71-9148

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24 April 2007

Ms. Jessica Glenny, Project Engineer
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U.S. Nuclear Regulatory Commission
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Rockville, MD 20852

Docket No.: 71-9148 & TAC No. L24020

Subject: Additional Supportive Information for the Model 770 Type B Container

Dear Ms. Glenny:

In response to your telephone message, enclosed please find copies of Sections 7 and 8 of the 770 SAR Rev 7 which should have been included in our 14 Mar 07 submission response letter. Should you need any further information, please contact me at (781) 505-8241.

Sincerely,

Lori Podolak
Product Licensing Specialist
Regulatory/QA Department

Enclosures: Section 7 & 8 of Model 770 SAR Rev 7

NMSS01

Section 7 – Package Operations

Operation of the Model 770 and 770B transport packages must be in accordance with the operating instructions supplied with the transport package, per 10 CFR 71.87 and 71.89. References to IAEA conform to the Type B(U)-96 criteria for packaging in accordance IAEA Regulations for the Safe Transport of Radioactive Material 1996 Edition (Revised) No. TS-R-1 (ST-1, Revised).

(Reference:
- *USNRC, 10 CFR 71.87 and 71.89*
- *IAEA TS-R-1, paragraph 501(a), 502(e) and 503)*

7.1 Package Loading

7.1.1 Preparation for Loading

The Model 770 and 770B packages must be loaded and closed in accordance with the following written procedures. Shipment of Type B quantities of radioactive material are authorized for sources specified in Section 7.1.1.1. Maintenance and inspection of the Model 770 or 770B packaging is in accordance with the requirements specified in Section 7.1.1.2.

7.1.1.1 Authorized Package Contents

(Reference:
- *USNRC, 10 CFR 71.87(a)*
- *IAEA TS-R-1, paragraph 502(f))*

Table 7.1a: Model 770 and 770B Package Information

Identification	Nuclide	Form	Maximum Capacity[1]	Maximum DU Weight	Maximum Package Weight
770	Ir-192	Special Form[2] Sources	1,000 Ci	425 lbs (191 kg)	1,025 lbs (465 kg)
	Co-60		800 Ci		
	Sc-46		800 Ci		
	Cs-137		1,000 Ci		
770B	Ir-192	Special Form[2] Sources	1,000 Ci	425 lbs (191 kg)	1,025 lbs (465 kg)
	Co-60		660 Ci		
	Sc-46		660 Ci		
	Cs-137		1,000 Ci		

[1] Maximum 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 the USDOT published in the Federal Register on 26 January 2004.

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

7.1.1.2 Packaging Maintenance and Inspection Prior to Loading

7.1.1.2.a Ensure all markings are legible and labels are securely fastened to the container.

7.1.1.2.b Inspect the container for signs of significant degradation. Ensure all welds are intact, the container is free of heavy rust and cracks/damage to the steel housing which breaches the container.

7.1.1.2.c Ensure all bolts securing the lock assembly to the container are present. Assure safety wires are present and intact as noted on the drawings referenced in the Type B certificate.

7.1.1.2.d Assure the locking assemblies actuate freely when performing an operational test and that the plunger lock engages and is functional. Assure the shipping caps install and secure onto the lock assemblies. (Remove the shipping caps from the lock assembly prior to container loading.)

7.1.1.2.e Assure threaded holes used to secure the cover plates to the container body do not have damaged threads and engage the 1/2-13 x 1 inch long cover plate bolts. (For each source tube side of the container, remove the cover plate bolts and cover from the container prior to loading that side of the container.)

7.1.1.2.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.

7.1.2 Loading of Contents

NOTE: ***These loading operations apply to "dry" loading only. The Model 770 and 770B packages are NOT approved for wet loading.***

7.1.2.1 Prior to transportation, ensure the package and its contents meet the following requirements:

7.1.2.1.a The contents are authorized for use in the package.

7.1.2.1.b The package condition has been inspected in accordance with Section 7.1.1.2.

