allow specified on drawing as Type C101 or C110, Condition H02.
Bottom Plate Top Endplate Shell	Remove A480 from standards list. Resolve discrepancy between A276 Type 304/304L and A276 Type 316/316L	A480 removed. Table 2.2 corrected to show 304/304L instead of 316/316L under ASTM A276.
Foam Fill	Added more information related to to polyurethane foam.	Added "CLOSED CELL FOAM, 18 LBS PER CUBIC FOOT MINIMUM DENSITY". The foam density is set as a minimum based on the material used in the test specimens. Increased foam density will provide increased shield support and the maximum density will be limited by the maximum package weight limit.
Set Screw	Item added to address thermal test issues, see question #9.	Added Set Screws to plug each Rivnut in the basic configuration.

NM5524

Item	Issue	Action Taken
Large set screw	Item added to address thermal test issues, see question #9.	Added Large Set Screws to plug each foam-fill hole in all configurations. Note: These were on the test units, but not shown on the descriptive drawing.
Sheet 3		
Note 1	Add statement as in sheet 2: "AND certified to ASME boiler and pressure vessel code Section VIII Div 1"	We used "OR" on the drawing because typically our welding is obtained to the AWS standard but the shell of these packages was obtained from a supplier that was certified to the ASME standard instead. The ASME standard is intended for pressure applications, and since this component is not required to meet these pressure requirements, welding to either AWS or ASME will produce satisfactory welds for this package. The use of "AND" is not applicable as welding will be either to AWS or to ASME but not certified to both standards.
Cotter Pin	Specify material standard	This is a commercial grade item and as such no national consensus material standard exists. However, we have applied "ASME B18.8.1TYPE 302/304/316 STN STL" for the material specification for this component.
Shield Bracket Shield Cup	Specify material standard copper alloy	Shield Bracket: Added "TYPE C101 OR C110 COPPER CONDITION H02 PER ASTM B152". Shield Cup: Added "TYPE C110 COPPER CONDITION H04 PER ASTM B187".
Shield Mount Back Plate Mounting Plate Port Tube	Remove A480 from standards list. Resolve discrepancy between A276 Type 304/304L and A276 Type 316/316L	Removed A480 from the drawing and revised Table 2.2 of the SAR to show 304/304L instead of 316/316L under ASTM A276.
Sheet 4		
Rib Insert	Indicate component on drawing	The rib insert was identified at the top of Section A4-A4 on Revision B of the drawing. An additional leader line has been added to Revision C of the drawing for further clarification.
Sheet 5		
Source Wire Assembly	Remove 'or equivalent'	Removed 'or equivalent' and corrected the model designations as "A424-14" or "A424-13" as these are the accepted model designations for these source wire assemblies.
Cover Screw	Specify material standard	No material standard specified. This screw is not important to safety. Its function is to attach the plastic dust cover and not the stainless steel lock cover under the dust cover. The plastic 'trefoil' component of the dust cover could be missing and the package would still pass the testing because of the presence of the stainless steel lock cover. The lock cover protects the source wire connector from a direct compressive hit which could send the connector through the lock slide slot and into the source tube thereby losing its security. The plastic dust cover serves no structural purpose to source security, however, the lock cover needs to be present for the puncture test component of the hypothetical accident condition testing and the penetration bar component of the normal condition testing.
Lock Cover Assembly	Specify components and materials constituting the assembly.	Moved assembly to sheet 10 showing components and materials of the assembly.
Dust Cover Assembly	Specify components and materials constituting the assembly.	Moved assembly to sheet 10 showing components and materials of the assembly.

