

71-9027



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20 February 2006

Mr. Stewart Brown, Senior Project Manager
Licensing Section
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

Docket No.: 71-9027
TAC Nos. L23922, L23895 and L23896

Subject: Response to RAI for the Model 741-OP Type B Container

Dear Mr. Brown:

In response to your letter dated 28 December 2005, we provide the following response.

2-1 As requested, drawing R741-OP has been revised to provide more descriptive information on the materials or specifications for the polyurethane foam, steel and wood used in this package.

Regarding the polyurethane foam, we have clarified this item as a "rigid" polyurethane foam. This two-part liquid, expanding rigid urethane foam is a closed cell, pourable foam that is extremely hard and rigid once cured, like that of a soft wood. QSA Global Inc. (and its predecessors) have used this material in our packages for decades for shock absorption. Controlling the material density of the end product polyurethane foam has proven to be more than adequate to ensure consistency and reproducibility of the packaging construction and strength. Other Type B packages using the same (or similar) polyurethane foams include USA/9296/B(U)-96, USA/9269/B(U)-96, USA/9148/B(U)-85 and USA/9283/B(U)-85.

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- 2-2 As requested, drawing R741-OP has been revised to provide the weight of the steel transport box without the 741-OP projector. This is shown on drawing R741-OP, sheet 1 in Note 6. The weight of the transport box is given as a range of 68-75 lbs.
- 2-3 The welding on the shell and the cleats for the 741 projector have been determined as not critical to safety for the following reasons:

Shell: The 741 projector shell is protected and retained within recesses in the side frames. Should a weld failure occur, without simultaneous removal of the side frames, the shell shape would remain essentially unchanged and held in place by the side frames.

As was demonstrated in the hypothetical accident testing for this package, though some bending of one side plate was induced in the testing, damage to the inner 741 projector was insufficient to remove a side plate. It is argued that for a shell weld failure to adversely impact the safety of the package, the following would also have to occur:

- The 741 projector would have to be released from the transport box and
- Both side frames would have to be sheared from the 741 projector (shear through eight 7/16-20 x 1" long steel bolts).

Even were these conditions met, the critical factor for the package integrity in this situation would not be the shell weld, but would be the exposed polyurethane foam surrounding the shield. In a thermal test, any crack or gap in the shell weld would be insignificant to the effect caused by the absence of the side frames as it relates to shield oxidation. Therefore the shell weld is not considered critical to the safety of this package.

Cleats: The shell cleats are used to secure the threaded rods which locate and orient the shield support structure prior to the addition of the rigid, polyurethane foam within the 741 shield projector cavity. After application of the polyurethane foam, the shield support structure is essentially a solid mass contained between the shell and side frames.

The shell incorporates eight welded cleats which secure four tie rods between two sides of the shell. A single weld cleat failure would be insufficient to allow movement of the shield within the rigid polyurethane foam relative to the shell. In the case where all eight welded cleats failed, the shield would still remain in place by the combined structure of the support materials captured within the polyurethane foam. This solid mass is further retained in place by the outer shield shell and the side frames. Failure of multiple weld cleats would be insufficient to allow movement of the shield such that a change in source position could result. Therefore the cleat welds are not considered critical to the safety of this package.

- 2-4 The welding for the projector (as shown on drawing R74190) of this package has been evaluated as not safety critical to the package. This has been described for specific welds on the 741 projector in response to Item 2-3 in this letter.

Other welding for the 741 projector, not described specifically in Item 2-3 of this letter, has also been evaluated as not important to the safety of the package. Physical testing to normal and hypothetical accident conditions of transport has demonstrated that so long as the projector is contained within the transport box prior to impact on the 30 ft drop test, any subsequent testing is insufficient to cause failure of the projector outside the regulatory limits.

The welding on the transport box is necessary such that the box is capable of holding the internal wood in place around the inner projector during transport. The wood surrounding the projector acts as a shock absorber under impact conditions. As was seen in the testing described Section 2.7 of the SAR, so long as the package is intact at impact, the wood will provide the necessary shock absorption to ensure the package will comply with the normal and hypothetical accident test conditions.

The most damaging impact is imparted in the 30 ft drop test. In this case, the fall of the package through 30 ft will not cause weld failure on the projector. Should the welds fail on the overpack box after impact and the 741 projector is tested to the subsequent puncture and thermal conditions, it will still meet the regulatory requirements for a Type B container.

Based on the above assessment, we have not included the requested welding note to drawing R74190. The welding of components used in the projector is determined to be not important to the safe transport of the package as configured and tested.