7.1.2.1.c Ensure that the source(s) are secured into place in the storage position(s) in accordance with the following requirements. Compliance with the following requirements ensures that the source(s) are securely locked in position before shipment.

1. Removal and installation of radioactive material contained within the shield container 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 wire mounted sources. 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. Remove the cover plate by removing the eight 5/16-18 hex head screws. Remove the source holddown cap. If using remote controls to transfer the source into the source changer, connect a guide tube from the cobalt device to the Model 770 or 770B source changer lock assembly.

3. Using remote handling techniques, load the source assembly so that it is fully inserted into the source tube with the inactive end of the source assembly protruding from the lock assembly of the container. Once loaded, engage the lock and remove the key. If used for the source transfer, remove the guide tube from the Model 770 or 770B and disconnect the source wire from the drive cable. Install the shipping cap over the source on the lock assembly. Repeat this step for the second source tube if transporting more than one source in the container.

7.1.2.1.d Ensure the cover plate is secured over both sides of the container using the eight 1/2-13 x 1 inch long cover plate bolts. Install a seal wire between two of the eight cover plate bolts on any side of the container which was loaded with a radioactive source assembly (see drawings referenced on the Type B certificate).

7.1.3 Preparation for Transport

(Reference:
- *10 CFR 71.87*
- *IAEA TS-R-1, applicable paragraphs of Section V)*

7.1.3.1 Ensure that all conditions of the certificate of compliance are met.

7.1.3.2 Perform a contamination wipe of the outside surface of the package and ensure removable contamination does not exceed the limit specified in 49 CFR 173.443.

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 If shipping more that one radionuclide in the package (e.g., two sources, different nuclides) then ensure that the sum of the fractional source activities meets the requirements of 49 CFR 173.433(d).

7.1.3.5 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:
(Reference:
- *IAEA TS-R-1, paragraph 510 and 511)*

7.2.1.2.a Survey the transport package in accordance with the requirements of 10 CFR 20.1906.

7.2.1.2.b Record the actual radiation levels on the receiving report.

7.2.1.2.c If the radiation levels exceed the limits in 10 CFR 71.47, secure the container in a Restricted Area and notify the appropriate personnel in accordance with 10 CFR 20.1906(d)(2) or applicable Agreement State regulations.

7.2.1.2.d Inspect the 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, 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.

7.2.1.2.e Visually inspect the Model 770 or 770B to assure that the seal wire has not been tampered with.

7.2.1.2.f 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

7.2.2.1 Unload the package must be in accordance with the instructions supplied with the package per 10 CFR 71.89.

7.2.2.2 Unloading of the package must also be in accordance with applicable licensing provisions for the user's facility related to radioactive material handling.

7.3 Preparation of Empty Package for Transport

(Reference:

- *IAEA TS-R-1, paragraph 520)*

In the following instructions, an *empty* transport package refers to a Model 770 or 770B transport package without an active source contained within the shielded container. To ship an empty transport package:

7.3.1. Perform the following procedure to confirm that there are no unauthorized sources within the container:

7.3.1.1. Remove the authorized source assembly from the package be in accordance with the instructions supplied with the package per 10 CFR 71.89.

7.3.1.2. After removing the source insert the depth gauge attached to the container into the empty tube(s) of the package. Read the gauge at the top of the outlet fitting.

7.3.1.3. The gauge should bottom out in the empty source tube(s) and indicate a safe condition. The red line should be flush with the top of the outlet fitting. Verify that each empty tube indicates a safe condition.

7.3.1.4. If the gauge indicates an unsafe condition (redline is above the outlet fitting) they may be an obstruction in the tube. Remove the gauge slowly while observing the survey meter. If the radiation levels increase as the gauge is being removed keep the gauge within the source tube, secure the container and contact QSA Global Inc. for further instructions. If radiation levels remain normal as the gauge is being removed, completely remove the gauge, secure the container and contact QSA Global Inc. for further instructions..