Item	Issue	Action Taken
Collar Screw	Specify an Alloy	Added "ASTM F837 GROUP 1 CONDITION CW1 STN STL"
Selector Ring	Specify material standard	Added "Type CF16FA STN STL PER ASTM A743".
Lock Slide	Specify a condition for ASTM A564 Type 630	Added "CONDITION H900".
Anti-Rotation Lug	List component in bill of materials	Added component to bill of material on drawing.
Cover Roll Pin	Component is part of the Dust Cover Assembly	Moved component to sheet 10 with Dust Cover Assembly.
Sheet 6		
Cover Screw	Specify material standard	See response for cover screw on sheet 5.
Collar Screw	Specify an Alloy	Added "ASTM F837 GROUP 1 CONDITION CW1 STN STL"
Lock Cover Assembly	Specify components and materials constituting the assembly.	Moved assembly to sheet 10 showing components and materials of the assembly.
Fitting	Specify material standard	Added "TYPE C360 BRASS CONDITION H02 PER ASTM B16".
Lock Pin	Specify correct level of hardening	Removed ASTM A681 from material description.
Dust Cover Assembly	Specify components and materials constituting the assembly.	Moved assembly to sheet 10 showing components and materials of the assembly.
Source Wire Assembly	Remove 'or equivalent'	Removed "or EQUIVALENT" and corrected the model designations as "A424-14" or "A424-13" as these are the accepted model designations for these source wire assemblies.
Sheet 7		
Rotor shield	Specify material standard	Added "TUNGSTEN PER ASTM 777 CLASS 1".
Slider Spring	Specify material standard	Added "TYPE 301, 302, 304, OR 17-7 PH STN STL PER ASTM A313 OR A666".
Flat Washer Slider	Specify material standard	Flat Washer: Added "TYPE 200 SERIES BRASS". (Not important to safety item). Slider: Added "TYPE C360 BRASS CONDITION H02 PER ASTM B16".
Shaft	Specify material standard	Added "TYPE 655 SILICON BRONZE CONDITION H04 PER ASTM B98".
Retainer Screw [...] Front Plate	Specify material standard	Front plate/ Rotor/Backer Plate: Added "TYPE 304/304L STN STL PER ASTM A276, A479, A240, OR A666 CONDITION-A EITHER HOT OR COLD FINISHED. PASSIVATED OR ELECTROPOLISHED. Knob: Added "TYPE 304 STN STL". (Not important to safety item) Retainer Disc: Added "TYPE 304/304L STN STL" (Not important to safety item) Shaft Spring: Added "TYPE 301, 302, 304, OR 17-7 PH STN STL". (Not important to safety item) Shield Roll Pin/Shaft Roll Pin: Added "TYPE 302, 303, 304, OR 316 STN STL". Set Screw: Added "TYPE 303 STN STL". (Not important to safety item) Retainer Screw: Added "TYPE 302Cu STN STL" (Not important to safety item)
Rotor	Indicate component on drawing	Change drawing to indicate Rotor.
Sheet 8		
Small Rivnut Security Screw	Specify material standard	Small Rivnut: Added " NAS1330N5E-256. TYPE 316/316L STN STL PER ASTM A276".

Item	Issue	Action Taken
Nut Ring	Remove A480 from standards list. Resolve discrepancy between A276 Type 304/304L and A276 Type 316/316L	Removed A480. Corrected Table 2.2 to show 304/304L instead of 316/316L under ASTM A276.
Hex Bolt	Specify condition for ASTM A593 Type 630. Add ASTM A453 Grade 660 Class D to Table 2.2a and to sections of the SAR referencing the Hex Bolts, or remove from list of materials.	Added "CONDITION AH" to Type 630 material. The strength properties of the two materials in the conditions specified are essentially the same. The Type 660 material is better suited for corrosion resistance in certain environments than the Type 630 material.
Sheet 9		
Note 1	Specify material standard and grade/type	Revised Table 2.2a to reference the shield as a minimum 99% depleted uranium (DU) in the "as-cast" condition. The DU used in the test specimen contained titanium within the percentages of the U-0.75% Ti alloy. However, U-0.75% Ti alloy cannot be specified because the shields were made in the "As-cast" condition and not heat treated to obtain the properties of U-0.75% Ti. DU shields made in the as-cast condition is expected to exhibit the properties specified in Table 2.2a.
Sheet 10		
Lock Cover Assembly	Specify components and materials constituting the assembly.	Sheet 10 shows assembly components and materials.
Dust Cover Assembly	Specify components and materials constituting the assembly.	Sheet 10 shows assembly components and materials.

