NRC FORM 618
(8-2000)
10 CFR 71

U.S. NUCLEAR REGULATORY COMMISSION

CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES

1. a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. DOCKET NUMBER	d. PACKAGE IDENTIFICATION NUMBER	PAGE	PAGES
9314	10	71-9314	USA/9314/B(U)-96	1 OF	4

2. PREAMBLE

a. This certificate is issued to certify that the package (packaging and contents) described in Item 5 below meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."

b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into 0077hich the package will be transported.

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

a. ISSUED TO *(Name and Address)*

QSA Global, Inc.
40 North Avenue
Burlington, MA 01803

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

QSA Global, Inc., application dated March 26, 2018, as supplemented.

4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

5.

(a) Packaging

(1) Model No.: 976 Series

(2) Description

The Model No. 976 Series transport packages include three versions called the 976A, 976C, and 976F, all designed for Type B quantities of radioactive material in special form. All versions of the Model No. 976 package include an inner shield container and a stainless steel drum with cork liner inserts to position and support the individual shield containers within the package. The drum is a 20 gallon capacity drum, with a 19 3/4" (502 mm) diameter and a height of 21 1/4" (540 mm), with 16 gauge, 0.06" (1.5 mm) thick 304 series stainless steel walls. The drum lid is secured in place with a lid closure band, and four 3/8" - 16 x 3/4" (19 mm) long 304 series stainless steel lid closure bolts. The lid bolts are inserted through four 3/8" (9.5 mm) diameter holes spaced equidistantly around the drum diameter. The drum lid has four 304 series stainless steel blocks measuring 1" (25.4 mm) by 1" (25.4 mm) by 3/4" (19 mm) tall; the steel blocks are welded on all four sides to the underside of the drum lid and the block welds are on the full length of the block on each side. Alternatively, the drum lid can be constructed to replace the welded, threaded blocks with floating nuts retained in square tubes that are welded to the lid. The cork liner inserts provide shield stability during transport and act as a thermal insulator in case of fire.

The Model 855 inner shield container for the Model No. 976A package is comprised of a depleted uranium shield, secured within a steel welded housing, capable of loading up to eight individual sources with titanium "J" tubes. Locking assemblies secure the sources at the bottom of the "J" tubes.

The Model 855 is approximately 11 1/4" (286 mm) in diameter at the base by 11 3/4" (298 mm) tall, without the eyebolt height. Copper separators are installed around all exposed surfaces of

5.(a)(2) Description (Continued)

the depleted uranium to prevent any steel-uranium interactions inside the shield container. The shield is further retained in place by polyurethane foam to fill the voids between the shield and the inner surfaces of the Model 855 housing. The cover is bolted to the top of the shield container during shipment. The Model 855 shield weighs a maximum of 225 lbs (102 kg) and contains a maximum of 135 lbs (61 kg) of depleted uranium.

The Model 3056 inner shield container for the Model No. 976C package is a lead shield pot measuring approximately 7.7" (196 mm) in diameter (including the handle bosses) with a height of 10.4" (264 mm). The Model 3056 inner shield container includes a depleted uranium inner core shield to provide additional shielding in close proximity to the source positions during transport. An insert contains the "J" tubes which are closed by tube caps. The Model 3056 container includes a cover to protect the source tubes and caps during shipment, stainless steel strapping, handle bosses, lifting handles and weighs a maximum of 114 lbs (52kg).

The Model 1911 inner shield container for the Model No. 976F package is a lead shield pot with a maximum thickness of 2 1/4" (57 mm), encased by a welded steel cylinder, 8" (203 mm) in diameter, 8 3/4" (222 mm) high and a maximum weight of 184 lbs (84 kg). The shield lid is secured to the shield container body by four stainless steel bolts and washers. The Model 1911 container is designed to be lifted by a steel eyebolt which is threaded onto a recess in the shield lid. The eyebolt is removed after loading the Model 1911 into the Model No. 976 F package cork lined drum and during transportation. There are three inner shield insert configurations to allow for different source loading applications within the Model 1911 shield container: a depleted uranium upper and lower shield insert, a tungsten upper and lower shield insert or a lead upper and lower shield insert. Additional handling source stainless steel, aluminum or tungsten capsule holders or cans may be used in the shield insert cavities.

The maximum package weights of the Model No. 976 Series Transport Packages are indicated below:

Model No.	Maximum Package Weight
976A	300 lbs (136 kg)
976C	190 lbs (86 kg)
976F	263 lbs (119 kg)

(3) Drawings

The Model No. 976 Series transport package is constructed in accordance with the following AEA Technology or QSA Global, Inc. drawings:

R97600, Rev. E, sheets 1–4	Model No. 976 Transport Package
R97608, Rev. K, sheet 1	20 Gallon Drum Model 976

(3) Drawings (Continued)

RCLM009, Rev. C, sheet 1	Clamp Band
R85590, Rev. K, sheets 1-6	Model 855 Source Changer
R3056, Rev. H, sheets 1-4	Model 3056 Shield Container Top Level Assy
RCLM011, Rev B	Clamp Band
R1911, Rev. H, sheets 1-6	Model 1911 Shield

The Model Nos. 976A, 976C and 976F drum and cork inserts, and the Model 1911 inner shield container, are authorized for fabrication.

5.(b) Contents

(1) Type and form of material

Iridium-192, Selenium-75, and Ytterbium-169 as special form sealed sources.

(2) Maximum quantity of material per package

Model No.	Inner Shield	Nuclide	Maximum Capacity[1] Ci	Maximum content weight (grams)
976A	855	Ir-192	1,000 (37 TBq)	176
		Se-75	1,000 (37 TBq)	
		Yb-169	865 (32 TBq)	
976C	3056	Ir-192	1,250 (46.25 TBq)	220
		Se-75	1,250 (46.25 TBq)	
		Yb-169	1,000 (37 TBq)	
976F	1911	Ir-192	1,000 (37 TBq)	220
		Se-75	1,000 (37 TBq)	
		Yb-169	1,000 (37 TBq)	

[1] For Ir-192, the maximum capacity is based on output curies which are determined by measuring the source output at 1 meter and expressing its activity in curies derived from the following: 0.48 R/h-Ci Iridium-192 at 1 meter.
For Se-75 and Yb-169, the maximum capacity is based on the content curies contained in the radioactive source(s).

6. In addition to the requirements of Subpart G of 10 CFR Part 71:

   (a) The package shall be prepared for shipment and operated with the sources secured in the shielded positions of the package, in accordance with Chapter 7 of the application, as supplemented.

   (b) The package must meet the Acceptance Tests and Maintenance Program of Chapter 8 of the application, as supplemented.

   (c) No new fabrication of the Model Nos. 855 and 3056 inner shield containers is authorized. Replacement components are provided as part of service and maintenance for existing units. Service operations for the Model No. 3056 shield container are limited to non-welded components.

   (d) Minimum values for the tensile and yield strengths of construction materials are indicated in Table 2.2.a of the application.

7. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR §71.17.

8. Revision No. 9 of this certificate may be used until July 31, 2019.

9. Expiration date: July 31, 2024.

REFERENCES

QSA Global, Inc., applications dated: March 26, 2018 and August 8, 2018.

Supplements dated: September 24, 2018, September 25, 2018, and November 7, 2018.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

/RA/

Ilka Berrios, Chief (Acting)
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

Date: 3/14/19