



QSA GLOBAL

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28 May 2013

ATTN: Document Control Desk
Mr. Eric Benner, Chief
Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
11555 Rockville Pike, Mailstop: EBB-3D-02M
Rockville, MD 20852

71-9371

RE: New Type B(U) Application for the Model 360 Series Transport Package Designs

Dear Director:

QSA Global, Inc. requests Type B(U) review and approval for the Model 360 Series transport container designations (360-2, 360-4, 360-4W, 360-10 and 360-10W). These package designs are of similar construction and fabrication and as such are considered a "family" of packages that we request be reviewed and approved under a single Type B(U) certification.

This submission contains proprietary documentation for which we request withholding from public disclosure under the provisions of 10 CFR §2.390(a)(4). The attachments to this letter include Attachment 1 which is the Affidavit required for proprietary documentation under §2.390; Attachment 2 which includes all submission documents covered by the proprietary request for withholding under the affidavit in Attachment 1; and Attachment 3 which includes all submission documents that can be released for public disclosure related to these packages.

It is noted that this package submission includes two drawings, one submitted for use by NRC staff in evaluation of the package designs and containing proprietary information; and the second submitted for reference under the Type B(U) package certification for use by preparers of the package for transport and open for public disclosure.

The SAR included with this submission has been formatted to comply with the recommended guidance in NUREG 1886 (Final – March 2009). These package designs will be submitted to the Canadian Nuclear Safety Commission to allow Type B(U) transport in Canada after obtaining USNRC and USDOT approval for Type B(U) transport. Should you have any additional questions or wish to discuss this submission after receipt please feel free to contact me.

Sincerely,

Lori Podolak
Senior Regulatory Affairs Specialist
Regulatory Affairs Department
Ph: (781) 505-8241
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RA/QA Approval

28 May 13
Date

Engineering Approval

24 MAY 13
Date

4M5501

Enclosures: (1-Hard Copy Original and 6 CDs each containing copies of this letter and the following files):

- Attachment 1: Affidavit Pursuant to §2.390
- Attachment 2: Proprietary Documents – SAR Revision 0 Sections 1-5 and drawing R36000 Revision B
- Attachment 3: List of Affected Pages, SAR Revision 0 Sections 6-9 and drawing R360-USER Revision A

cc: Huda Akhavannick
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

Attachment 1: Affidavit Pursuant to 10 CFR §2.390

AFFIDAVIT Pursuant to 10 CFR §2.390

I, Cathleen Roughan, Director Regulatory Affairs/Quality Assurance of QSA Global, Inc. hereby affirm and state:

1. I have been specifically delegated the function of reviewing the information sought to be withheld and am authorized to apply for its withholding on behalf of QSA Global, Inc.
2. QSA Global, Inc. is providing NRC with a detailed drawing (R36000 Rev A) and technical details, specifications and product related information as part of Sections 1 through 5 of the SAR Revision 0 for the Model 360 Series transport packages. These documents contain proprietary commercial information.
3. The information sought to be withheld pursuant to the provisions of 10 CFR §2.390(a)(4) are marked as follows in Attachment 2 of our application letter “***Proprietary information submitted under 10 CFR §2.390 to be withheld from public disclosure under 10 CFR §2.390.***”
4. These documents should be held in confidence by the NRC per 10 CFR §2.390(a)(4) based on the following justifications:
 - a. This information is owned and been held in confidence by QSA Global, Inc.
 - b. This information is of a type that QSA Global, Inc. has determined should be held in confidence since its release for public disclosure could result in a loss of an existing or potential competitive advantage as follows:
 - i. The information reveals the distinguishing aspects of the design and the prevention of its use by QSA Global, Inc. competitors gives QSA Global, Inc. a competitive economic advantage.
 - ii. The information, if used by a competitor, is likely to reduce the competitor’s expenditure of resources or improve their advantage in design, quality and manufacture of a similar product.
 - c. This information is being transmitted to the NRC voluntarily and in confidence for use in evaluation and approval of these package designs for Type B(U) transport certification.
 - d. This information is not available in public sources.
 - e. Public disclosure of this information is likely to cause substantial harm to the competitive position of QSA Global, Inc. because of the reasons outlined below:
 - i. Similar products are manufactured and sold by competitors of QSA Global, Inc.
 - ii. The development of this information by QSA Global, Inc., including test/evaluation documentation supporting these package designs, is the result of significant expenditure of staff effort and a considerable amount of money. It is our belief that a competitor would have to undertake similar effort and expense to generate equivalent information
 - iii. In order to generate such information, a competitor would also require considerable time (e.g., in excess of 1 year).