7.3.2 Assure that the levels of removable radioactive contamination on the outside surface of the transport package does not exceed the limit specified in 49 CFR 173.443.

7.3.3 When it is confirmed that the packages are empty, prepare the transport package for shipment. Survey the assembled package to ensure the external surface radiation level does not exceed 5 μSv/h.

7.3.4 Ship the container according to the procedure for transporting radioactive material as established in 49 CFR 171-178.

7.4 Other Operations

7.4.1 Package Transportation By Consignor

(Reference:

- *IAEA TS-R-1, paragraph 508, 512 through 514)*

Persons transporting the Model 770 or 770B transport packages in their own conveyances should comply with the following:

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 μSv/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

(Reference:

- *IAEA TS-R-1, paragraph 308 and 309)*

In the event of a transport emergency or accident involving this package, follow the guidance contained in "2004 Emergency Response Guidebook: A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/Hazardous Materials Incident", or equivalent guidance documentation.

Reference: "2004 Emergency Response Guidebook: A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/Hazardous Materials Incident"

7.5 Appendix

Not Applicable.

Section 8 - ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

8.1 Acceptance Test

8.1.1 Visual Inspections and Measurements

8.1.1.1 Visually inspect each transport package component to be shipped to assure the following:

8.1.1.1.a The transport package was assembled properly to the applicable drawing referenced on the Type B certificate.

8.1.1.1.b All fasteners as required by the applicable drawing referenced on the Type B certificate are properly installed and secured.

8.1.1.1.c 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.

8.1.1.2 Evaluate each package for shielding to ensure the transport dose rate requirements are met when the container is loaded to capacity.

8.1.1.3 Visual inspections and measurements will be performed in accordance with QSA Global Inc.'s USNRC approved Quality Assurance Program No. 0040.

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

(Reference:

- *10 CFR 71.85(a) and (b))*
- *IAEA TS-R-1, paragraph 501(a))*

Prior to first use as part of a Model 770 or 770B 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. For sources transported in this container and manufactured by QSA Global, QSA Global will perform source assembly integrity inspections to ensure that the source capsule is securely attached to the flexible steel wire prior to transport in these containers.

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.

8.1.4 Leakage Tests

The source capsules (primary containment) are wipe tested for leakage of radioactive contamination upon initial manufacture. 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 used if they fail any of these tests.

8.1.5 Component and Material Tests

The lock assembly of the package is tested to assure that the security of the source will be maintained. Failure of this test will prevent use of the package until the failure is corrected and the package re-tested. 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 transport package and at 1 meter from the surface are evaluated prior to first transport based on a physical radiation profile with Co-60 using approved sources. These radiation levels, when extrapolated to the rated capacity of the transport package, must not exceed 200 mR/hr at the surface, nor 10 mR/hr at 1 meter from the surface of the transport package. Since the shielding effectiveness for all other radionuclides and content capacities authorized in these packages is greater than the shielding effectiveness for the Co-60 rated capacity, results of the radiation profile using Co-60 is sufficient to demonstrate the shielding effectiveness for all other radionuclide capacities transported in these packages. Failure of this radiation profile test will prevent use of the transport package as a Type B(U) package.

8.1.7 Thermal Tests

Not applicable. The source content of the Model 770 and 770B packages has minimal effect on the package surface temperature and therefore no additional testing is necessary to evaluate thermal properties of the packaging.

8.1.8 Miscellaneous Tests

Not applicable.

8.2 Maintenance Program

8.2.1 Structural and Pressure Tests

Not applicable. Material certification, or equivalent dedication process, 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 770 and 770B 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. Also a contamination wipe is performed of the shield source tubes whenever the shield is returned to the manufacturer (typically the shield is shipped to a customer with new sources and may be returned directly to the manufacturer with decayed sources for disposition).

8.2.3 Component and Material Tests

The transport package is 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 these packages has minimal effect 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.