

71-9035



QSA Global, Inc.
40 North Avenue
Burlington, MA 01803
Telephone: (781) 272-2000
Toll Free: (800) 815-1383
Facsimile: (781) 359-9191

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.: 71-9035
TAC Nos. L23921 and L23897

Subject: Response to RAI for the Model 680-OP Type B Container

Dear Mr. Brown:

In response to your letter dated 23 December 2005, we provide the following response.

2-1 As requested, drawing R680-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.

NMSS01

- 2-2 As requested, drawing R680-OP has been revised to provide the weight of the steel transport box without the 680-OP projector. This is shown on drawing R680-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 680 projector have been determined as not critical to safety for the following reasons:

Shell: The 680 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 680 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 680 projector would have to be released from the transport box and
- Both side frames would have to be sheared from the 680 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 680 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 R68090) of this package has been evaluated as not safety critical to the package. This has been described for specific welds on the 680 projector in response to Item 2-3 in this letter.

Other welding for the 680 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 680 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 R68090. 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 R680-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 R680-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 680 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 680 projector without failure.

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


Sincerely,



Lori Podolak
Product Licensing Specialist
Regulatory Affairs Department
Ph: (781) 272-2000 ext 241
Fax: (781) 359-9191
Email: Lori.Podolak@qsa-global.com


RA/QA Approval


21 Feb 06
Date


Engineering Approval

21 Feb 06
Date

Enclosure: Drawing R680-OP Rev E

Security-Related Information Figure Withheld Under 10 CFR 2.390

| | | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">APPROVALS</th> <th style="width: 50%;">DATE</th> </tr> </thead> <tbody> <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 08</td> </tr> </tbody> </table> | | APPROVALS | DATE | <i>[Signature]</i> | 2-17-08 | <i>[Signature]</i> | 21 Feb 08 |  <p>40 NORTH AVE, BURLINGTON, MA 01803</p> | | DESCRIPTIVE DRAWING | |
|--------------------|-------------|---|-------------------------|--------------------------------------|------------------------|--------------------|---------|--------------------|-----------|---|--|--------------------------------|--|
| APPROVALS | DATE | | | | | | | | | | | | |
| <i>[Signature]</i> | 2-17-08 | | | | | | | | | | | | |
| <i>[Signature]</i> | 21 Feb 08 | | | | | | | | | | | | |
| | | <small>UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES:</small> <small>FRACTIONS ± 1/8 X.X ± 0.12 X.XX ± 0.08 X.XXX ± 0.020</small> | | TITLE MODEL 680 -OP | | | | | | | | | |
| ERF # | 1273 | SIZE A | DWG. NO. R680-OP | | REV E | | | | | | | | |
| | | SCALE: NONE | | SHEET 1 OF 7 | | | | | | | | | |

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. | R680-0P | REV |
| A | SCALE: NONE | SHEET 2 OF 7 | E |

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. | R680-OP | REV |
| A | SCALE: | NONE | E |
| | | SHEET 3 | OF 7 |

FIGURE WITHHELD UNDER 10 CFR 2.390

| | | | |
|--|-------------|--------------|-----|
| UNLESS OTHERWISE SPECIFIED: ALL DIM.S ARE INCHES, TOL. \pm 1/8 | | | |
| SIZE | DWG. NO. | R680-0P | REV |
| A | SCALE: NONE | SHEET 4 OF 7 | E |

Security-Related Information Figure Withheld Under 10 CFR 2.390

| | |
|-------|------|
| ERF # | 1273 |
|-------|------|


| APPROVALS | DATE |  DESCRIPTIVE DRAWING | |
|---|------|---|-------------------------|
| | | 40 NORTH AVE, BURLINGTON, MA 01803 | |
| <small>UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES: FRACTIONS ± 1/8 X.X ± 0.12 X.XX ± 0.08 X.XXX ± 0.020</small> | | TITLE MODEL 680-OP | |
| | | SIZE A | DWG. NO. R680-OP |
| | | SCALE: NONE | SHEET 5 OF 7 |
| | | REV E | |

FIGURE WITHHELD UNDER 10 CFR 2.390

| | | | |
|---|----------|----------|------|
| UNLESS OTHERWISE SPECIFIED: ALL DIM.S ARE INCHES, TOL \pm 1/8 | | | |
| SIZE | DWG. NO. | R 741-OP | REV |
| A | SCALE: | NONE | E |
| | | 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. | R680-0P | REV |
| A | SCALE: | NONE | E |
| | | SHEET 7 | OF 7 |