2. Make the following corrections and edits to Table 2.2a:

Table 2

Issue	Action Taken
Correct the form of stainless steel 17-4 PH (Type 630) per ASTM A564 from "Plate" to "Bar"	The form changed from "Plate" to "Bar"
Correct minimum tensile strength, yield strength and elongation of stainless steel 316/316L per ASTM F879 in the CW condition to agree with the minimum values in ASTM F879	Mechanical properties for group 1 materials in ASTM F879 corrected to reflect the minimum values. Also, changed the material type from "316/316L" to "Any Group 1 Alloy"
Correct minimum tensile strength, yield strength and elongation of stainless steel 316/316L per ASTM A286 in the annealed condition to reflect the minimum values specified in A276 for Type 316L	No type 316/316L material per ASTM A276 used on the package. Only type 304/304L material per ASTM A276 used on the package. Corrected the minimum mechanical property values for 304/304L material per ASTM A276.
Correct minimum tensile strength, yield strength and elongation of stainless steel 304/304L per ASTM A511 to agree with the tensile requirements specified for all austenitic steels in ASTM A511	Corrected the minimum mechanical property values for 304/304L material per ASTM A511.
Justify the values provided for minimum tensile strength, yield strength and elongation of stainless steel 303 per ASTM A582. ASTM A582 does not provide minimum tensile properties.	ASTM A582 removed from Table 2 and replaced by Reference #2 on page 19. Table 2 corrected to show minimum mechanical property values for Type 303 material per reference #2 on page 19.

Issue	Action Taken
Provide a standard specification and condition for the U-0.75%Ti depleted uranium casting and justify or correct the minimum tensile properties provided. If a standard is not available, provide the reference for the material properties provided in Table 2.2a and specify the nominal density of the uranium alloy.	Table 2 corrected to show depleted uranium casting is not U-0.75% Ti alloy, but instead 99% minimum depleted uranium. The DU used in the test specimen contained titanium within the percentages of the U-0.75% Ti alloy. However, U-0.75% Ti alloy cannot be specified because the shields were made in the "As-cast" condition and not heat treated to obtain the properties of U-0.75% Ti. Minimum mechanical property values for "as-cast" depleted uranium shown per reference #1 on page 822.
Provide a standard specification, condition and elongation for the brass alloy 485 bar and justify or correct the minimum tensile properties provided.	Brass bar alloy 485 not used in the package, but instead Type 360 brass bar in the H02 condition per ASTM B16 is used in the package. Table 2 corrected to show minimum mechanical properties for Type 360 brass bar in the H02 condition per ASTM B16.
Provide a standard specification, condition and elongation for the copper alloy 100 sheet/bar and justify or correct the minimum tensile properties provided.	Table 2 corrected to show the minimum mechanical property values for both type 101 or 110 in sheet form and type 110 in bar form per ASTM B152.
Provide a condition and the corresponding minimum tensile properties (tensile strength, yield strength and elongation) for the silicon bronze alloy 655 per ASTM B98.	Table 2 corrected to show the minimum mechanical property values for type 655 silicon bronze in condition H04 and in rod form per ASTM B98.
Further revisions were made to the materials listed in Table Nos 2.2a, 3.2a, and 3.2b to ensure they only cover the materials listed in the drawings.	Removed the following materials from Table 2.2a: 1. Stainless Steel 17-4PH, Plate, ASTM A693, H900 2. Stainless Steel 17-4PH, Plate, ASTM A693, H925 3. Stainless Steel 17-4PH, Plate, ASTM A693, H1025 4. Polyethylene (UHMW), Plate 5. Polyurethane, Plate 6. Polyurethane, Rigid Foam Added the following materials to Table 2.2a: 1. Stainless Steel CF16FA, Casting, ASTM A743, As-cast. 2. Stainless Steel CF8, Casting, ASTM A743, As-cast. 3. Stainless Steel Type 660, Fastener, ASTM A453, Class D. 4. Stainless Steel Any Alloy Group 1, Fastener, ASTM F837, CW1. 5. Stainless Steel Type 316/316L, Fastener, Ref#3. 6. Stainless Steel Type 18-8, Fastener, Commercial Grade Item. Changed the following materials on Table 2.2a: 1. Titanium Ti 3Al-2.4V, Tube, ASTM B338 (was B861), grade 9 annealed. Note: ASTM B861 is for pipe not tube. 2. Added specification option for Stainless Steel 304/304L to include ASTM A666 in addition to A240. 3. Removed the reference to 90%W for the Tungsten entry and adjusted the elongation from 5 to 2 and the ultimate strength from 110 ksi to 94 ksi. This was done to allow for use of magnetic or non-magnetic tungsten Class 1. This change does not adversely affect the test results since the parts (outlet port shield and lock sleeve) using this material are non-structural.

3. Clearly indicate the lock plate and lock plate bolts referenced in Table 3.2a on the certificate drawings and specify the condition of the 17-4PH stainless steel per ASTM F593 Group 7 in Table 3.2a

   The Lock Plate is identified as the Rear Plate and the Lock Plate Bolts are identified as the Hex Bolts in the drawing. The component identification in 3.2a has been revised to clarify the component identification in the drawing. Condition AH has been added to the Hex Bolts (ASTM F593 Group1) comments.