- iv. If a competitor used this information and did not have to undertake the work required to generate this information, they are likely to have lower overall costs and so are likely to have an unfair economic advantage over QSA Global, Inc. in offering a similar product to the market.
5. QSA Global has spent considerable commercial and technical resources to design and build this innovative family of source changers that is unique in its ability to store and transport a wide range of industrial radiography sources that are used worldwide. Access to the technical information for this unique design would give a competitor an unfair advantage in expanding their domestic and international market without having to perform their own research and development of the market needs and the ideal configuration of the transport package to meet a wide variety of customer needs. Accordingly, QSA Global, Inc. requests that the designated information be withheld from public disclosure pursuant to 10 CFR §2.390.

Executed on 20 May 2013


Cathleen Roughan, Director
Regulatory Affairs/Quality Assurance

Subscribed and sworn to (or affirmed) before me on this 20 day of May, 2013 by Cathleen Roughan, proved to me on the basis of satisfactory evidence to be the person who appeared before me.

Signature Melissa J. Fortuna

Seal

My Commission Expires 19 day of July, 2013.

**Attachment 3: List of Affected Pages, SAR Revision 0 Sections 1 & 6-9 and
Drawing R360-USER Revision A**

Security-Related Information
Figure Withheld Under 10 CFR 2.390

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE INCHES, TOLERANCE $\pm 1/16$



QSA GLOBAL

40 NORTH AVE, BURLINGTON, MA 01803

**DESCRIPTIVE
DRAWING**

TITLE **MODEL 360 TRANSPORT PACKAGE**

SIZE	DWG. NO.	REV
A	R360-USER	A
	SCALE: NONE	SHEET 1 OF 2

Security-Related Information
Figure Withheld Under 10 CFR 2.390

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE INCHES, TOLERANCE $\pm 1/16$			
 QSA GLOBAL		DESCRIPTIVE DRAWING	
40 NORTH AVE. BURLINGTON, MA 01803			
TITLE MODEL 360 TRANSPORT PACKAGE			
SIZE	DWG. NO.	REV	
A	R360-USER	A	
	SCALE: NONE	SHEET 2 OF 2	

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Section 6 - CRITICALITY EVALUATION

All parts of this section are not applicable. The Models 360 Series Transport Packages are not used for shipment of Type B quantities of fissile material.

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Section 7 – Package Operations

Operation of the Models 360 Series Transport Packages must be in accordance with the operating instructions supplied with the transport package, per 10 CFR 71.87 and 71.89.

7.1 Package Loading

7.1.1 Preparation for Loading

The Model 360 Series transport packages must be loaded and closed in accordance with procedures that, at a minimum, include the requirements specified in this section. Shipment of Type B(U) quantities of radioactive material are authorized for sources specified in Section 7.1.1.1. Maintenance and inspection of these packages is in accordance with the requirements specified in Section 7.1.1.2.