The welding on the transport box has been clarified on drawing R741-OP to indicate that welding adheres to AWS (or equivalent) standards. Historically the welding was performed by an outside vendor and inspected by QSA Global Inc. (previously AEA Technology QSA, Inc.) AWS certified weld inspectors. As of 21 November 2005, all welding performed on the overpack box was directly performed to adhere to AWS standards.

For routine transport of the package, physical inspections prior to shipment, as required by Sections 7 & 8 of the SAR will identify any package damage which may develop during use which could affect the welds and will initiate repair or replacement of the transport box if necessary. Based on use of this package by ourselves and customers over the last five years, we are not aware of any weld failures of the transport box. The transport box welding has demonstrated adequate for routine, normal transport of the package without failures.

2-5 As requested, drawing R741-OP has been revised to show the wooden bottom support for this package. As shown on sheet 5 of this drawing, the bottom wood support dimensions exceed the dimensions of the 741 projector and will act to support and distribute the projector weight to the steel box bottom plate. Also this main method for movement of this container is the same as described in Section 2.4.1 of the SAR. In the last five years of use of this container by ourselves and customers, the steel box bottom plate has demonstrated its ability to support the weight of the 741 projector without failure.

Should you have any additional questions or wish to discuss this submission, please contact me as shown below.

Sincerely,



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Enclosure: Drawing R741-OP Rev C

 RA/QA Approval	<u>21 Feb 06</u> Date
 Engineering Approval	<u>21 Feb 06</u> Date

Security-Related Information Figure Withheld Under 10 CFR 2.390

		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">APPROVALS</th> <th style="width: 50%;">DATE</th> </tr> <tr> <td style="text-align: center;"><i>[Signature]</i></td> <td style="text-align: center;">2-17-08</td> </tr> <tr> <td style="text-align: center;"><i>[Signature]</i></td> <td style="text-align: center;">21 Feb 06</td> </tr> </table>	APPROVALS	DATE	<i>[Signature]</i>	2-17-08	<i>[Signature]</i>	21 Feb 06	 40 NORTH AVE, BURLINGTON, MA 01803	DESCRIPTIVE DRAWING
APPROVALS	DATE									
<i>[Signature]</i>	2-17-08									
<i>[Signature]</i>	21 Feb 06									
ERF #	1273	<small>UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES: FRACTIONS ± 1/8 XX ± 0.12 XXX ± 0.08 XXXX ± 0.020</small>	TITLE MODEL 741 -OP							
			SIZE DWG. NO. R741-OP	REV						
			A SCALE: NONE SHEET 1 OF 7	C						

Security-Related Information Figure Withheld Under 10 CFR 2.390

UNLESS OTHERWISE SPECIFIED: ALL DIM.S ARE INCHES, TOL \pm 1/8			
SIZE	DWG. NO.	R741-OP	REV
A	SCALE: NONE	SHEET 2 OF 7	C

FIGURE WITHHELD UNDER 10 CFR 2.390

UNLESS OTHERWISE SPECIFIED: ALL DIM.S ARE INCHES, TOL \pm 1/8			
SIZE	DWG. NO.	R741-0P	REV
A	SCALE:	NONE	SHEET 3 OF 7
			C

FIGURE WITHHELD UNDER 10 CFR 2.390

UNLESS OTHERWISE SPECIFIED: ALL DIM.S ARE INCHES, TOL \pm 1/8			
SIZE	DWG. NO.	R741-0P	REV
A	SCALE:	NONE	SHEET 4 OF 7
			C

Security-Related Information Figure Withheld Under 10 CFR 2.390

		APPROVALS	DATE	 QSA GLOBAL	DESCRIPTIVE DRAWING
				40 NORTH AVE, BURLINGTON, MA 01803	
		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES: FRACTIONS ± 1/8 XX ± 0.12 XXX ± 0.06 XXX ± 0.020		TITLE MODEL 741-OP	
ERF #	1273	SIZE	DWG. NO.	R741-OP	REV
		A	SCALE: NONE	SHEET 5 OF 7	C

FIGURE WITHHELD UNDER 10 CFR 2.390

UNLESS OTHERWISE SPECIFIED: ALL DIM.S ARE INCHES, TOL \pm 1/8			
SIZE	DWG. NO.	R741-OP	REV
A	SCALE:	NONE	C
		SHEET 6	OF 7

FIGURE WITHHELD UNDER 10 CFR 2.390

UNLESS OTHERWISE SPECIFIED: ALL DIM.S ARE INCHES, TOL \pm 1/4			
SIZE	DWG. NO.	R741-OP	REV
A	SCALE:	NONE	C
		SHEET 7	OF 7