4. Confirm which Source Wire Assembly will be used in the Model Sentry 110, Sentry 330 and 867 packages and correct application accordingly. Provide drawings and materials for the source wire assembly that will be used

   The Model Sentry 110 will use the Model A424-14 source wire assembly. The Model Sentry 330 will use the Model A424-13 source wire assembly. The Model 867 package can use either the Model A424-13 or the Model A424-14 source wire assemblies.

   These source wire assemblies are essentially identical in construction materials with a slight variation in the overall assembly length and different source capsules attached to the end of the source wire assembly. The Model A424-14 has a Model 60011 source capsule attached to the end of the wire, and the Model A424-13 can have either a Model 60011 or a 60012 source capsule attached to the end of the wire. The difference in capsules for the Model A424-13 allows for a difference in maximum Co-60 activity for that particular source assembly.

   Per the USNRC website page http://nrc-stp.ornl.gov/ssdr.html:

   > ***"Public access to the Sealed Source and Device registry has been indefinitely shut down pending a security review. Regulatory agencies continue to have access to the registry via password protection.***
   >
   > ***Agreement State staff seeking access should contact their Radiation Control Program Director.***
   >
   > ***NRC staff seeking access should contact Mr. Ujagar Bhachu (ujagar.bhachu@nrc.gov, 301-415-7894) of the Office of Federal and State Materials and Environmental Management Programs to resolve any difficulties in access."***

   If the information contained in source registration MA-1059-S-105-S cannot be obtained by your office by contacting Mr. Ujagar Bhachu above, please advise and we will provide the registry sheet approval under separate cover requesting that it be maintained proprietary since your Agency has not made this information available to the public due to potential security issues.

   These source assemblies are intended for use during industrial radiography operations. The Models Sentry 110 and Sentry 330 will be approved as industrial radiography devices and the Model 867 will be approved as an industrial radiography source changer. The A424-13 and A424-14 assemblies are currently approved and used in similar industrial radiographic exposure/source changer packages which are also approved as Type B(U) transport containers (ref: USA/9035/B(U)-96 and USA/9148/B(U)-85). Detailed information relative to these source assemblies, including their ability to comply with the endurance and tensile test requirements of ANSI N432-1980 and ISO 3999-1:1999(E), has been previously reviewed and approved under the source registration approval performed by the Massachusetts Department of Public Health regulatory agency (an Agreement State) and submitted in support of registry sheet MA-1059-S-105-S.

Reference to the CNSC registry documents was included for ease of review by the CNSC under the dual review intent of NUREG-1668. The Canadian government does not issue source approvals similar to the practice in the USA, however, the CNSC will review and approve the same information under their device approvals. Enclosed, for USNRC information, are copies of the recently revised certificates R-061-1996-4-2016 and R-061-2032-4-2016 (Note: these were referenced as R-061-1996-3-2016 and R-061-2032-3-2016 in our original application). Again, detailed information relative to these source assemblies will not appear on these certificates but will have been addressed under the separate source registration review and approval performed by the Massachusetts Department of Public Health under registry sheet MA-1059-S-105-S.

These assemblies are documented on our production drawings and that information is considered proprietary to our business interests. Our USNRC QA program (0040) controls the design, fabrication and acceptance for these sources to ensure equivalency and compliance with the approved configurations. If acceptance of these sources based on the existing USNRC QA program controls is not acceptable, then the actual production drawings can be provided as proprietary under separate cover as this information reveals specific details of the design which, if used by a competitor, would put QSA Global, Inc. at a competitive disadvantage due to loss of intellectual property.

5. Provide drawings and materials for the source wire assemblies Model 42465-8, 42465-9 and 42465-10

The 42465-8, 42465-9 and 42465-10 are not source wire Models but internal designations for the source wire assemblies on our production drawing. The 42465-8 designation is a Model A424-14 with the 60011 source capsule attached. The 42465-9 designation is a Model A424-13 with the 60012 source capsule attached. The 42465-9 designation is a Model A424-13 with the 60011 source capsule attached. These source wire assemblies, as defined under our production drawings, meet the fabrication requirements of their respective source wire Model designations under registry sheet MA-1059-S-105-S. Therefore wire assembly 42465-8 is the Model A424-14 as the 42465-9 and 42465-10 are versions of the Model A424-13. They are, by definition under our production program, representative of the source assemblies to be shipped in these packages and relevant to the tests performed.