7.1.1.1 Authorized Package Contents

Table 7.1a: Model 360 Series Package Information

Package	Isotope	Activity Shield Location	Form ¹	Maximum Source Capacity ²	Maximum Package Capacity ²	Maximum Content Weight ³	Maximum DU Weight	Maximum Package Weight
360-2	Ir-192	Bottom	Special Form Sources	150 Ci	300 Ci ⁴	0.3 lbs (138 grams)	40 lbs (18 kg)	110 lbs (50 kg)
	Ir-192	Top or Middle		135 Ci	270 Ci			
	Se-75	Any		5,000 Ci	5,000 Ci			
	Yb-169	Any		5,000 Ci	5,000 Ci			
360-4	Ir-192	Bottom	Special Form Sources	150 Ci ⁴	600 Ci ⁴	0.6 lbs (276 grams)	55 lbs (25 kg)	130 lbs (59 kg)
	Ir-192	Top or Middle		135 Ci	540 Ci			
	Se-75	Any		5,000 Ci	5,000 Ci			
	Yb-169	Any		5,000 Ci	5,000 Ci			
360-4W	Ir-192	Any	Special Form Sources	65 Ci	260 Ci	0.6 lbs (276 grams)	NA	155 lbs (70.3 kg)
	Se-75	Any		5,000 Ci	5,000 Ci			
	Yb-169	Any		5,000 Ci	5,000 Ci			
360-10	Ir-192	Any	Special Form Sources	150 Ci	1,500 Ci	1.5 lbs (690 grams)	80 lbs (36 kg)	170 lbs (77 kg)
	Se-75	Any		5,000 Ci	5,000 Ci			
	Yb-169	Any		5,000 Ci	5,000 Ci			
360-10W	Ir-192	Any	Special Form Sources	17 Ci	170 Ci	1.5 lbs (690 grams)	NA	180 lbs (82 kg)
	Se-75	Any		5,000 Ci	5,000 Ci			
	Yb-169	Any		5,000 Ci	5,000 Ci			

¹Special Form is defined in 10 CFR 71, 49 CFR 173, and IAEA TS-R-1.

²Maximum activity for Ir-192 is defined as output Curies as required in ANSI N432 and 10 CFR 34.20 and in line with TS-R-1 and Rulemaking by the USNRC and USDOT published in the Federal Register on 26 January 2004.

³Maximum content weight includes the mass of the radioactive material and the source capsule handling assembly for a shipment containing the maximum number of source assemblies that can be transported per package design.

⁴The maximum package capacity may be reduced based on the number sources loaded in the Top or Middle shielded positions within the package.

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7.1.1.2 Packaging Maintenance and Inspection Prior to Loading

- a. Ensure all markings are legible.
- b. Inspect the container for signs of significant degradation. Ensure all welds are intact, the container is free of heavy rust, cracks or damage to the steel housing which breaches the container.
- c. Assure all bolts and fasteners (hardware) required for assembly of the package and as specified on the drawings referenced on the Type B transport certificate are fit for use. Without removing any safety wired hardware by disassembly from the device, examine the visible external surfaces of the bolts/fasteners for any signs of fatigue cracking.
- d. The bolts/fasteners must be replaced if they are no longer fit for use (e.g., threads stripped, unable to fully thread, signs of cracking, etc). Assure the cover can be properly secured to the container base in accordance with the drawings referenced on the Type B transport certificate.
- e. Ensure the shipping caps over each source securing mechanism (SSM) can be installed. Assure the locking assemblies actuate freely when performing an operational test and that the lock slides and plunger locks engage and are functional.
- f. If the container fails any of the inspections in steps 7.1.1.2.a-e, remove the container from use until it can be brought into compliance with the Type B certificate.

NOTE: *All components, including fasteners, used on the Model 360 Series transport packages must be replaced by QSA Global, Inc. supplied or approved components. Contact QSA Global, Inc. if any damaged is identified during this inspection or if replacement components are needed to make a compliant Type B(U) shipment.*

7.1.2 Loading of Contents

NOTE: *These loading operations apply to “dry” loading only. The Model 360 Series transport packages are NOT approved for wet loading.*

7.1.2.1 General Pre-transportation Requirements

- a. Ensure the contents are authorized for use in the package.
- b. Ensure the package condition has been inspected in accordance with Section 7.1.1.2.

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- c. Ensure that the source(s) are secured into place in the storage positions in accordance with the following requirements. Compliance with the following requirements ensures that the sources are securely locked in position before shipment.
 1. Removal and installation of radioactive material contained within the shield containers must be performed in a shielded cell/enclosure capable of holding the maximum isotope capacity of the container, or by using remote transfer operations for source holder assemblies. Container loading can only be performed by persons specifically authorized under an NRC or Agreement State license (or as otherwise authorized by an International Regulatory Authority).

All necessary safety precautions and regulations must be observed to ensure safe transfer of the radioactive material.

2. Using remote handling techniques, load the source assemblies so that they are fully inserted into the source tubes with the active end of the source assembly inserted first.
3. Once the source is loaded, secure the source in place by sliding the lock slide over the assembly, depress the plunger lock on the source securing mechanism (SSM) and install the protective cap over the end of the source assembly. Ensure the key is removed from the plunger lock after the lock is engaged.

NOTE: When loading chain style source assemblies (e.g., TSI or TI-F) into the **360-10 or 360-10W style containers ONLY**, ensure that a jumper extension provided with the package by QSA Global, Inc. is attached to the source assembly connector before securing the source in the package by sliding the lock slide and depressing the lock on the SSM. (Jumper extensions are not required for loading of the 360-2, 360-4 or 260-4W containers)

If a jumper extension is not available at the time of source loading, contact QSA Global, Inc. before loading the source. **DO NOT** load a chain source in a 360-10 or 360-10W style container without using a QSA Global, Inc. provided jumper extension.

Failure to use the proper jumper extension or to load the source chains in these devices without a jumper extension at all will invalidate the package for shipment under the Type B(U) approval.

4. Repeat steps 7.1.2.1.c.2 and 3 if a source will be loaded in another source tube/lock assembly of the device.

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5. If additional sources will not be loaded into the package, ensure the lock assembly cover is installed and the plunger lock is depressed and the key removed. Once all sources are loaded into the transport package, attach the cover assembly to the container base by means of the four captive cover bolts.

7.1.3 Preparation for Transport

- 7.1.3.1 Ensure that all conditions of the certificate of compliance are met including attachment of a tamper indicating seal wire as shown on the drawings referenced on the certificate of compliance.
- 7.1.3.2 Perform a contamination wipe of the outside surface of the package and ensure removable contamination does not exceed 0.0001 μCi when averaged over a wipe area of 300 cm^2 .
- 7.1.3.3 Survey all exterior surfaces of the package to assure that the radiation level does not exceed 200 mR/hr at the surface. Measure the radiation level at one meter from all exterior surfaces to assure that the radiation level is less than 10 mR/hr.
- 7.1.3.4 Ship the container according to the procedure for transporting radioactive material as established in 49 CFR 171-178.

NOTE: The US Department of Transportation, in 49 CFR 173.22(c), requires each shipper of Type B quantities of radioactive material to provide prior notification to the consignee of the dates of shipment and expected arrival.

7.2 Package Unloading

7.2.1 Receipt of Package from Carrier

- 7.2.1.1 The consignee of a transport package of radioactive material must make arrangements to receive the transport package when it is delivered. If the transport package is to be picked up at the carrier's terminal, 10 CFR 20.1906 requires that this be done expeditiously upon notification of its arrival.
- 7.2.1.2 Upon receipt of a transport package of radioactive material:
 - a. Survey the transport package with a survey meter as soon as possible, preferably at the time of pick-up and no more than three hours after it was received during normal working hours. Radiation levels should not exceed 200 mR/hr at the surface of the transport package, nor 10 mR/hr at a distance of 1 meter from the surface.
 - b. Record the actual radiation levels on the receiving report.
 - c. If the radiation levels exceed these limits, secure the container in a Restricted Area and notify the appropriate personnel in accordance with 10 CFR 20 or applicable Agreement State regulations.

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- d. Inspect the outer container for physical damage or leaking. If the package is damaged or leaking or it is suspected that the package may have leaked or been damaged or been tampered with in transit (e.g., tamper indicating seal is not present or not intact), restrict access to the package. As soon as possible, contact the Radiation Safety Office to perform a full assessment of the package condition and take necessary follow-up actions.
- e. Record the radioisotope, activity, model number, and serial number of the source and the transport package model number and serial number.

7.2.2 Removal of Contents

Transfer the package to a remote handling cell, or prepare the package for source transfer to an appropriate exposure device in accordance with the applicable exposure device operating manual and applicable licensing provisions for the user's facility related to radioactive material handling. Remove the sealed source assembly(ies) from the package and transfer to an alternate shielded storage location or container.