These assemblies are documented on our production drawings and that information is considered proprietary to our business interests. Our USNRC QA program (0040) controls the design, fabrication and acceptance for these sources to ensure equivalency and compliance with the approved configurations. If acceptance of these sources based on the existing USNRC QA program controls is not acceptable, then the actual production drawings can be provided as proprietary under separate cover as this information reveals specific details of the design which, if used by a competitor ,would put QSA Global, Inc. at a competitive disadvantage due to loss of intellectual property.

6. Confirm the choice of materials to be used to fabricate the source capsule and correct Table 3.2a accordingly

Table 3.2a has been corrected in Revision 1 of the SAR to identify the source capsule alloy as 304/304L.

7. Specify whether the polyurethane foam is open cell or closed cell and specify tolerances on the density of the 20 pound per cubic foot polyurethane foam in the certificate drawings.

The polyurethane foam is closed cell and has a density tolerance of 20 $lb/ft^3 \pm 2$ lb/ft^3. The drawing has been updated to include the minimum foam density and the foam is further specified as a "closed cell" polyurethane foam with a minimum density of 18 lb/ft^3 in Section 1.2.1.2 of Revision 1 to the SAR (see enclosed).

8. Explain the discrepancy between the thermal expansion coefficient provided for the depleted uranium in Table 3.2b and that provided in Section 2.7.4.5(b)(2) of the application

Table 3.2b is corrected to show the same thermal expansion coefficient provided in Section 2.7.4.5(b)(2). This value is confirmed by the reference #6 given in Table 3.2b. (Reference #6: Marks' Standard Handbook for Mechanical Engineers, Tenth Edition, McGraw-Hill, 1996, Page 6-11).

9. Provide additional proof that the DU shield does not oxidize during the hypothetical accident condition thermal test (fire).

The basic configuration has been changed to include stainless steel set screws in all unused threaded holes with a diameter larger than ¼ inch. This will ensure no oxygen flows through these openings during the thermal test. The set screws will be flush or below the exterior surface of the package. The standard configuration already includes bolts and screws in all threaded holes larger than ¼ inch and therefore will also prevent oxygen flow into the foam.

Four open-end stainless steel pop rivets attach each of the two nameplates to the side of the package. The small holes at the center of these rivets allow the package to remain open to the environment. Once the foam has pyrolized in these small rivet holes, oxygen flow will stop preventing any further combustion and protecting the shield from oxidation or loss of shielding ability.

The foam's ability to protect the shield when only small opening exist on the package has been demonstrated in Test Plan 72.

10. Provide information on the essentially unyielding, horizontal surface.

The drop test pad used for the packages under this application meets the requirements specified in IAEA Safety Series No. 37 "Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, (1985 Edition as Amended 1990)" which we believe to describe an "essentially unyielding surface". The drop test target consists of a 2 inch thick steel plate measuring 60 inches squared, with a calculated weight of 2,079 lbs. The plate incorporated protruding steel structures across the face of the plate that was floated onto a concrete pad while the pad was still wet.

The concrete pad measured 96 inches square and 24 inches thick with a calculated mass of 18,104 lbs. The concrete is reinforced with 5/8 inch diameter re-bar. The total drop test pad (steel and concrete) has a calculated mass of 20,448 lbs and the pad is located on firm soil. The heaviest package under this approval request weighs 780 lbs. The drop pad is therefore more than 26 times the weight of the test units dropped for this testing which is more than twice the recommendation in IAEA of 10 times the package weight.

11. Make the following corrections and changes to the application (see below)

Item/Issue	Action Taken
Correct typographical error in "1.2m" drop test reference on page 21 of 41 in Test Plan 180 dated February 2009	Corrected. The version of Test Plan 180 included in SAR Revision 1 has been updated with this corrected page.
Revise 6W for decay heat to 5.5W on page 3-6 of the SAR Revision 0	Corrected.

Item/Issue	Action Taken
Add No. 1 to 3 to SAR or delete this appendix since reader does not access your internal network location K: (Test Plan 180 page 16 – March 2009)	Appendix 2.12.3 has been revised to add a notation on the referenced page to indicate that Items 1 and 2 on that sheet were for internal reference only and were not included in the USNRC submission application. This corrected Test Plan has been included in Appendix 2.12.3 of the SAR Revision 1.