7.3 Preparation of Empty Package for Transport

In the following instructions, an *empty* transport package refers to a Model 360 Series transport package without an active source assembly contained within the shielded container. To ship an empty transport package:

- 7.3.1. Unload the container in accordance with Section 7.2.2.
- 7.3.2. Assure that the levels of removable radioactive contamination on the outside surface of the transport package does not exceed 4 Bq/cm² (when averaged over 300 cm²).
- 7.3.3. Assure that the levels of removable radioactive contamination on the inside surface of the shield container does not exceed 400 Bq/cm² (when averaged over 300 cm²).
- 7.3.4. When it is confirmed that the Model 360 Series transport package is empty, prepare the transport package for shipment and survey to ensure the external surface radiation level does not exceed 5 μSv/h.

NOTE: When transporting the Model 360-2, 360-4 or 360-10 transport packages, shipping documentation must reflect the depleted uranium shielding that will be present even if no radioactive source assemblies are to be transported in these containers. (This is not necessary for the Model 360-4W and 360-10W transport packages as they are comprised of tungsten shielding only.)

7.4 Other Operations

7.4.1 Package Transportation By Consignor

Persons transporting the Model 360 Series transport packages in their own conveyances should comply with the following:

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7.4.1.1 For a conveyance and equipment used regularly for radioactive material transport, check to determine the level of contamination that may be present on these items. This contamination check is suggested if the package shows signs of damage upon receipt or during transport, or if a leak test on the special form source transported in the package exceeds the allowable limit of 185 Bq.

7.4.1.2 If contamination above 4 Bq/cm^2 (when averaged over 300 cm^2) is detected on any part of a conveyance or equipment used regularly for radioactive material transport, or if a radiation level exceeding $5 \text{ } \mu\text{Sv/h}$ is detected on any conveyance or equipment surface, then remove the affected item from use until decontaminated or decayed to meets these limits.

7.4.2 Emergency Response

In the event of a transport emergency or accident involving this package, follow the guidance contained in “2012 Emergency Response Guidebook: A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/Hazardous Materials Incident”, or equivalent guidance documentation.

7.5 Appendix

7.5.1 Reference: “2012 Emergency Response Guidebook: A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/Hazardous Materials Incident”

Section 8 - ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

8.1 Acceptance Test

8.1.1 Visual Inspections and Measurements

Each transport package component is inspected visually prior to shipment for compliance to the following criteria:

- 8.1.1.1 The transport package was assembled properly to the applicable drawing.
- 8.1.1.2 Evaluate each shield container for shielding integrity when used in the applicable Model 360 Series assembly to ensure the transport dose rate requirements are met when the container is loaded to capacity.
- 8.1.1.3 All fasteners as required by the applicable drawings are properly installed and secured.
- 8.1.1.4 The relevant labels are attached, contain the required information, and are marked in accordance with 10 CFR 20.1904, 10 CFR 40.13(c)(6)(i), 10 CFR 34, and 10 CFR 71 or equivalent Agreement State regulations.

Visual inspections and measurements will be performed in accordance with a USNRC approved Quality Assurance Program per the requirements of 10 CFR 71.101.

8.1.2 Weld Examinations

Weld examinations will be performed in accordance with the applicable drawings requirements and in accordance with QSA Global, Inc.'s USNRC approved Quality Assurance Program No. 0040.

8.1.3 Structural and Pressure Tests

Prior to first use as part of a Model 360 Series Transport Package, container structural conformance will be evaluated in accordance with the applicable drawings requirements and in accordance with QSA Global, Inc.'s USNRC approved Quality Assurance Program No. 0040. The containment system is not designed to require increased or decreased operating pressures to maintain containment during transport, therefore pressure tests of package components prior to first use is not required.

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8.1.4 Leakage Tests

The source capsules (primary containment) are wipe tested for leakage of radioactive contamination upon initial manufacture and every six months thereafter prior to transfer and/or shipment. The removable contamination must be less than 0.005 microcuries. The source capsules will also be subjected to leak tests under ISO9978:1992(E) (or more recent editions). The source capsules are not transported in the Model 360 Series packages if they fail any of these tests.