12. Clarify why the radiation level at surface after post test is lower than initial build.

There are a number of factors contributing to why the post test surface measurements are lower than the initial build surface measurements:

- All measurements, except for TP180G post test, are very low to begin with.
- The measurement is performed manually by hand.
- The variability of radiation measurements associated with different activity sources (e.g., extrapolation of dose measurements based on low activity profile sources can overestimate the corrected surface dose rates due to radiation scatter through the shield).
- The measurement is taken with a meter that is an analog device allowing some estimating by the inspector. The inspector watches for peak values within a given time limit or uses the scalar mode of the meter to perform the same task.
- The meter and probe have a calibrated accuracy of plus and minus 10%.
- The exact position of the flexible source wire can alter slightly due to the small design clearance between the source capsule and the shield tube.
- Before the test the source capsule could have been located in a slightly less shielded section in the shield than after the test. After the test a minor shift could have positioned the source in a slightly better shielded location in the package.
- External damage could create more distance to a previously less shielded area resulting in less radiation dose at the surface at the damaged location.

The maximum dose rate allowed at the surface of the package for normal transport is 200 mR/hr. There is no applicable radiation dose limit for the surface of the package after performance of the hypothetical accident condition testing. The only applicable criteria is a limit of 1,000 mR/hr at 1 meter from the surface of the package. The dose at the package surface for TP180E measured after the hypothetical accident condition testing was 2 orders of magnitude lower than is allowed at a distance of 1 meter and since the actual dose rates are so very low, the change in pre and post surface readings is not significant to the package integrity.

13. Verify the inconsistency in the radiation dose rates at the surface for Test Plan 72-S2 and 80 and demonstrate that the DU shield oxidization does not progress after the end of the hypothetical accident condition thermal test.

Test Plan 80 covered the HAC testing for a Model 650L transport package used primarily for the transport of Ir-192. This package was thermal tested using specimen TP80(B). The test unit was surveyed at the surface and at one meter prior to testing and then surveyed at a distance of 1 meter only after completion of the thermal testing. Prior to testing the maximum dose rate at 1 meter from TP80(B) was 3.1 mR/hr. After testing the maximum dose rate at 1 meter from TP80(B) was 28 mR/hr. This increase in the dose rate at 1 meter was attributed to some minor oxidation which occurred to depleted uranium shield as well as some shield displacement within the outer shell of the package after the testing.

Test Plan 72-S2 covered the HAC testing for a Model 680-OP transport package used for the transport of Co-60. Two test units were thermal tested one within the overpack box assembly and the other tested on the inner container without the overpack box assembly. The dose information at 1 meter for these units is shown below:

Unit	Pre-Thermal Test @ 1 m	Post-Thermal Test @ 1 m
TP72-S1(B) (inner device w/o overpack)	2.3 mR/hr	330 mR/hr
TP72-S1(C) (inner device with overpack)	2.7 mR/hr	2.5 mR/hr

After the thermal test for TP72-S1(B) a visual examination of the unit and inner shield showed no signs of any significant oxidation, however, it was noted that the shield had moved ~1 inch and lead shielding that had been present on the shield had melted during the testing. The increase in radiation levels seen for TP72-S1(B) was primarily attributed to the shield displacement and lead shield loss at the measured dose point since no visual evidence of shield oxidation was present after the testing.

14. Correct the numbering on page 7-6 from Section nos. 7.3.1.1 to 7.4.1.1.

Corrected on Revision 1 of the SAR (see enclosed).

Enclosed with this letter is Revision 1 of the SAR. Copies of this letter and all referenced documents are provided on the 6 CDs enclosed with this response). At this time there are no further changes or modifications necessary to the Type B approval currently under review with your office. Should you have any additional questions or wish to discuss this submission after receipt please feel free to contact me.

Sincerely,

Lori Podolak
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Regulatory Affairs Department
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C. Rompman — RA/QA Approval — 20 Apr 11 — Date

Engineering Approval — 20 Apr 11 — Date

Enclosures (6 Copies on 6 CDs: R86000 Revision C and D (contained in Appendix 1.3 of SAR)
Summary Table of Changes to SAR Revision 0 to Revision 1
List of Affected Pages
SAR Revision 1
CNSC Certificate R-061-1996-3-2016 & R-061-2032-3-2016

cc: ATTN: Document Control Desk
Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
One White Flint
Rockville, MD 20852