8.1.5 Component and Material Tests

Component and material compliance is achieved in accordance with the requirements in QSA Global, Inc.'s USNRC approved Quality Assurance Program No. 0040.

8.1.6 Shielding Tests

The radiation levels at the surface of the Model 360 Series transport packages and at 1 meter from the surface of these packages are evaluated prior to first transport. This survey, performed in a low background area involves a slow scan survey of the entire package external surface area as well as one meter from the surface of the container. This survey is used to identify any significant void volumes or shield porosity which could prevent the finished package from complying with the dose limits in 10 CFR 71.47.

This radiation profile is performed at the time of manufacture of the Model 360 Series containers. For 360 style package designs that have multiple loading positions (e.g., 360-2, 360-4 and 360-4W) radiation profiles will be performed for sources loaded in both the bottom and the top loading positions to fully characterize the package shielding effectiveness.

Radiation profile surveys are made with the radiation detector housing in contact with the surface of the container and then also at one meter from the surface of the container. The maximum radiation levels, when extrapolated to the rated capacity of the transport package, cannot exceed 200 mR/hr at the surface, nor 10 mR/hr at 1 meter from the surface of the transport package.

Failure of the radiation profile tests for any Model 360 Series container will cause the rejection of the affected Model 360 Series package as a Type B container. Rejected packages, which do not comply with the construction requirements on the applicable drawings referenced on the Type B certificate, or that do not comply with the radiation profile requirements will not be distributed as approved Type B(U) packages.

8.1.7 Thermal Tests

Not applicable. The source content of the Model 360 Series packages will not adversely affect the package surface temperature, and therefore no additional testing is necessary to evaluate thermal properties of the packaging.

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8.1.8 Miscellaneous Tests

Not applicable.

8.2 Maintenance Program

8.2.1 Structural and Pressure Tests

Not applicable. Material certification is obtained for Safety Class A components used in the transport package prior to their initial use. Based on the construction of the design, no additional structural testing during the life of the package is necessary if the container shows no signs of defect when prepared for shipment in accordance with the requirements of Section 7 of the SAR. The Model 360 Series packaging systems are not designed to require increased or decreased operating pressures to maintain containment during transport, therefore pressure tests of package components prior to individual shipment is not required.

8.2.2 Leakage Tests

As described in Section 8.1.4, "Leakage Tests," the radioactive source assembly is leak-tested at manufacture. In addition, the sources are leak tested in accordance with that Section at least once every six months thereafter if being transported to ensure that removable contamination is less than 0.005 microcuries.

8.2.3 Component and Material Tests

The transport package components, including re-usable source chain assemblies intended for re-loading by QSA Global, Inc., are inspected for tightness of fasteners, proper seal wires, and general condition prior to each use as described in Section 7 of this SAR. No additional component or material testing is required prior to shipment.

8.2.4 Thermal Tests

Not applicable. The source content of the Model 360 Series packages has no adverse affect on the package surface temperature and therefore no additional testing is necessary to evaluate thermal properties of the packaging prior to shipment.

8.2.5 Miscellaneous Tests

Inspections and tests designed for secondary users of this transport package under the general license provisions of 10 CFR 71.17(b) are provided in Section 7.

8.3 Appendix

Not applicable.

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Section 9 – Quality Assurance

9.1 U.S. Quality Assurance Program Requirements

Almost all component fabrication (including assembly) is controlled under the QSA Global, Inc. Quality Assurance Plan approved by the USNRC (approval number 0040) and ISO 9001. Since these packages are designed to transport source assemblies manufactured by QSA Global, Inc. as well as source assemblies manufactured by other source providers (e.g. the source wire chain assemblies), the manufacture of source assemblies by other source providers would be in compliance with those competitors Quality Assurance programs. QSA Global, Inc. makes no changes/repairs to competitors source assemblies other than installing our own source capsules into a their manufactured source assemblies.

9.2 Canada Quality Assurance Program Requirements

Not applicable. This package is originally submitted for certification in the United States and complies with the criteria in Section 9.1.

9.3 Appendix

Not applicable.